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WOMEN'S JOBS AND MARRIAGE—
*BABY-BOOM VERSUS BABY-BUST**

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ABSTRACT

Studies of the determinants of labor supply do not typically include characteristics of the marriage market. What inspired this paper is Shoshana Grossbard-Shechtman's economic theory of marriage which considers how marriage market forces influence individual value of time in marriage. From pioneering work by Louis Henry and others, we know that changes in cohort size influence marriage market conditions. Consequently, it is hypothesized that changes in cohort size influence the value of time of women in marriage. Given that most women are married or plan to marry, this analysis implies that women born at times of increases in the number of births will be more likely to participate in the labor force. This hypothesis was using U.S. time series data on women's labor force participation and a number of other variables known to have an impact on labor supply. It is found that rapid increases in women's labor force participation coincided with rapid growth of the population entering marriage markets and therefore the creation of marriage market imbalances favoring men. Such rapid growth in population characterized not only the post World War II so-called baby-boom, but also an earlier period of growth in births starting in the late 1930s. As for the slow growth in women's labor force participation observed in recent years, it has coincided with the coming of age of successive generations of shrinking size born during the baby-bust.

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Introduction

Women ‘s rate of labor force participation (LFP) has been increasing for most of the last 100 years, from 18.9% in 1890 to 57.5% in 1990.[1] Since 1990, women’s labor force participation (LFP) has been increasing very slowly. In 1991, the overall LFP rate for women of all ages actually decreased for the first time since World War II, a small decline of .2% in comparison to 1990. The upward trend characterizing most of the post-war period resumed at a slow pace in 1992. In 1994, the LFP rate was standing at 58.8%. A breakdown by age group offers a somewhat different picture.

The decrease in women’s labor force participation which occurred in 1991 was more pronounced amongst younger age groups: for women between the ages of 20 and 24 that rate declined by 1.2%. Between 1993 and 1994 the LFP rate of women age 20-24 decreased by .2% while it increased by .9% for all women 16 years and older. In recent years, increases in LFP have been larger for women over 40 than for women in their twenties, whereas the opposite was the case twenty years ago, a time of rapid increases in overall LFP.

Are these divergences between the labor force behavior of younger and older women significant? If so, what are their causes? Are these divergences persistent? Do they indicate age effects, period effects or cohort effects? If they are cohort effects, what causes differences across birth cohorts? The goal of this paper is to explain past trends in the labor force participation of women in different age groups. While we recognize that the LFP of women can be influenced by a variety of economic and demographic factors, our paper differs from previous papers on the topic in its emphasis on cohort effects and in its explanation for such cohort effects based on an economic theory of marriage markets. Marriage market analysis leads to the hypothesis that women born during periods of rapid growth in births—as was the case at the beginning of the baby-boom—tend to experience marriage squeezes and are therefore more likely to enter the labor force than women born in other periods. The opposite is true for women born during periods of declining fertility. When grown up, women born at the beginning of a baby-bust enter marriage markets which are imbalanced to their advantage, a factor which will reduce their propensity to enter the labor force. This baby-boom hypothesis is tested with pooled time-series analysis, our data consisting of changes over five-year periods observed for five different age groups. Our analysis supports the marriage squeeze hypothesis. Even though the empirical analysis presented in this paper ends with 1990,

our findings suggest that further slowdowns in the rate of increase in women's labor force participation are to be expected in the future.

Were There Cohort Effects on Women's LFP From 1965 to 1990?

During the period of our study, 1965 to 1990, rates of LFP for women increased dramatically. For instance, the rate of LFP for women ages 25 to 29 almost doubled from 38.9% in 1965 to 73.8% in 1990. LFP rates and changes in LFP rates over five-year periods are presented in Table 1 for 5 age groups and 6 points in time. Table 1, and Figures 1 and 2 based on that table, help us disentangle age, period, and cohort effects for recent trends in women's participation in the labor force. When looking at the numbers and the graphs, it helps to keep in mind that age, year, and cohort are related as follows: $t = a + c$, where t is year, a is age, and c is cohort.

Figure 1 plots trends in participation rates for the years 1965-1990 separately for five-year age groups between the ages of 20 and 44. It appears from this graph that period effects were operating: female labor force participation (LFP) rates increased throughout the entire period for all age groups (with one recent exception: no change in LFP for women ages 20-24 between 1985 and 1990), with the rate of change decreasing over time. The slowdown is most noticeable for the youngest age group. The only exception are women ages 40-44, for whom LFP increased at a constant or increasing rate .

