Women's Jobs and Marriage: Baby-Boom versus Baby-Bust

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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

In the U.S. 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. 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 1990 and 1995 the LFP rate of women age 20-24 decreased by 1.3% while it increased for women in all other age groups. 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? 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 analysis 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 marriage squeeze 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 provides some support for the marriage squeeze hypothesis.

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 U.S. 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 (no slowdown was observed for ages 40-44).

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.[2]

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 experienced 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 [12][13][19]). It also appears that cohorts of women born immediately after World War II experienced faster growth in LFP in Canada [5][23] and France [6][31][3]. 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 the baby-boom as starting in 1946, as is conventionally defined. In fact, in the U.S. the number of births started to increase in 1940. The period 1946-1950, the beginning of the baby-boom, saw a rapid growth in births. Between 1957 and 1961 the number of births remained at a plateau. By 1961 a rapid fall in the number of births had set in.[4]

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, the 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 1941-45 birth cohort with the first baby-boom women 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 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 cohorts born in the 1960's seem to have experienced slower increases in women's LFP than earlier generations.

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 .

Explaining Trends in Women's LFP

A number of explanations have been offered for past trends in women's LFP. Economists have put particular emphasis on *wage and income effects*. Changes in wages involve both an income effect and a substitution effect. A *substitution effect* occurs as wages influence value of time and the more costly time is, the less people will engage in time-consuming leisure activities. A change in wage also includes in *income effect*. At higher income levels, people prefer more leisure and less work. The effect of wages 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 [18][34]. A recession is expected to lead to reduced female labor supply to the extent that it lowers women's wages and employment opportunities, and there is a substitution effect. Women's own wages can also influence LFP due to an income effect. From this perspective, lower wages are expected to cause higher employment levels. 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 [10][27][31][22], 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 in theory also involves an income effect on women's LFP. It may induce women to increase their labor supply, the so-called *added worker effect* [26]. Previous time-series analyses have indicated that married women's labor force participation is negatively related to men's earnings [27][32]. 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 exogeneous 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 [15]. 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 [10][21][27][32]. 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. Even if one could document that women's education and LFP are varying simultaneously in the same direction this would not necessarily indicate a causal relationship. Women expecting to participate more in the LF are more likely to invest in their own education.

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. in [6][8][10][27][32]. The recent decline in women's LFP observed in the U.S. has also been related to increases in fertility [34]. 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 [28]. 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 [6]).

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 [7], 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 [7][35] 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 [12][14][15][19]. As has been pointed out by demographers (e.g. [9][20]), 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.[5]

A marriage-related explanation for cohort effects on women's labor supply is derived from a theory of marriage and labor markets, which connects labor supply and marriage decisions [11][13][15]. 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* [15]. 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.[6] 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 whose relation with their husband was influenced by marriage market conditions at the time they married and who will possibly get back into the marriage market, and previously married women reentering the marriage market.[7] 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 [15][16].

Due to the fact that on average men marry at older ages than women, 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.

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. This marriage squeeze hypothesis holds for all women, regardless of marital status, and for married women in particular. As most variation in women's LFP occurs among married women with children, any explanation of the LFP of all women is mostly an explanation of the married LFP of mothers. It is precisely when they are in a situation where they may prefer not to be in the LF - such as the period after the birth of a baby - that women may experience the consequences of a marriage squeeze.

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. 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. It follows that married women suffering from a marriage squeeze are expected to work more, whether these women are married to wealthy husbands or to poor husbands. Also, women suffering from a marriage squeeze are likely to work more, whether they have children or not. Marriage squeeze effects on the LFP of mothers of young children are expected to be stronger than marriage squeeze on the LFP of other groups of women (see [15], Chapter 4). Vice-versa, if 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 marriage squeezes for men leading 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. Also, younger age cohorts may have a more modern outlook on life, implying more female LFP, and a cohort effect may coincide with a period effect. Such attitudinal changes are presented as an explanation for cohort effects in Kempeneer's Canadian study [23]. One expects period effects, such as changes in modernity, to grow over time and not to reverse themselves: the younger the cohort, the more modern.

