

The Effect of Real Wage Rates on Female LFPR

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Abstract

This paper attempts to explain the effect of real wages for women on the labor force participation rates of married women. The study examines this relationship while controlling for fertility rates, divorce rates, education, real wages for men, and unemployment rates. The income and substitution effects described in Gary Becker's work provide the theoretical framework for this paper. The study includes annual data from 1960 to 1997, and uses linear regression analysis to examine the data. After controlling for the previously mentioned variables, this researcher expects to find a positive significant relationship between real wages for women and the labor force participation rates of women.

Introduction

Recent statistical trends show that the labor force participation rates (LFPR) of women in the United States have increased steadily in the years since WWII. Data from more recent decades show that the increase in the total LFPR of women is due primarily to the large increases in LFPR of married women in particular. As a result of this trend, researchers have looked to several variables to explain it. Fertility rates, divorce rates, educational attainment of women, unemployment rates, and real wages for both men and women may help explain the increasing LFPR of women. (Blau, 1998). This paper will examine the relationship of real annual earnings for women with respect to the increasing LFPR of women in the United States from 1960 to 1997 while controlling for fertility rates, divorce, unemployment, and real wages for women

Theoretical Framework

In *The Economic Approach to Human Behavior* (Becker, 1976) and *A Treatise on the Family* (Becker, 1981), Gary Becker addressed the household the way economists have historically addressed firms. In doing so, he shed new light on how households allocate time. Consequently, he noted the effect of wages on decisions that affect the labor force participation of women, such as fertility and marriage. Becker correctly predicted that women would have fewer children and delay marriage longer as wage rates for women increased.

The theoretical basis for this paper relies principally on the substitution and income effects as described in Gary Becker's work. The income effect suggests that the wage rate relates negatively to the hours an individual will supply to the labor market. A wage increase, for example, results in higher income that can be used to consume goods and services, including leisure time (or time not spent in the labor market). Thus, a wage increase can lead

an individual to spend less time working in the market because the individual will choose to “consume” more leisure. The substitution effect suggests an opposite outcome. According to the substitution effect, an increase in wages increases the price of leisure time. Therefore an individual will demand less leisure and spend more time working in the market (Becker, 1976).

In applying Becker’s model to the labor force activity of married women, we must discuss how the income and substitution effects function within the context of a household. According to Becker, household members, rather than individuals, jointly make labor force participation decisions. The total household income affects the total hours of labor supplied to the market by household members. Thus, the income of other household members, particularly the husband, enter a married woman’s labor force participation decision. In particular, a husband’s income increases a married woman’s non-wage income, which, according to the income effect, should reduce her labor supply to the market.

Review of Literature

Effect of Wages on Female LFPR

One study by Jacob Mincer states that the substitution effect positively affects LFPR, and the income effect negatively affects LFPR. However, he also argues that the demand for leisure alone cannot determine the labor market activity of women, particularly married women. This results primarily from the fact that while men spend their time either in market work or pure leisure, women divide their time between market work, work in the home, and pure leisure. For many women, work in the home and work in the market are substitutable, which means that they can do the work at home themselves or work in the market and use part of their earnings to pay someone else to do the work in the home such as cooking, cleaning, and caring for the children. Thus, one can conclude that if women’s wages increase while all other factors remain constant, women will supply more hours of labor to the labor market. This illustrates the dominance of the substitution effect for women (Mincer, 1962).

Effect of Fertility

According to a study by Gronau (1977) as women give up market time to spend time at home in childcare the price of children increases. Thus, the demand for children, and consequently, fertility, decreases. Blau (1998) states that a decrease in fertility coincides with higher categories of LFPR for women.

Effect of Divorce

Gronau’s research also addresses the effect of divorce on the LFPR of women. He hypothesizes that divorced women spend more time in the labor market because they do not have the unearned income (provided by the husband) that married women have. The absence of the husband earnings for a divorced woman decreases her reservation wage and increases the number of hours she is willing to supply to the labor market (Gronau, 1977). Blau also notes that the level of LFPR increases with the incidence of divorce among women (Blau, 1998).

Effect of Education

According to Blau’s paper the effect of education on female LFPR derives from the effect of education on wages. The study shows that real wages increase faster for women with higher levels of education (Blau, 1998).

Research Design

The sample includes annual data for the years from 1960 to 1997. The dependent variable is the annual labor force participation rates of women (LFPR). Two independent variables are used to capture the effect of a woman's earnings on LFPR. The first is the median annual earnings for women (earnwm). In addition, because previous research shows that the effect of wages on the LFPR of women depends on education, an interaction term 'eduearn' was created by multiplying educ * earnwm. The control variables include the annual fertility rate, the annual divorce rate, the median educational attainment for women, the median annual earnings for men, and the annual unemployment rate. Multiple regression analysis was used to test for relationship between LFPR and the independent variables.