Age also matters at any given time and for any given birth cohort. Figure 2 shows the effect of age on women's LFP for each birth cohort. Life-cycle profiles—capturing a cycle from age 20 up to age 44, using five-year age categories—are shown for five-year birth cohorts. It can be seen that an earlier tendency for women to drop out of the labor force when they had young children was replaced by a rate of participation continuously increasing with age.

The simplest way to look at overall cohort effects is to look at Figure 2. Figure 2 indicates that with the exception of the youngest cohort, later cohorts have exhibited higher levels of participation than earlier cohorts throughout their life-cycle. It can be seen that the most dramatic growth in LFP occurred for women ages 25 to 34 when the cohort born in the years 1941-1945 is compared with the cohort born in the years 1946-1950. LFP rates then grew by more than 12% over five years. The rate of labor force participation for women age 30-34 grew from 51.9% in 1975 to 64.1% in 1980 (see Table 1). Such double-digit increase in LFP within five years is extraordinary. The only other double-digit change in the period we study was experience by women of the same birth cohort, when they were ages 25 to 29 five years earlier.

There thus appears to be something unique about the labor force participation of women born right after World War II, in the years 1946 to 1950 (see also Grossbard-Shechtman 1982, 1985, Heer and Grossbard-Shechtman 1981). In this paper we compare first baby-boom women (born from 1946 to 1950) with the cohorts preceding them (pre-baby-boomers), with later baby-boomers born in the years 1951 to 1960, and with post-baby-boomers born after 1960. We define a baby-boom as a period of increasing births. The

total number of births grew in the U.S. during the period 1946-1960, the most rapid growth occurring at the beginning of the baby-boom. By 1960, the number of births stopped growing. By 1961 a rapid fall in the number of births had set in.[2]

The unique experience of first baby-boom women can also be highlighted by an examination of Figure 1. While Figure 1 is framed in terms of age and year of observation, it can be used to show changes in LFP across birth cohorts. Let us focus on first baby-boom women born in the years 1946-1950. These women were aged 20-24 in 1970, 25-29 in 1975, and 40-44 in 1990. The dark line indicates that in a particular age group (let us say 20-24) there was a replacement of women born in 1941-45 by women born in 1946-1950, i.e. a pre-baby-boom birth cohort was replaced by first baby-boomers. It can be seen that every time the first baby-boomers entered into an age category (i.e. every dark line), this was a time of rapid increase in that age group's LFP. The slope of the dark line (the change in LFP over a five-year period) is steeper than the slope of the other lines corresponding to the same age group at different times. This indicates more rapid change in LFP when comparing the last pre-baby-boom cohort with the first baby-boomers than when comparing other cohorts at the same age. The slope of the dark line is also steeper than the slope of other lines corresponding to the same point in time, reflecting the unusually large changes in women's LFP associated with the entry of first baby-boom women into an age group.

Figures 1 and 2 also reveal that the post-baby-boom cohorts born in the years 1961 to 1970 experienced particularly small increases in women's LFP. Simple looks at the data organized by age group, period, and birth cohort thus suggest the presence of possibly important cohort effects. The first baby-boomers, the generation of women born at the beginning of the baby-boom, seem to have experienced faster increases in labor force participation than earlier or later generations. The post baby-boomers seem to have experienced slower increases in women's LFP than earlier generations.

Previous studies, while not emphasizing cohort effects on women's LFP, give us some valuable clues regarding the possible existence of cohort effects. For instance, Ciuriak and Sims (1980) analyzed time series of fertility and LFP of women ages 20-34 in the U.S. and Canada for the period 1950-1980, and found that until 1970 fertility and female LFP tended to move in opposite directions. However, in the period 1970-1980 they found that the rate of fertility decline decelerated without concurrent deceleration in the rate of increase in women's LFP. These findings could well indicate that the first baby-boomers, who entered these age groups at that time, behaved in significantly different ways in comparison to previous cohorts.

Next, we explore why there would have been cohort effects on women's labor force participation. The following section also assesses other variables which may be causally related to women's labor force participation (LFP).