We are now ready to present a model of women's labor supply which we intend to test.

Models and Methods

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 assertive 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

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

where w_m is male wages, F is fertility, BB is a dummy for birth cohort, and X is a vector of other variables influencing w^{*}.[8] It is predicted that β_{w_m} and β_F are positive. The coefficient β_{BB} is expected to be negative if the birth cohort is first baby-boom.

Let p be the likelihood that a woman participates in the labor force. If the woman is a rational decision-maker it is expected that p is higher if $w_f > w^{*}$. Women with higher wages are more likely to be in a situation where $w_f > w^{*}$, and therefore more likely to work.[9] The likelihood of labor force participation (LFP) is also a function of the same variables found on the right-hand side of Equation (2). The effects of these variables on LFP will take the opposite sign of their effect on reservation wage.

We will aggregate our observations by age groups. Consequently, a labor force participation function P is defined for time t and age group i:

$$P_{ti} = c_0 + c_1 \log w_{fti} + c_2 \log w_{mti} + c_3 \log F_{ti} + c_4 BB_{ti} + c_5 Y_{ti} + c_6 t + c_7 t^2 + e_t, \tag{3}$$

where Y is income. The continuous variables wages and fertility are presented in logarithmic form and a trend factor t and its square were added.[10] The time trend controls for period-varying factors other than the ones we included (factors such as Affirmative Action policies). The income variable is GNP defined for the entire population. National income can be related to women's LFP in at least two ways. 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.

We then differentiate equation 3 with respect to 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:

$$\frac{\partial P_{ti}}{\partial t} = \tau_0 + \tau_1 \frac{\dot{w}_{fti}}{w_{fti}} + \tau_2 \frac{\dot{w}_{mti}}{w_{mti}} + \tau_3 \frac{\dot{F}_{ti}}{F_{ti}} + \tau_4 \frac{\dot{Y}_{ti}}{Y_{ti}} + \tau_5 \frac{\partial BB}{\partial t} + \tau_6 t + u_{ti} \tag{4}$$

where $\dot{w}_f / w_f$ etc. are rates of growth. The BB (baby-boom) term captures how an observation defined at time t and age i switches over time from being associated with one birth cohort to being associated with the next birth cohort. Dummy variables will be used to single out switches to particular birth cohorts. We are not using a continuous variable indicating rate of change in cohort size for we expect the relationship between marriage market conditions and rate of change in cohort size to be non-linear. Small fluctuations in this rate may not matter.

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, income is also possibly endogenous, and a spurious relationship could exist between women's labor force participation and fertility. To deal with the endogeneity of fertility we will also estimate reduced forms of Equation 4, which does not include fertility. In order to highlight the possible importance of cohort effects, we will estimate equations without cohort dummies *BB*. Equations including an education variable will also be estimated, even though education and LFP may also be spuriously related. Some of our models also include lagged participation (women's LFP at time *t*-5)

Data.

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.[11] We approximate $\partial P_t / \partial t$ in equation 4 by , the dependent variable, by $P_t - P_{t-5}$, i.e., the difference in women's labor force participation over a five-year period.

The values of the dependent variable, change in women's labor force participation, are listed in Table 1. The variables are defined in Table 2. The dependent variable is change in overall labor force participation rate, regardless of marital status and race[12]. We focus our attention on three cohort switches: the switch from women born in 1941-45 to women born in 1946-50 (FIRST BABY-BOOM), the switch from earlier cohorts to later cohorts born prior to World War II (PRE BABY-BOOM); and the switch from born in late Baby-Boom to born in the sixties or from born in early sixties to born in late sixties (BORN SIXTIES). Our reference cohort switch is the switch from born in early baby-boom to born in later baby-boom. The method of estimation was Ordinary Least Squares (OLS)[13]

Findings.

