

Married Women Labor Force Participation

Analysis

This analysis is to see the factors influencing married women's labor force participation using the Mroz dataset (the dataset consists of 753 observations). This analysis use logistic regression to model the probability of a married woman participating in the labor force based on various socioeconomic and demographic factors.

Dataset

- Labor-force participation (lfp) of married white women, which is a categorical variable with values 0 or 1.
- Number of children younger than 6 years old (k5), represented as a positive integer. Number of children aged 6-18 (k618), also a positive integer.
- Age (age) of the wife, given as a positive integer.
- Wife's college attendance (wc), a categorical variable where 0 indicates no attendance and 1 indicates attendance.
- Husband's college attendance (hc), another categorical variable where 0 indicates no attendance and 1 indicates attendance.
- Log expected wage rate (lwg) for women in the labor force, represented as a numerical variable.
- Family income (inc) without including the wife's income, also represented as a numerical variable.

Dep. Variable:	lfp_binary	No. Observations:	753
Model:	Logit	Df Residuals:	745
Method:	MLE	Df Model:	7
Date:	Sat, 12 Oct 2024	Pseudo R-squ.:	0.1209
Time:	20:17:56	Log-Likelihood:	-452.63
converged:	True	LL-Null:	-514.87
Covariance Type:	nonrobust	LLR p-value:	8.923e-24

	coef	std err	z	P> z 	[0.025	0.975]
const	3.1821	0.644	4.938	0.000	1.919	4.445
k5	-1.4629	0.197	-7.426	0.000	-1.849	-1.077
k618	-0.0646	0.068	-0.950	0.342	-0.198	0.069
age	-0.0629	0.013	-4.918	0.000	-0.088	-0.038
wc_binary	0.8073	0.230	3.510	0.000	0.357	1.258
hc_binary	0.1117	0.206	0.542	0.588	-0.292	0.516
lwg	0.6047	0.151	4.009	0.000	0.309	0.900
inc	-0.0344	0.008	-4.196	0.000	-0.051	-0.018

1. The Impact of Young Children

One of the most striking findings is the strong negative relationship between having young children (under 6 years old) and labor force participation. The coefficient for 'k5' (number of children under 5) is -1.4629, which is highly significant ($p < 0.001$). This translates to an odds ratio of 0.231561, meaning that for each additional young child, the odds of a woman participating in the labor force decrease by about 76.8% ($1 - 0.231561$), holding other factors constant.

This finding underscores the substantial caregiving responsibilities associated with young children and their impact on women's career decisions. It highlights the potential need for policies supporting childcare and work-life balance to enable greater labor force participation among mothers of young children.

2. The Role of Education

The analysis reveals a positive relationship between a woman's college attendance ('wc_binary') and her likelihood of participating in the labor force. The coefficient is 0.8073 ($p < 0.001$), corresponding to an odds ratio of 2.241788. This means that women who attended college have 2.24 times higher odds of participating in the labor force compared to those who didn't, all else being equal.

Interestingly, the husband's college attendance ('hc_binary') does not show a statistically significant effect ($p = 0.588$). This suggests that a woman's own education level is a more crucial factor in her labor force participation decision than her husband's education.

These findings emphasize the importance of education in empowering women to enter the workforce, potentially through increased job opportunities, higher earning potential, or changed attitudes towards work.

3. Age and Labor Force Participation

The model shows a negative relationship between age and labor force participation, with a coefficient of -0.0629 ($p < 0.001$). This translates to an odds ratio of 0.939065 , meaning that for each year increase in age, the odds of labor force participation decrease by about 6.1% ($1 - 0.939065$), holding other factors constant.

This trend could reflect various factors, such as:

- Increased family responsibilities as women age
- Potential early retirement
- Cohort effects where older generations might have different attitudes towards women working

The age effect underscores the importance of considering lifecycle factors in policies aimed at promoting women's labor force participation.

4. The Influence of Wages and Family Income

The log expected wage rate ('lwg') shows a positive relationship with labor force participation (coefficient: 0.6047 , $p < 0.001$). The odds ratio of 1.830690 indicates that a one unit increase in log expected wage is associated with an 83% increase in the odds of labor force participation.

Conversely, family income excluding the wife's income ('inc') has a negative relationship with labor force participation (coefficient: -0.0344 , $p < 0.001$). The odds ratio of 0.966140 suggests that for each unit increase in family income, the odds of the wife participating in the labor force decrease by about 3.4%.