Theoretical Considerations

A number of explanations have been offered for past trends in women's LFP. Economic theory has put particular emphasis on *wage and income effects.* Changes in wages involve both an income effect and a substitution effect. Their effect on the LFP of women depends on whose wage is changing: men's or women's. Consider the effect of a recession. The recent drop in women's labor force participation which occurred in 1990-1991 has been attributed to the recession which started around 1990 (Harper 1992, U.S. Department of Labor 1992). A recession is expected to lead to reduced female labor supply to the extent that it lowers women's wages and employment opportunities, a *substitution effect* (leisure being substituted for work). Women's own wages can also influence LFP due to an income effect, which is expected to be negative. Previous research on time-series in women's labor force participation have indicated that women's wages have been positively associated with their labor force participation (Smith and Ward 1984, Goldin 1990), which indicates that the substitution effect dominates the income effect of own wages.

At the same time, a recession causes men's wages to go down and their unemployment level to rise, which is also an income effect and may induce women to increase their labor supply, the so-called *added worker effect* (Mincer 1962). Previous time-series analyses have indicated that married women's labor force participation is negatively related to men's earnings (Smith and Ward 1984). In the past, the income effects associated with recessions seem to have dominated the substitution effect of women's own wages and employment opportunities: recessions in the period 1965-1989 were not accompanied by interruptions in the growth of the female labor force in the U.S. It is possible that the recession of the 1990s differs from previous recessions in terms of either the degree to which men's and women's wages were affected or the size of these substitution and income effects. Wage effects would explain why the last recession discouraged women from entering the labor force—in contrast to previous recessions—if women's real wages decreased more than men's or if the substitution effect increased relatively to the own income effect and the added worker effect. Possible flaws with this explanation are suggested by the fact that women's wages have been reported to increase relatively to men's wages and that such explanation seems unlikely to account for the slowdown in the growth of women's LFP, which started as early as 1987 among certain age groups.

A potential problem in analyzing wage effects on LFP is that of direction of causality. Wages are established when supply and demand interact. If exogenous supply increases cause women's LFP to change, one expects periods of lower female wages to be associated with higher LFP rates for women. Also, the causality from men's wages to

women' LFP may not hold. Instead, men's wages may be negatively affected by women's labor force participation, to the extent that wives contribute to their husbands' success at work. This is one possible explanation for the considerable marriage premium observed in studies of men's wages (see Grossbard-Shechtman 1993, ch 12). If wives employed in the labor force don't contribute as much to their husband's earnings as do wives who don't work outside the home, women's LFP may have a negative impact on men's wages.

Education is another factor that is known to affect women's LFP. Previous studies have found that the rise in women's labor force participation was associated with increased levels of education (Smith and Ward 1984, Goldin 1990). Increased rates of school enrollments for women ages 20-24 could possibly explain the slowdown in LFP observed for that age group in the period 1985 to 1990, a period with a 4.2 increase in the percent of women in school full-time. However, LFP of women in this age group increased at a decreasing rate consistently throughout the period 1975-1990, whereas full-time school enrollments fluctuated in their rate of growth: after a fast increase between 1975 and 1980, a standstill occurred between 1980 and 1985, followed by another fast increase between 1985 and 1990. Also, changes in school enrollments are unlikely to explain the trends described above for older age groups.

The previous literature has also noticed that demographic variables affect labor force participation. The effect of *age* is well-known and was discussed earlier. An explanation that has often been given for variations in women's LFP is that there is a discouraging effect of *fertility* on women's LFP. Previous fluctuations in the growth of women's LFP over time have been attributed in part to changes in fertility (e.g. Smith and Ward 1984, Goldin 1990). The small decline in women's LFP observed from 1990 to 1991 has also been related to increases in fertility (U.S. Department of Labor 1992). However, birth rates started to increase a few years prior to the recent drop in women's LFP. For instance, the birth rate for women 30 to 34 years old has been increasing since 1975, when it stood at 52.3 per 1,000 women. By 1989, women in this age group averaged a birth rate of 76.2 per 1,000 women (National Center for Health Statistics 1991). During the same period, the LFP for women in this category went up from 51.9% in 1975 to 73.1% in 1989. Similarly, fertility rates started a clear upward trend for women 25 to 29 in 1977, for women 35 to 39 in 1979, and for women 40 to 44 in 1984. In all these cases, increases in birth rates and labor force participation occurred *simultaneously*. A theoretical perspective alerts us to the fact that the relationship between fertility and women's labor force participation can originate in three ways: fertility may affect labor supply, labor supply may affect fertility, and the two may be related spuriously due to the effect of other variables (see Lehrer and Nerlove 1986).