Tables 3 and 4 report a number of the regressions we estimated. The regressions in Table 3 estimate models which do not include fertility measures. Regression 1 in Table 3, which omits all cohort switch dummies and fertility variables explains considerably less of the variations in women's LFP over time than the other regressions, as apparent from the low R-squared. By adding the three cohort switch dummies to Regression 1 in Table 3 one significantly improves the model's explanatory power, as apparent from the large increase in R-squared. From Regression 2, it appears that first baby-boom women were found to be significantly more likely to participate in the labor force than later baby-boomers (the reference group) and that the switch from early pre-baby-boom to later pre-baby-boom was also associated with higher increases in women's LFP than the switch from early baby-boom to later baby-boom. Given that Regression 2 in Table 3 controls for growth in male and female wages and GNP growth, this indicates cohort effects independent of cohort effects on income in contrast to Easterlin's cohort effects. Initially, we did not expect the positive coefficient of pre-baby-boom. But after we found out that in the U.S. an upward trend in birth started during World War II, we understood why a switch from early pre-baby-boom to later pre-baby-boom would also be associated with a marriage squeeze for women. When lagged GNP is added to the model (Regression 3 in Table 3) the coefficient of first baby-boom switch remains strongly significant and positive, while the coefficient of pre-baby-boom switch decreases significantly.

The regressions in Table 4 indicate that the effect of first baby-boom switch is independent of a cohort effect on fertility. All regressions in Table 4 include two measures of fertility: rate of growth in total fertility and rate of growth in percent of childless women. Switch to first baby-boom cohort is significant and positive in all three specifications. In contrast, switch to pre-baby-boom has insignificant effects on LFP after controls for fertility were introduced. These findings are robust to the different specifications reported in Table 4. This indicates that the cohort effect found for this cohort in Table 3 depended on the lower or later fertility of later pre-baby-boomers. Regression 1 in Table 4 includes all the variables included in the last regression of Table 3 plus the fertility variables.

Since the time trend appeared to have no effect in Regression 1 it was excluded from Regression 2, causing a slight increase in explanatory power as measured by the adjusted R-squared. A comparison of Tables 3 and 4 also indicates that the inclusion of fertility variables causes the lagged participation variable to become insignificant. Regression 3 in Table 4 shows that by dropping lagged participation and pre-baby-boom switch from the regression one does not affect the results.

That the effect of first-baby-boom switch on women's LFP remains significant after controlling for changes in fertility is a further refutation of the Easterlin explanation of cohort effects. It is not simply because of lower income or lower or later fertility that first-baby-boom women have experienced faster increases in LFP than later baby-boom women. These findings strengthen the marriage squeeze hypothesis presented here, which explained cohort effects in terms of marriage market conditions.

The cohort effects we are finding can capture either cohort effects on married women's LFP, or cohort effects on the proportion of women who are married. Given that (a) most unmarried women work at all times (except for the school enrollment of the youngest age group discussed above), and (b) there were no significant increases in the proportion of women married among first baby-boomers, we can conclude that our cohort effect captures effects on women's LFP holding marital status constant. According to one of our interpretations, changes in marriage market conditions affect the terms of individual marriages, reducing the average husband's willingness to be financially responsible for his wife and increasing the average wife's need for financial independence. The finding of a first baby-boom effect on LFP (controlling for changes in income and fertility) is also consistent with the hypothesis that a change in attitudes occurred autonomously, leading first baby-boom women to work more outside the home.

Furthermore, Regression 3 in Table 4 suggests that women born in the sixties are less likely to participate in the labor force than later baby-boomers. However, this finding may not be statistically significant. Even though the coefficient of born in the sixties is large relatively to its standard error, that regression does not include lagged participation and therefore t-tests may not be valid [30]. Were this finding significant, we could conclude that after controlling for wages, income, and fertility women born in the sixties have lower LFP rates than women born in the fifties. This would confirm the marriage squeeze hypothesis offered here. According to this hypothesis women born in the sixties are to benefit from a marriage squeeze for men and are therefore expected to participate less in the LF. In contrast, a cultural explanation based on attitudinal change leads us to predict continuous increases in women's LFP. Such explanation can therefore not account for the possible decrease in the LFP of women born in the sixties.

Many of the regressions indicate significant coefficients of male and female wage show signs which are consistent with most economists' 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. We also estimated models including rate of change in the percent of women going to college as one of the explanatory variables, but such education variable turned out to have insignificant effects on women's LFP.