These findings highlight the economic considerations in women's labor force participation decisions:

- Higher potential wages act as an incentive for women to join the workforce
- Higher family income may reduce the financial necessity for women to work

5. Model Performance and Fit

The model demonstrates a reasonable fit to the data:

- McFadden's Pseudo R-squared: 0.1209
- Accuracy: 69.32%

While these metrics indicate that the model captures significant patterns in the data, they also suggest that there are other factors influencing labor force participation that are not included in this model.

Actual	0	1
0	180	145
1	86	342

The classification table shows that the model is better at predicting labor force participation (342 correct predictions out of 428 actual participants) than non participation (180 correct predictions out of 325 actual non participants). This suggests that the model might be slightly biased towards predicting participation.

6. Marginal Effects

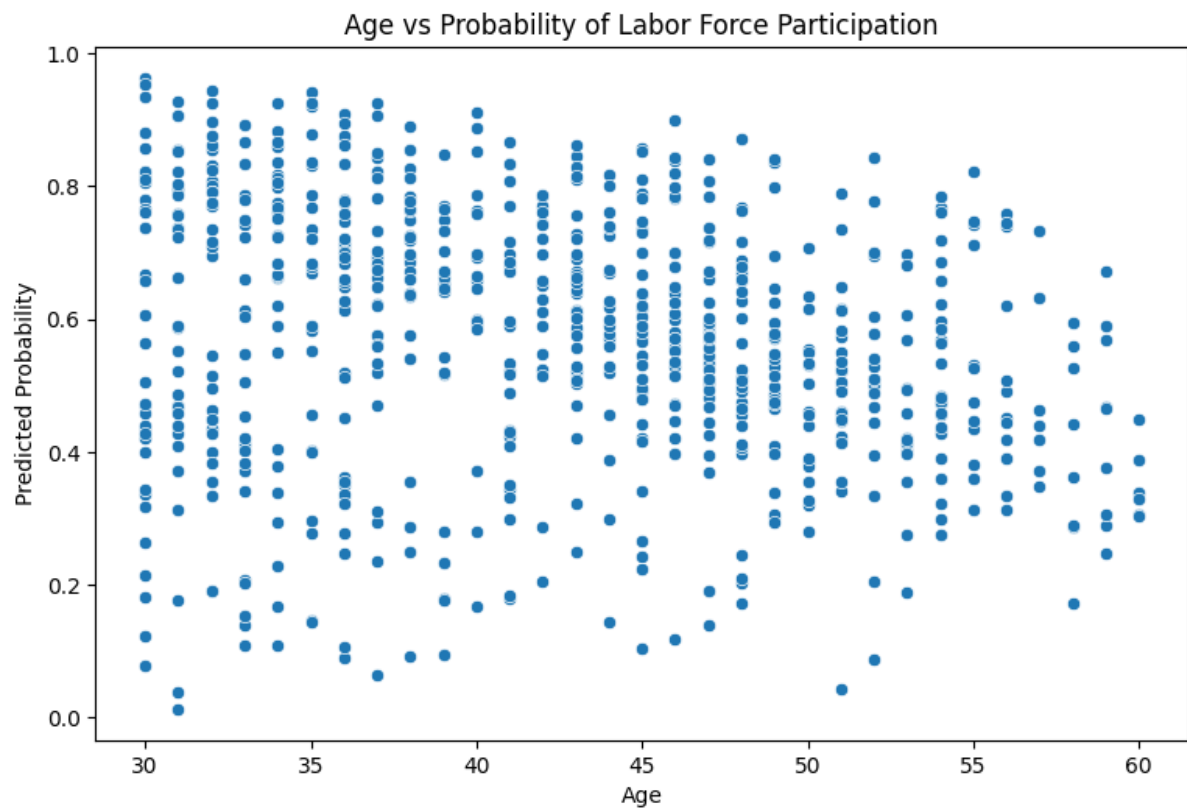
Dep. Variable:	lfp_binary					
Method:	dydx					
At:	overall					
	dy/dx	std err	z	P> z 	[0.025	0.975]
k5	-0.3037	0.035	-8.633	0.000	-0.373	-0.235
k618	-0.0134	0.014	-0.951	0.341	-0.041	0.014
age	-0.0131	0.002	-5.224	0.000	-0.018	-0.008
wc_binary	0.1676	0.046	3.614	0.000	0.077	0.258
hc_binary	0.0232	0.043	0.543	0.587	-0.061	0.107
lwg	0.1255	0.030	4.171	0.000	0.067	0.185
inc	-0.0072	0.002	-4.381	0.000	-0.010	-0.004