The demographic variable at the center of this paper is the *cohort* to which a woman belongs. There are at least three possible reasons why the labor force participation of women born into different cohorts may differ: Easterlin's relative income hypothesis, Grossbard-Shechtman's marriage squeeze hypothesis and cultural explanations.

According to Easterlin (1980), individuals in cohorts with high relative income, i.e. income which is high relatively to parental income when these individuals were growing up, will want more children and women in these cohorts will be less likely to participate in the labor force. In Easterlin's theory, lower LFP of women follows not only from the higher fertility but also from the relatively high income of husbands. The baby-boomers experienced low relative income (Easterlin 1980, Welch 1979) and therefore women born during the baby-boom are more likely to work than women belonging to other cohorts. Vice-versa, women born in a baby-bust are expected to have more children and to marry husbands with higher relative incomes, which would lead to lower labor force participation. It is important to notice that according to Easterlin, cohort size influences women's labor force participation via fertility and incomes. Were cohort effects to be found after controls for income and fertility have been included, they could not been easily explained by Easterlin's relative income hypothesis.

A second reason why we expect cohort effects on women's LFP is that various cohorts experience different *marriage market* conditions and that marriage market conditions influence women's decision to participate in the labor force (see Grossbard-Shechtman 1982, 1985, 1993, Heer and Grossbard-Shechtman 1981). As has been pointed out by demographers (e.g. Glick, Beresford and Heer 1963, Henry 1975), changes in cohort size eventually lead to marriage market imbalances. A marriage market imbalance involving an oversupply of women has been called a marriage squeeze for women. Changes in cohort size cause marriage squeezes due to a tendency for marriages to occur between men and women separated by a positive age differential. On average, U.S. husbands are two years older than their wives. Therefore, in comparison to women born during periods of stagnant or declining fertility, women born at the onset of a period of rapid population growth will participate in marriage markets with a relatively small number of slightly older men. In contrast, men born at the start of a period of rapid population growth will participate in marriage markets with a relatively large number of slightly younger women (relatively to men born during periods of stagnant or declining fertility). This implies that first baby-boom women, born at the beginning of the baby-boom, experienced a marriage squeeze.[3]

A marriage-related explanation for cohort effects on women's labor supply follows from Grossbard-Shechtman's (1976, 1984, 1993) theory of marriage and labor markets, which connects labor supply and marriage decisions. According to this theory, women are viewed as making a choice between participation in the labor force, self-satisfying leisure and work at home for the benefit of a spouse, defined as *spousal labor* (see Grossbard-Shechtman, 1993). Women often get paid for their spousal labor. For instance, in many instances where the wife works more hours in the home than the husband and the husband earns more than the wife there is an exchange of wife's spousal labor for a material compensation by the husband, the quasi-wage for spousal labor.[4] Women who have the option of being employed in spousal labor decide to participate in the labor force to the extent that work outside the home is more attractive than spousal labor. The higher the compensation for spousal labor, the less it is likely that women will look for

jobs in the labor force. Marriage market conditions which affect compensations for spousal labor will affect the LFP of single women (preparing themselves towards careers in industry and marriage), married women who will possibly get back into the marriage market and previously married women reentering the marriage market.[5] Cross-city comparisons based on U.S. data indicate that women are less likely to participate in the labor force in cities with better marriage market conditions for women (see Grossbard-Shechtman 1993, Ch. 6 and Grossbard-Shechtman and Neideffer 1995).

Women born at the onset of a period of rapid population growth experience a marriage squeeze and are therefore likely to receive a lower compensation for their spousal labor than women in more favorable marriage markets. The lower compensation for spousal labor implies a lower reservation wage and a higher rate of LFP characterizing women born at the onset of a baby-boom in comparison to the LFP of women born during periods of stable or declining births. Grossbard-Shechtman's marriage squeeze hypothesis applied to women's LFP is thus that

Women born during a baby-boom are more likely to participate in the labor force than women born at other times. Conversely, women born during a baby-bust are less likely to participate in the labor force than women born at other times.