This study adds to previous analyses using similar pooled cross-section time-series data on women's labor force participation which did not mention the impact of changes in cohort size. In part, this is a result of the way their previous studies defined their observations. For instance, Smith and Ward constructed their data as changes in value from one cohort to the next [32]. Goldin's data were defined for cohorts at a given time [10]. 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.

Conclusion

This paper attempts to explain fluctuations in women's labor force participation (LFP) observed in the U.S. in the period 1965-1990. Results from pooled time series indicate 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 later. This finding appeared in models controlling for wages, income and fertility, and can therefore not be accounted by Easterlin's explanations for such cohort effect. However, our finding is consistent with the marriage squeeze hypothesis based on Grossbard-Shechtman's analysis of marriage markets. According to this hypothesis, 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—may have pushed women into the labor force. This finding is also consistent with a cultural explanation. Attitudes towards work and family may have changed over time, encouraging women's LFP.

Our findings also suggest that women born in the sixties are less likely to participate in the LF. Were this true, it would also be consistent with our marriage squeeze hypothesis, for these young women are facing more favorable marriage market conditions than their predecessors. Here the alternative cultural explanation would not hold. This U.S. finding needs to be confirmed with more data from recent years. Now that more women born in periods of declining fertility have entered labor markets and marriage markets, and we have more observation points, we will be able to establish with more confidence whether there were significant slowdowns in the growth of women's labor force participation. Also, according to the marriage squeeze hypothesis, it follows 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.

We hope that our paper will inspire others to test for cohort effects on women's LFP. If cohort effects are documented for various countries, it will be very interesting to compare the direction and magnitude of such effects across countries. If, as we claim, changes in marriage market conditions indeed account for a substantial part of cohort effects on women's LFP, it could be that such marriage market factors are more influential in some countries than in others. Cross-country variations in such cohort effects would be related to differences in the institutions regulating marriage [15]. One wonders about the extent to which the U.S. experience in this area is relevant to a better understanding of trends in women's LFP in France or other European countries, and vice-versa.

Notes

1. The rate for 1890 is for all women 15 years or older [33]. 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. This experience is common to many Western countries [37] including Canada [5][23] and France [6][21][31].

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. Also Ciuriak and Sims [5] 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.

4. It is conventionally accepted today that the baby boom in the U.S. lasted until 1964. In France the number of births started to decrease in 1973.

5. The age differential between men and women is likely to respond to marriage squeezes (see [3]) and to vary with other factors, such as the existence of polygamy [15]. Men's average age at marriage always exceeds women's, but the differential varies across countries. In the U.S. the average age differential has stood at around two years in the last decades, indicating little response to variations in marriage squeeze.

6. 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 [11] and household labor [13]. Peters' wage in marriage is a similar concept [29].

7. Bargaining theories which consider choices [4][24][25][29] 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.

8. 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 [17], and ethnicity of both wife and husband [15].

9. 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. 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 [13][15].

10. The reason a square term of trend is introduced is so that a trend term remains after differentiating by time.

11. For a discussion of models that combine time series and cross-sectional data, see [22].

12. Race seems to play a minor role in explaining changes in women's labor force participation over time [10][32]. We obtained our data from the U.S. Bureau of Labor Statistics. Data for five-year age groups were not available for married women separately or for Black and White women separately for the extent of the period under study. Most variation in women's LFP over time occurs among married women.

13. Given that the observed LFP rates are neither close to 0 nor close to 1, there would be no benefits to assume a logistic function.