The marginal effects provide insights into how changes in the independent variables affect the probability of labor force participation:

- Young children have the largest marginal effect: each additional child under 5 decreases the probability of labor force participation by about 30.37 percentage points.
- College attendance increases the probability by about 16.76 percentage points.
- A one unit increase in log expected wage increases the probability by about 12.55 percentage points.
- Each year of age decreases the probability by about 1.31 percentage points.
- Each unit increase in family income decreases the probability by about 0.72 percentage points.

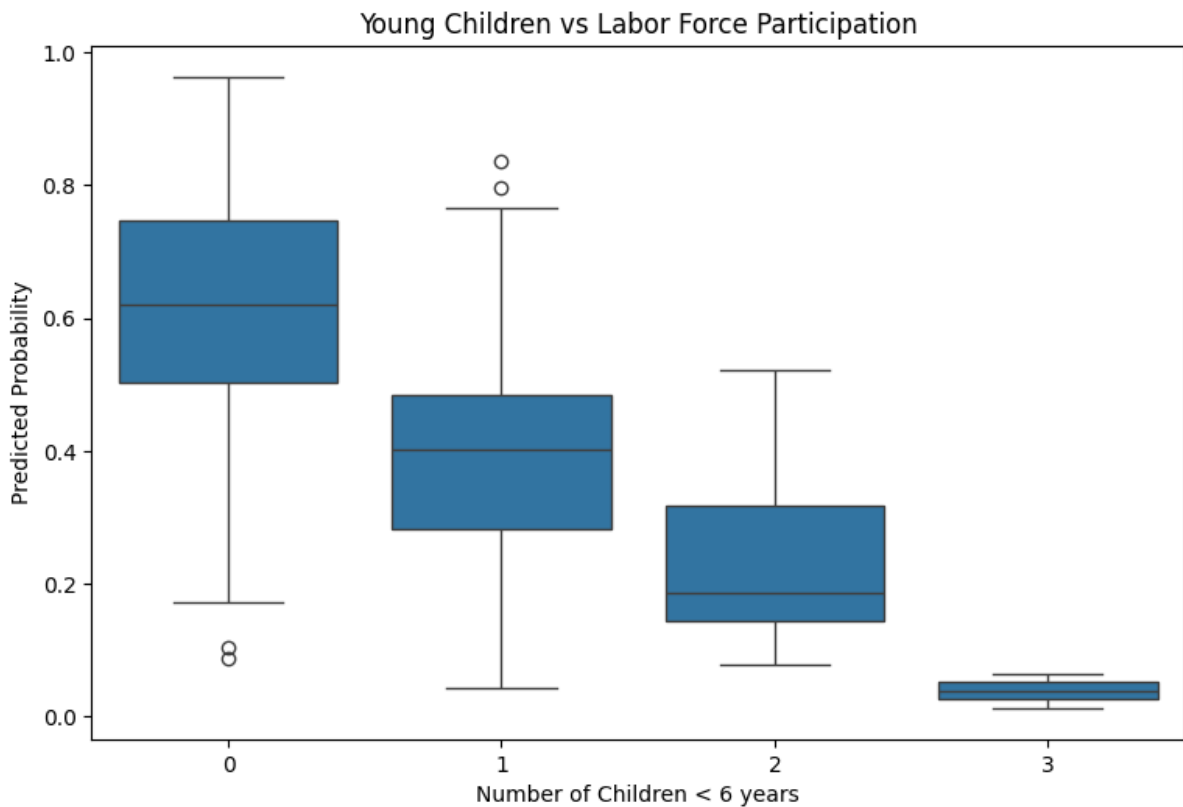
These marginal effects highlight the relative importance of each factor in influencing labor force participation decisions.