This marriage squeeze hypothesis holds for all women, regardless of marital status, and for married women in particular. In the specific context of the post-World-War-II baby-boom, it follows from this theory that women born at the onset of the baby-boom will be more likely to participate in the labor force than women born earlier or later. The slowest growth in participation is expected among women born at the onset of the baby-bust following the baby-boom.

Both Easterlin's theory and Grossbard-Shechtman's theory lead us to expect baby-boom women to participate in the labor force more than baby-bust women. Easterlin's explanation can possibly be differentiated from Grossbard-Shechtman's explanation if cohort effects remain after controls for fertility and income are introduced. Women suffering from a marriage squeeze are likely to work more, whether these women are married to wealthy husbands or to poor husbands. According to Grossbard-Shechtman, husbands and wives do not automatically share their incomes, and the share of the husband's income from which the wife benefits, part of her quasi-wage for spousal labor, is likely to be smaller if there is a marriage squeeze for women. Also, women suffering from a marriage squeeze are likely to work more, whether they have children or not. In fact, cohort effects on the LFP of mothers of young children are expected to be stronger than cohort effects on the LFP of other groups of married women. This follows from the often observed preference mothers of young children reveal for staying home, a luxury they may not be able to afford without access to their husband's income. Also, if it is found that baby-bust women's slower increases in LFP can not be accounted for by changes in wages or fertility, it is likely that the remaining cohort effect is due to increases in women's value in markets for spousal labor.

A third explanation for cohort effects on women's LFP is of a cultural nature. Cohort effects may be the result of unique historical events experienced by a cohort at a crucial stage in their personal development. For instance, the cohort of people who were of college age during the Vietnam war may have been uniquely influenced by this experience, causing ripple effects at every stage in the life-cycle.

We are now ready to present a model of women's labor supply which includes the above-mentioned variables.

Model

Individual women (or men) decide on participation in the labor force based on comparison between their value of time outside the labor force, and the wage they can obtain in the labor force. A rational woman will participate in the labor force if

$$w_f > w^* \qquad (1)$$

where w_f is the woman's wage and w^* is her value of time outside the labor force, her reservation wage. The reservation wage is a function of the compensation a woman may potentially or actually receive for her spousal labor. In either case, that compensation is unobserved. The compensation for spousal labor is a function of marriage market conditions and of circumstances particular to an individual woman and—if she is married—her husband. In turn, marriage market conditions vary with cohort. Marriage squeezes for women, such as those experienced by first baby-boomers, are expected to lower women's reservation wage. In contrast, marriage squeezes for men, such as those experienced by baby-busters, are expected to raise women's reservation wage.

Men's income is expected to influence women's reservation wage through at least two channels: a positive effect on aggregate marriage market conditions and therefore women's compensation for spousal labor, and a possibly negative effect on the relative bargaining power of wives versus husbands in marriage. Furthermore, one expects women's compensations for spousal labor and reservation wages to be positively associated with men's income not necessarily due to a causation starting with men's income, but due to assortative mating between men with more qualities, including higher income, and women with more qualities and therefore higher reservation wages. It is expected that a positive association between men's income and women's reservation wage dominates.

The reservation wage is also positively associated with number of children and presence of school-age of children. Here too, causality is not one-sided. Women receiving higher compensations for spousal labor may have more children and children may raise the compensation for spousal labor. We write the reservation wage equation as

$$w^* = \beta_o + \beta_{w_m} w_m + \beta_F F + \beta_{BB} BB + \varphi X + \varepsilon, \qquad \textbf{(2)}$$

where w_m is male wages, *F* is fertility, *BB* is cohort (first baby-boom, pre-baby-boom or post-baby-boom), and X is a vector of other variables influencing w^*.[6] It is predicted that β_{w_m} and β_f are positive and that β_{BB} is negative.