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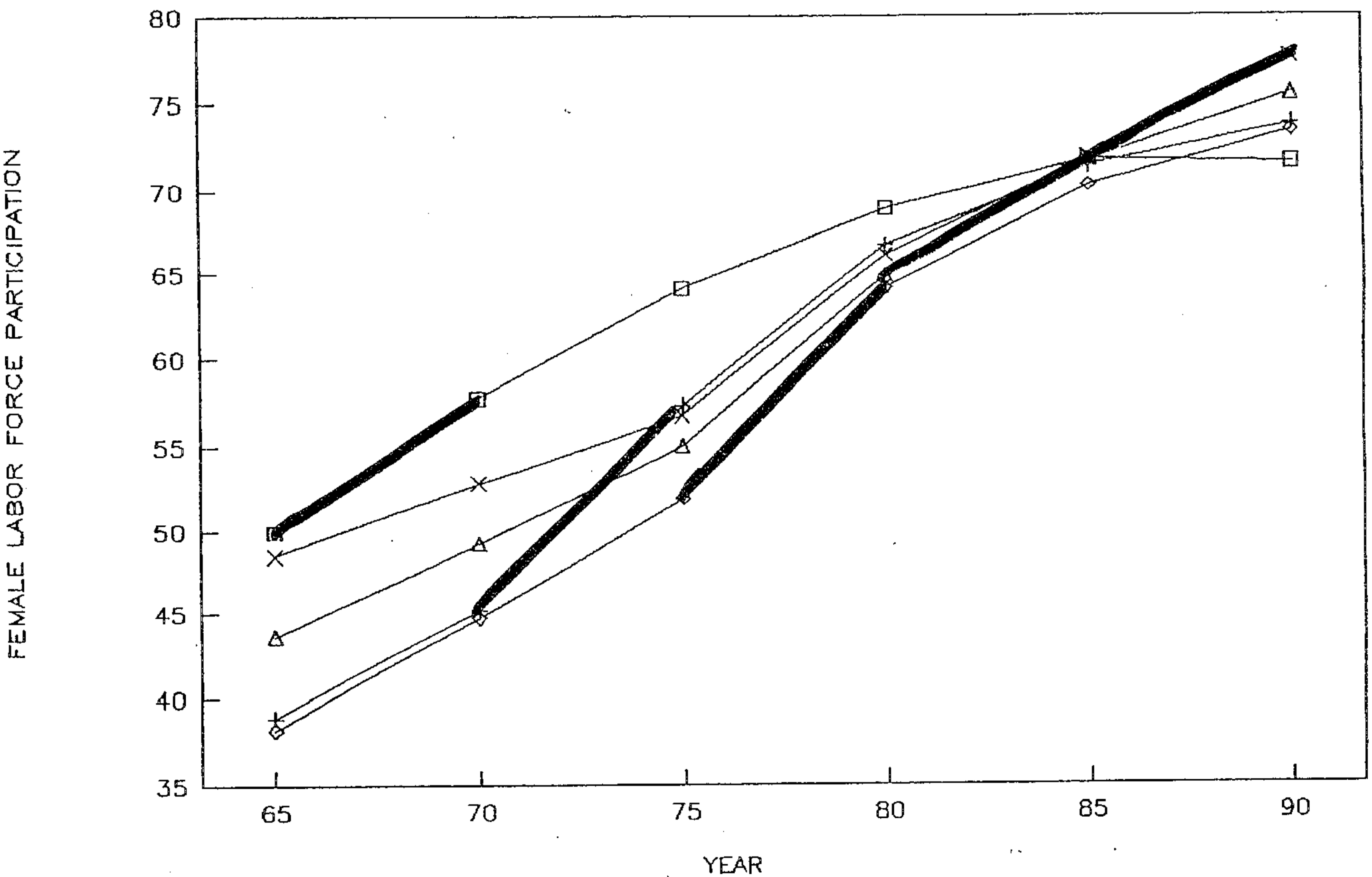
FIGURE 1. Women's Labor Force Participation Rates by Calendar Year and Five-year Age Groups