In compiling this data, several values remained unobtainable. The median educational attainment of women excluded values for 1961 and 1963 and for the years after 1992. The missing values for the educational attainment of women for 1961 and 1963 were estimated by taking the average of the preceding and succeeding years. The values for the years after 1992 were set at 12.7 (the same attainment level as 1992) under the assumption that the educational attainment would not decrease, but at least reach 12.7 years. The annual figures for LFPR of women were found by averaging the monthly LFPR figures for each year. Summary statistics for the variables appear in Table 1.

The sources of data used in this study came from the websites published by the US Department of Labor, the US Bureau of Labor Statistics (BLS), and the US Census Bureau, as well as the Statistical Abstracts of the United States for 1970 and 1999.

Table 1. Descriptive Statistics

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Labor Force Participation Rate of Women	38	37.76	59.83	49.1295	7.41039
Median Annual Earnings for Women in Real (1999) Dollars	38	18322.00	26275.00	23143.97	2212.52012
Fertility Rate	38	14.60	31.00	17.1237	3.33770
Divorce Rate	38	2.20	5.30	4.1158	1.05568
Median Years of Education for Women, annually	38	10.90	12.70	12.3000	.41785
Annual Average Unemployment Rate	38	3.50	9.70	6.0895	1.47039
Median Annual Earnings for Men in Real (1999) Dollars	38	30213.00	41973.00	36567.89	2745.42369
EDUEARN	38	199709.8	329209.4	285499.3	35416.89
Valid N (listwise)	38				

The average LFPR of women between 1960 and 1997 is 49.13 meaning that 49.13 percent of all non-institutionalized women over the age of 16 were in the labor force. The average median annual earnings for women fall approximately 13, 454 dollars below the average median earnings of men for the time period. The average fertility rate for the time period is 17.1237 (birth rate per 1,000 population), and the divorce rate is 4.1158 (per 1,000 population). The educational attainment for the period averages at 12.3 years.

Results and Analysis

Table 2 provides the results of the multiple regression results. Since the p-value of .000 for the independent variable of median annual earnings for women is less than .05, I reject the null hypothesis that no significant relationship exists between the independent variable of real wages for women and the dependent variable of female LFPR. Specifically, as real wages for women increase by one dollar, female LFPR changes by $-.04+.003(\text{Education})$. Thus, the effect of earnings on female LFPR is negative for educational attainment levels less than 13.3 years, but the effect is positive for educational attainment levels greater than 13.3 years.

With respect to the control variables, all of the control variables except fertility rate and unemployment rate show a significant relationship to female LFPR. The beta values for median years of education for women, annually and divorce rate suggest that these variables have a stronger relationship to female LFPR than the earnings variable does.

Table 2. Multiple Regression Results

		Coefficients ^a				
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	784.152	74.623		10.508	.000
	Median Annual Earnings for Women in Real (1999) Dollars	-4.35E-02	.004	-12.978	-11.886	.000
	Fertility Rate	-5.32E-02	.122	-.024	-.436	.666
	Divorce Rate	2.048	.612	.292	3.345	.002
	Median Years of Education for Women, annually	-.59.998	5.892	-3.383	-10.182	.000
	Annual Average Unemployment Rate	-.385	.232	-.076	-1.659	.107
	EDUEARN	3.516E-03	.000	16.803	12.292	.000

^a. Dependent Variable: Labor Force Participation Rate of Women

Conclusions and Recommendations

The data analysis supports the original hypothesis that median annual earnings for women significantly affects the dependent variable of female LFPR. However, earnings alone cannot explain the increase in female LFPR in the United States from 1960 to 1997. Rather, the research shows that earnings interact with education to affect female LFPR. Thus, although the results of this study agree with the previous research that the substitution effect dominates the market activity choices for women, it suggests this occurs only in women with high education attainment.

This study also holds several possibilities for continued exploration of the effect of the control variables on female LFPR. For example, one could look for a possible causal relationship between incidences of divorce and female LFPR. Another related area of study would be the exploration of relationships between pre-market factors (such as plans to continue education and desired field of study) and the resulting wages of women and the effect on female LFPR. Finally, the study could be extended to determine how these effects differ based on race, ethnicity, and age.

Limitations of the Study

During the course of this study complications arose in attempting to account for the effect of both earnings and education on female LFPR. Due to the effect that education has on earnings, it became difficult to isolate the effects of the two variables. Further study could be done to better determine how earnings and education affect female LFPR. Finally, attempts to control for the effect of men's earnings on women's LFPR resulted in multicollinearity problems. Thus, that variable had to be excluded from the final regression analysis.

Acknowledgements

I would like to thank my faculty sponsors, Donna Anderson and George Langelett, as well as Lisa Giddings for their help in conducting this study.

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