Let *d* be a dummy equal to 1 if a woman works. If the woman is a rational decision-maker it is expected that *d* = 1 if $w_f > w^*$. The likelihood that the woman participates in the labor force can be written as the following function

$$P(d=1) = \phi[\gamma_o + \gamma_{w_f} w_f + \gamma_{w_m} w_m + \gamma_F F + \gamma_{BB} BB + \theta Y] \qquad \textbf{(3)}$$

where *Y* are other variables influencing a woman's participation the labor force and where $\phi(\,)$ is a probability density function such as the logistic function.. Women with higher wages are more likely to be in a situation where $w_f > w^*$, and therefore more likely to work.[7] This implies a positive γ_{wf}. Women with a higher reservation wage are less likely to work, and therefore it is predicted that γ_{w_m} and γ_F are negative and that γ_{BB} is positive. Next, labor force participation function *P* is defined at time *t* and formulated as a Taylor series expansion:

$$P_t(Z_t) = b_0 + b_1 Z_t + b_2 Z_t^2 + b_3 Z_t^3, \qquad \textbf{(4)}$$

where *Z* is a vector of explanatory variables including w_f, w_m, etc. Provided that the *Z*'s don't take extreme values, the first two terms of the Taylor series are an adequate approximation. We then replace *Z* with the explanatory variables mentioned above and use logarithms of the continuous variables wages and fertility. We also add a trend factor *T*, and obtain

$$P_t = c_0 + c_1 \log w_{ft} + c_2 \log w_{mt} + c_3 \log F_t + c_4 BB + c_5 Y_t + c_6 T + c_7 T^2 + e_t \qquad \textbf{(5)}$$

We then differentiate equation 5 by time in order to reduce the effect of some of the unmeasured factors which enter into the calculation of residual correlations. This leads to the following equation defined for women of age *i*

$$\frac{\partial P_{ti}}{\partial t} = \tau_0 + \tau_1 \frac{\dot{w}_{fti}}{w_{fti}} + \tau_2 \frac{\dot{w}_{mti}}{w_{mti}} + \tau_3 \frac{\dot{F}_{ti}}{F_{ti}} + \tau_4 \frac{\dot{Y}_{ti}}{Y_{ti}} + \tau_5 \frac{\partial BB}{\partial \tau} + \tau_6 T + u_{t} \qquad (6)$$

where $\frac{\dot{w}_f}{w_f}$ etc. are rates of growth. The baby-boom variables are changes in cohort composition.

A possible problem is that a number of variables on the right-hand side are not truly exogenous to women's labor force participation decision. For instance, wages are endogenous to labor supply, and a spurious relationship could exist between women's labor force participation and fertility (see the previous section). To deal with these endogeneity problems we will also estimate reduced forms of Equation 6. Also, in order to highlight the possible importance of cohort effects, we will estimate equations without cohort dummies *BB*.

Empirical Tests

Data and Methods. Tests were performed using pooled time-series for five-year periods from 1965 to 1990 for the following five age groups: 20-24, 25-29, 30-34, 35-39, and 40-44.[8] We approximate $\frac{\partial P_t}{\partial t}$ in equation 6 by $P_t - P_{t-5}$, i.e., the difference in participation over a five-year period. Change in cohort composition amounts to $BB_t - BB_{t-5}$, i.e. the replacement of an age group by members of a new five-year cohort. For instance, first baby-boomers born between 1946 and 1950 replacing the cohort born in 1941-1945

The values of the dependent variable, change in women's labor force participation, are listed in Table 1. The dependent variable is change in overall labor force participation rate, regardless of marital status and race[9]. In our estimations we will add a third income variable, the rate of growth in GNP (Gross National Product). Faster growth in GNP is likely to cause faster growth in women's labor force to the extent that it captures a measure of job creation on the demand side of the labor market. Alternatively, faster growth in women's LFP may cause faster growth in GNP, as more labor resources are devoted to measured production. The additional GNP includes the value of products generated by the additional workforce. We will introduce some lagged variables to help us disentangle these possible causalities.

The models we tested present all the economic variables, real female wage, real male wage, and real GNP, on the right-hand side. Some of the models also include fertility measures. The variables are defined in Table 2. A time trend variable, which controls for period-varying factors other than the ones we included (factors such as Affirmative Action policies), was included in most of the models we estimated. Most models we report also include lagged participation (women's LFP at time *t*-5) and lagged GNP (at time *t*-5). The dependent variable is always defined as a change over time and all right-hand-side continuous variables are rates of growth.

Findings. Tables 3 and 4 report a number of the regressions we estimated. The OLS regressions in Table 3 estimate the model presented in equation 6, with the addition of two lagged variables and interpreting *Y* as GNP. Most coefficients have the signs as predicted. Most importantly for the purpose of this paper, first baby-boom women were found to be significantly more likely to participate in the labor force than other cohorts.