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

□ AGE GROUP 20–24 + AGE GROUP 25–29 ◇ AGE GROUP 30–34
△ AGE GROUP 35–39 × AGE GROUP 40–44

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

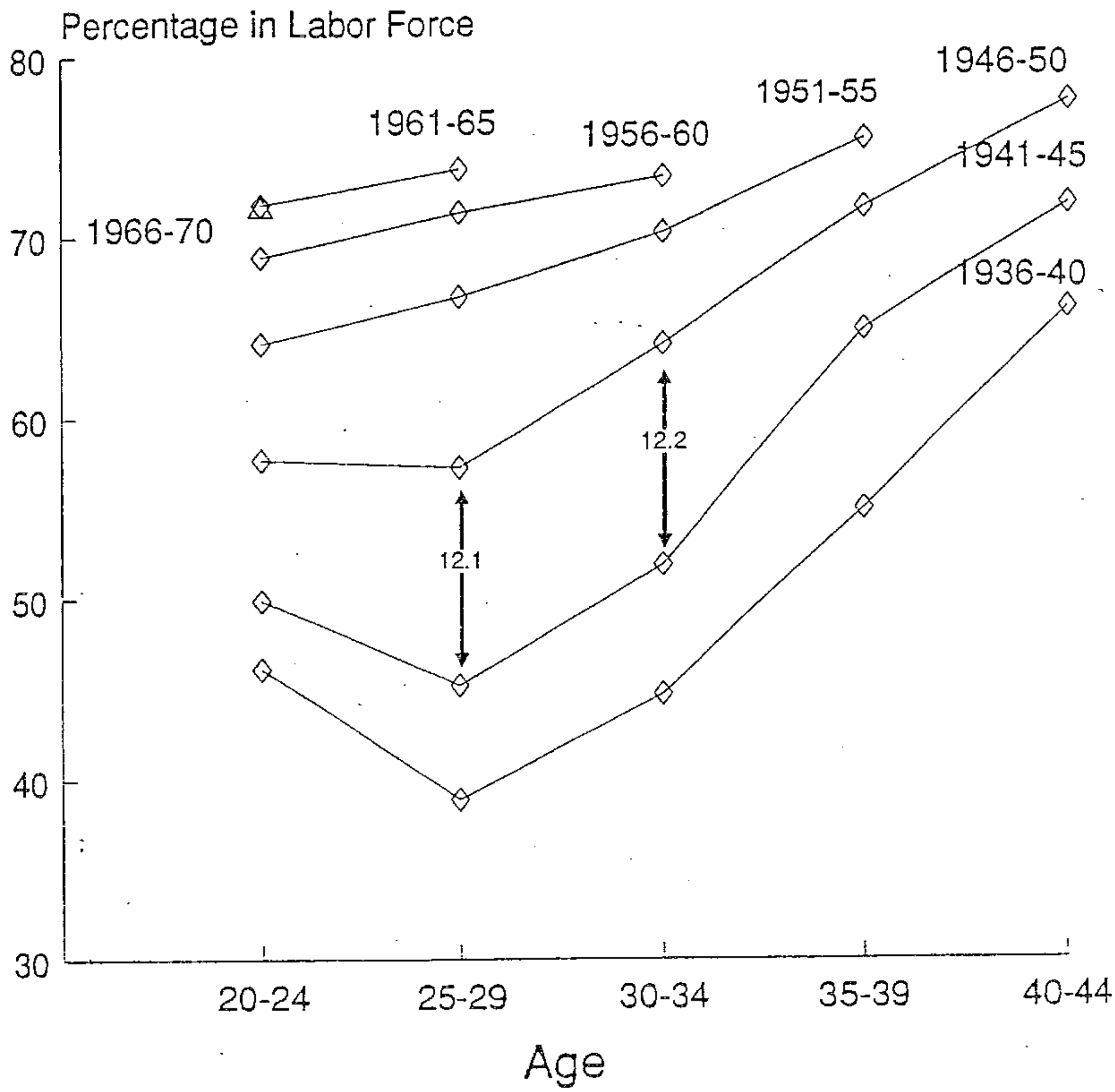


Table 1. Female Labor Force Participation (FLFP) Rates and Changes in FLFP Rates Over 5-year Periods by Age and Cohort, U.S. 1965-1990