Age vs Probability of Labor Force Participation



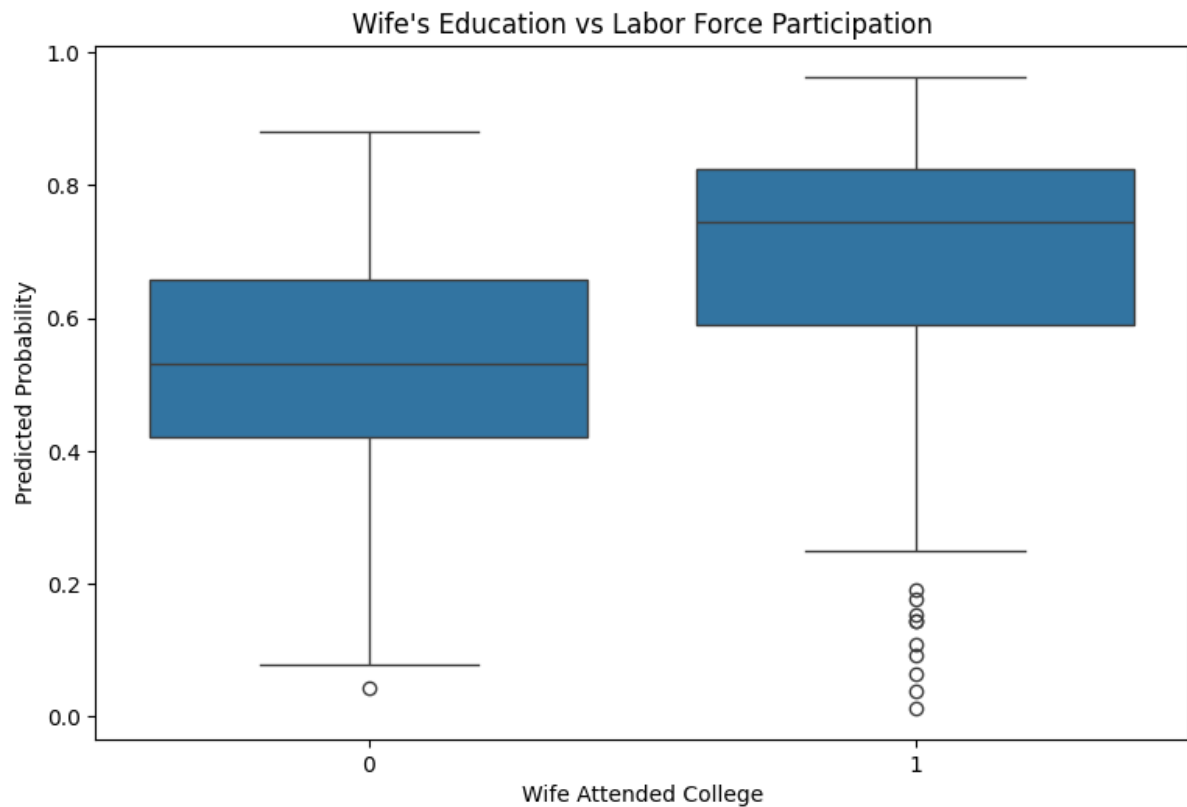
There's a slight downward trend as age increases, the wide spread of probabilities at every age suggests that age alone isn't a strong predictor. Women of all ages show a range of participation probabilities, with many clustering in the higher probability range. This indicates that other factors (like education, family situation, or economic conditions) likely play a more significant role in determining whether a woman participates in the workforce. The consistent variability across ages implies that these influencing factors remain important throughout a woman's career, rather than being tied to specific age milestones.

Number of Young Children vs Probability of Labor Force Participation



We can see a strong negative relationship between the number of young children (under 6 years old) and a woman's probability of participating in the labor force. As the number of young children increases from 0 to 3, there's a dramatic decrease in the median probability of labor force participation, with the boxes (representing the middle 50% of data) shifting progressively lower. Women with no young children have the highest and widest range of participation probabilities, while those with 3 young children show a very low and narrow range of probabilities. Having young children, particularly multiple young children, is a major factor associated with reduced labor force participation for women.

Wife's Education vs Probability of Labor Force Participation



Women who attended college (represented by '1' on the x-axis) show a notably higher median probability of labor force participation compared to those who did not attend college (represented by '0'). The box for college educated women is positioned higher on the y-axis, indicating that not only is their median probability higher, but their overall range of probabilities skews higher as well. Higher education is associated with increased likelihood of women joining the workforce. The outliers for college educated women with very low participation probabilities tell us that while education is influential, other factors can still play significant roles in individual cases.

lgw (Log Expected Wage) vs Probabilty of Labor Force Participation



As the log expected wage increases there's a clear upward trend in the probability of labor force participation (y axis). Higher potential earnings act as a significant incentive for women to join the workforce. While wage is an important factor, other variables likely influence participation decisions, as evidenced by the variation in probabilities at any given wage level.