This effect of birth cohort is independent of fertility effects and income effects, which indicates that Easterlin's theory does not explain this cohort effect. It is very possible that this cohort effect indicates a marriage market effect, a theoretical perspective found in Grossbard-Shechtman (1993).

The finding of first-baby-boom effects independent of wage, income, and fertility effects is robust to different specifications reported in Tables 3 and 4 (Note that regression 3 in Table 3 does not include lagged participation and the *t*-tests may not be valid). Regression 1 in Table 4, which omits all baby-boom dummies explains considerably less of the variations in women's LFP over time than comparable regressions in Table 4. Cohort effects appear sensitive to the inclusion of the clearly significant fertility variables, as is apparent from a comparison of Tables 3 and 4. In particular, regressions 2 and 3 in Table 4 which do not include controls for fertility, indicate that pre-baby-boomers were also significantly more likely to participate in the LF than women born in later years of the baby boom. This may reflect the rise in cohort size which started by 1941 a little baby-boom at a much slower pace than the large baby-boom starting in 1946. This pre-baby-boom effect disappears when controls for fertility are introduced. As apparent from Table 3 the net-of-fertility LFP of later baby-boomers is higher than the net-of-fertility LFP of pre-baby-boomers. The latter were not as likely to enter the labor force while having children, especially young children. When fertility variables are included, the time trend loses its significance.

Regression 3 in Table 3 indicates that post-baby-boom women are less likely to participate in the labor force than later baby-boomers. This finding also confirms the marriage market analysis of Grossbard-Shechtman. The coefficient of post-baby-boom is large relatively to its standard error, but that regression does not include lagged participation and therefore *t*-tests may not be valid (Ramanathan 1992, Chapter 9). It has to be remembered that only 3 observations out of 25 belonged to this post-baby-boom cohort.

The regressions which indicate significant coefficients of male and female wage show signs which are consistent with traditional interpretations of male and female wage effects on women's LFP. The GNP and lagged GNP coefficients are always significant: higher concurrent growth is positively associated with larger increases in women's LFP, most likely because more income is recorded when more women are working. Faster growth in GNP seems to cause slower increases in women's LFP five years later, consistent with the negative income effect on LFP familiar to labor economists.

Conclusion

This paper offers a novel explanation for changes in women's labor force participation over time. Large increases in women' LFP in the 1970s and recent decreases in LFP of younger women are explained in terms of a marriage squeeze hypothesis. Results from pooled time series data indicate that women born at a time of rapid population growth experienced faster growth in LFP than other women.

We found that women born during the first five years of the baby-boom are more likely to increase their participation in the labor force than women born either later or earlier, the contrast being larger with women born later than with women born earlier. This is consistent with our story according to which first baby-boom women, being part of a cohort significantly larger than the preceding cohorts, have encountered unfavorable marriage market conditions. In turn, limited opportunities within marriage—irrespectively of actual marital status—have pushed women into the labor force.

Previous analyses using similar pooled cross-section time-series data on women's labor force participation have not mentioned the impact of changes in cohort size. In part, this is a result of the way they defined their observations. For instance, Smith and Ward (1984) constructed their data as changes in value from one cohort to the next. Goldin's (1990) data were defined for cohorts at a given time. This made it difficult to notice the effect of birth cohorts. In contrast, our data, which consist of changes over time, enable us to estimate cohort effects.

First baby-boom women have higher LFP rates, controlling for income and own fertility behavior. Therefore, Easterlin's theory, which explains the LFP of baby-boom women in terms of family income and fertility, can not account for our findings. Our findings reinforce the case for including marriage and divorce opportunities when studying labor supply.

Our findings have important implications for predicting future trends in women's LFP. We found that women born at the onset of the baby-boom have experienced faster increases in labor force participation than any other cohorts covered in our study. This first baby-boom effect continues to be felt. For instance, between 1992 and 1993 the LFP rate decreased by .1 for women between the ages of 35 and 44 and increased by .7 for women 45 to 49, the age group now becoming increasingly composed of first-baby-boomers. We can predict further increases in labor force participation for the first baby-boomers, corresponding to later ages as the years go by.