	20-24	**25-29**	**30-34**	**35-39**	**40-44**
1965	49.9	38.9	3.82.	43.6	48.5
1970	57.7[7.8](2)	45.2[6.3](1)	44.7[6.5](1)	49.2[5.6]	52.8[4.3]
1975	64.1[6.4](3)	57.3[12.1](2)	51.9[7.2](1)	55.0[5.8](1)	56.7[3.9]
1980	68.9[4.8](3)	66.7[9.4](3)	64.1[12.2](2)	64.9[9.9](1)	66.1[9.4](1)
1985	71.8[2.9](4)	71.4[4.7](3)	70.3[6.2](3)	71.7[6.8](2)	71.9[5.8](1)
1990	71.6[-.2](4)	73.8[2.4](4)	73.4[3.2](3)	75.5[3.8](3)	77.6[5.7](2)

Notes: Number in square brackets are changes in FLFP rates
(1) Switch to cohort born prior to the baby boom
(2) Switch to first baby boom cohorts
(3) Switch to later baby boom cohorts
(4) Cohort born in the sixties

Table 2. Definitions, Means and Standard Deviations, 25 age-year groups; 1970-1990

	Definition	Mean	S. Deviation
FLFP[1]	Change is rate of labor force participation over 5-year period	6.100	2.926
Female Wage[2]	Rate of growth in real female wage during 5-year period	.046	.068
Male Wage[2]	Rate of growth in real male wage during 5-year period	.005	.087
GNP[3]	Rate of growth in real Gross National Product, base year: 1982	.148	.023
Total Fertility[3]	Rate of growth of total fertility rate	-.056	.227
Childless[3]	Rate of growth in percent of childless women	.126	.233

Sources: [1] Unpublished data based on Current Population Surveys. Nationally aggregated statistics were provided by the Bureau of Labor Statistics
[2] Bureau of Labor Statistics: Employment and Earnings
[3] Statistical Abstract of the United States

Table 3. Regression of Changes in Women's Labor Force Participation
U.S., Women 20-44, 1965-1990, Fertility Variables Excluded

	(1)	(2)	(3)
First Baby-Boom	-	4.35**	3.69**
		(4.25)	(3.81)
Pre-Baby-Boom	-	3.39**	2.17*
		(3.00)	(1.88)
Born Sixties	-	-.88	.18
		(.60)	(.13)
Time	-.36**	-.29**	-.35**
	(3.64)	(3.85)	(4.29)
Female Wage	15.58	-1.68	12.94
	(1.40)	(.20)	(1.26)
Male Wage	-22.98*	-23.58**	-17.00*
	(1.94)	(2.51)	(1.89)
G.N.P.	30.77	3.26	25.94
	(1.22)	(.16)	(1.25)
Lagged Participation	.44**	.38**	.44**
	(2.27)	(2.14)	(2.69)
Lagged G.N.P.	-	-	-26.77**
			(2.18)
Constant	27.39	24.19	29.77
Adjusted *R*-squared	.45	.73	.78

*Notes: t-statistics in parentheses: * significant at p > .05, ** significant at p > .01*

Table 4. Regression of Changes in Women's Labor Force Participation
U.S., Women 20-44, 1965-1990

	(1)	(2)	(3)
First Baby-Boom	2.58**	2.61**	1.78**
	(2.61)	(2.75)	(2.48)
Pre-Baby-Boom	.83	.74	-
	(.79)	(.76)	
Born Sixties	-1.26	-1.46	-2.49**
	(1.00)	(1.37)	(3.01)
Time	-.05	-	-
	(.32)		
Female Wage	16.80*	17.13*	17.33**
	(1.91)	(2.02)	(2.33)
Male Wage	-12.75	-12.3	-13.73*
	(1.69)	(1.72)	(2.17)
G.N.P.	55.62**	60.58**	51.76**
	(2.23)	(3.23)	(3.85)
Total Fertility	-9.90**	-11.22**	-11.2**
	(2.16)	(6.19)	(6.53)
Childless	5.99**	6.36**	7.54**
	(3.01)	(4.06)	(5.38)
Lagged Participation	.23	.22	-
	(1.52)	(1.54)	
Lagged G.N.P.	-24.2**	-22.99**	-24.82**
	(2.32)	(2.45)	(3.05)
Constant	1.52	-3.16	.24
Adjusted R-squared	.85	.86	.86

*Notes: t-statistics in parentheses: * significant at p* > .05, ** *significant at p* > .01