We also found that baby-bust women are less likely to participate in the labor force, although this finding was less robust to various specifications. It is possible that as more baby-bust women are entering labor markets and marriage markets, and we have more observation points, we will identify significant slowdowns in the growth of women's labor force participation. It is even possible that declines in women's LFP, such as the one observed between 1990 and 1991, will become more common. The marriage squeeze hypothesis also leads us to predict that by the time women born in the late seventies—a period of echo of the baby-boom—will be old enough to work and marry, the United States may experience another period of rapid increases in women's labor force participation.

Notes

1. The rate for 1890 is for all women 15 years or older (U.S. Census Office 1895). The rate for 1990 is for all women 16 years or older [34]. An exception to this continuous rise occurred during the years immediately following World War II.
2. Similarly, the tendency for women to drop out of the labor force when children are born has been decreasing in France and Canada [6] [23] [31].
3. For instance, Table 5 in [6] indicates the most rapid changes in labor force participation for French women in the period 1968-75 among mothers in age groups 25 to 34, which indicates the effect of a replacement of women belonging to birth cohorts 1934 to 1943 with women belonging to birth cohorts 1941 to 1950. This includes the entry of women born right after WW II. Also,
2. It is not clear why it is conventionally accepted today that the baby boom lasted until 1964.
3. The age differential between men and women is likely to respond to marriage squeezes (see Bergstrom and Lam 1989) and to vary with other factors, such as the existence of polygamy (Grossbard-Shechtman 1993). However, the average age differential never seems to change signs.
4. Spousal labor can be supplied by both men and women. Given that in most cases the wife engages in more spousal labor than the husband, a payment in money or in kind is more likely to go from the husband to the wife than vice-versa. In earlier work, spousal labor was called wife-services (Grossbard 1976) and household labor (Grossbard-Shechtman 1984). Peters' (1986) wage in marriage is similar to Grossbard-Shechtman's quasi-wage for spousal labor .
5. Bargaining theories which consider choices (Blood and Wolfe 1960, McElroy and Horney 1981, McCrate 1992) between marriage and LFP don't apply to single women. They typically assume that a marriage exists and don't explain the decision to enter marriage.
6. Other variables that are associated with women's compensation for spousal labor and their value of time include the age difference between husband and wife (see Grossbard-Shechtman and Neuman, 1988), and ethnicity of both wife and husband (see Grossbard-Shechtman, 1993, ch 8).
7. To capture a possible own income effect discouraging individuals from working, we may want to consider marginal (dis)utilities from work and spousal labor. Accordingly, a full specification of inequality would be w_f + *NPB* (work) > w^* + *NPB* (spousal labor), where *NPB* stands for non-pecuniary benefits, which could possibly be negative (see Grossbard Shechtman, 1984, 1993). To the extent that higher income raises the NPB of spousal labor relatively to the NPB of work, women earning higher wages may work less.
8. For a discussion of models that combine time series and cross-sectional data, see Chapter 8 in Judge et.al. (1985).

9. Race seems to play a minor role in explaining changes in women's labor force participation over time (Smith and Ward 1985, Goldin 1990). Most variation in women's LFP over time occurs among married women.

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FIGURE 1. Women's Labor Force Participation Rates by Calendar Year and Five-year Age Groups

Note The transition from the last pre-baby-boom cohort to the first baby-boom cohort is emphasized.

FIGURE 2. Women's Labor Force Participation Rates by Age,
Five-year Cohorts Born Between 1936 and 1970

TABLE 1. Changes in Female Labor Force Participation Rates
Over 5-year Periods by Age and Cohort, U.S. 1970-1990

	20-24	**25-29**	**30-34**	**35-39**	**40-44**
1970	7.8 (2)	6.3 (1)	6.5 (1)	5.6 (1)	4.3 (1)
1975	6.4 (3)	12.1 (2)	7.2 (1)	5.8 (1)	3.9 (1)
1980	4.8 (3)	9.4 (3)	12.2 (2)	9.9 (1)	9.4 (1)
1985	2.9 (4)	4.7 (3)	6.2 (3)	6.8 (2)	5.8 (1)
1990	-.2 (4)	2.4 (4)	3.1 (3)	3.8 (3)	5.7 (2)

Notes: (1) Cohort entering this age group is pre-baby-boom
(2) Cohort entering this age group is first baby-boom cohort
(3) Cohort entering this age group is a 2nd or 3rd baby-boom cohort
(4) Cohort intering this age group is post-baby-boom