

# Reproductive Policies and Female Labor Force Participation

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How does the implementation of policies that enforced women's reproductive rights affect the female labor force participation rate?

Pregnancy Discrimination Act (1978)

U.S. Supreme Court case decision to legalize abortions as a result of Roe v. Wade (1973)

# Contribution

- I have reviewed several econometric regression analyses that illustrate the effects of Roe v. Wade on female labor force participation, but I have not seen any with the Pregnancy Discrimination Act.

# Abstract

In this study, I conduct a time-series analysis over the years 1960-2017 to examine the effects of the Pregnancy Discrimination Act and Roe v. Wade on the U.S. female labor force participation rate. Explanatory variables include real median annual female earnings, educational attainment of women, and the nation's unemployment rate. The effects of the Discrimination Act and Roe v. Wade are captured using dummy time variables. Controlling for the fundamental drivers of the female labor force participation rate, the results suggest that the implementation of the anti-discrimination act positively impacted the behavior of working women in the United States.



# Literature Review (1/3)

In a 2004 study, conducted by David E. Kalist, a difference-in-difference-in-difference (DDD) regression is used to estimate the impact of abortion legalization on female labor force participation. This DDD regression uses three pooled cross sections (1971, 1972, and 1974) to estimate the probability of *working*, where working is a dummy variable equal to one if the female worked 40+ weeks during the year. The author focused on six explanatory variables for this regression. The explanatory variables used in this study are *Black* (a dummy variable =1 if black); *NoAbort* (=1 for states that did not have legalized abortion prior to *Roe v. Wade*, and =0 for states that did have access to legalized abortion prior to *Roe*); *Roe* (=1 for the *Roe v. Wade* time period); *X* (a vector of personal characteristics); *Year*; and *State*. Kalist theorizes that the relationship between abortion legalization and the female labor force participation rate is positive. This is due to the rationalization that as females gain access to abortion and other forms of contraception, fertility is reduced, which increases the female labor force participation - as the probability of exiting the labor force due to an unforeseen pregnancy is lower. The results from this study support the original hypothesis that access to legalized abortion allows working women the option to terminate an unwanted pregnancy which, in turn, allows them to maintain their employment status. This study is similar to the one I will be conducting in that the link between the implementation of policies that enforced women's reproductive rights and the female labor force participation rate will be examined. I will be observing the effects of *Roe v. Wade* as well as the *Pregnancy Discrimination Act* to deduce whether it had a positive influence on the behavior of working women in the United States.

# Literature Review (2/3)

In this article, Professor Shehan discusses the impact of the U.S. Supreme Court's decision to grant women the right to terminate a pregnancy under certain conditions on women's ability to prioritize educational and employment pursuits. The author examines the effects of women being able to exert control over reproduction by gaining access to a wider range of contraception and abortion drugs since the policy has been implemented. Throughout the article, Shehan considers such statistics as female college enrollment over time, marriage age for U.S. women over time, and the percentage of mothers in the labor force over time. After comparing these statistics from pre-*Roe v. Wade* and post-*Roe v. Wade*, the author concludes that the legalization of abortion has been influential in increasing the likelihood that females attend and graduate college, get married later in life, start families later in life, and focus on pursuing employment opportunities. This study is relevant to my chosen research topic as I will be considering similar factors that affect female labor force participation such as educational attainment and the legalization of abortion due to the *Roe v. Wade* Supreme Court case decision. The information from this article will lend valuable statistics and insight to the development of my theory.

# Literature Review (3/3)

Within this journal, June O'Neill addresses the question of whether the discoveries of cross-sectional studies are relevant for understanding the labor force behavior of women over time. The author focuses on the 1970's time period in which unusually slow growth in earnings occurred, yet women's labor force growth rates were rapidly increasing. O'Neill also incorporates some of her own estimates in this study by using time-series data. The author's time-series regression uses annual observations for the time period 1948-1978 of female labor force participation rates on women's wages, men's incomes, the unemployment rate of married men, the divorce rate, an industrial structure index and a time trend. This study concludes that much of the trend over time can be explained by the female wage rate and male income, although it is notable that divorce and other factors are influential. Within my own regression analysis on the effects of *Roe v. Wade* and the *Pregnancy Discrimination Act* on the female labor force participation rate, I will be controlling for fundamental drivers of the female labor force participation rate, similar to those used in this study. Such factors include observations of real median annual female earnings over time, the unemployment rate over time, and the share of females over 25 with 4 years of college or more. This research was also influential in determining how I will specify my model. Similarly, I plan to use a time-series regression because, as mentioned in this article, cross-sectional models cannot be expected to accurately predict changes over time -which is what I am interested in.

# Model Specification

- Time-series analysis
  - ❖ Over the years 1960-2017 (58 observations/variable)
- Ordinary Least Squares (OLS)
  - ❖ Estimated with Newey-West
- Theoretical Equation
  - ❖  $FLFP_t = \beta_0 + \beta_1 FE_t - \beta_2 UN_t + \beta_3 SPBA_t + \beta_4 PDA_t + \beta_5 ROE_t + \varepsilon_t$



# Explanatory Variables

- ❖ Real Median Annual Female Earnings (\$) (Denoted as  $FE_t$ )
  - ❖ Earnings are in 2017 CPI-U-RS adjusted dollars
- ❖ U.S. Unemployment Rate (%) (Denoted as  $UN_t$ )
- ❖ Percent of Female Working Age Population with 4 years of College or More (%) (Denoted as  $SPBA_t$ )
- ❖ Pregnancy Discrimination Act (Denoted as  $PDA_t$ )
- ❖ Roe v. Wade (Denoted as  $ROE_t$ )

# Data

- Data for FE was retrieved online from the *U.S Department of Labor, Women's Bureau*. This variable measures the real median annual earnings of females.
- Data for SPBA was gathered from both the *United States Census Bureau* and the *Federal Reserve Economic Data (FRED)* website.
  - This data is a ratio of the number of females over the age of 25 with 4 years or more of college to the working age population (aged 25-54) of females for the United States.
- The data for UN was collected from the *Federal Reserve Economic Data (FRED)* website as well.
- This regression also includes two dummy time variables, PDA and ROE, to examine the effects of the Pregnancy Discrimination act of 1978 and the 1973 U.S. Supreme Court case decision as a result of Roe V. Wade on the female labor force participation rate.
  - (=1 if after policy implementation, zero otherwise)



# Hypothesis Testing

Coefficient for  $FE_t \dots (+)$

- $H_0: \beta \leq 0, H_1: \beta > 0$

Coefficient for  $UN_t \dots (-)$

- $H_0: \beta \geq 0, H_1: \beta < 0$

Coefficient for  $SPBA_t \dots (+)$

- $H_0: \beta \leq 0, H_1: \beta > 0$

Coefficient for  $ROE_t \dots (+)$

- $H_0: \beta \leq 0, H_1: \beta > 0$

Coefficient for  $PDA_t \dots (+)$

- $H_0: \beta \leq 0, H_1: \beta > 0$

# Hypothesis Theoretical Reasoning

Explanatory Variable	Hypothesized Relationship with FLFP	Reasoning
$UN_t$	-	If the unemployment rate is high, it may be a sign that the economy is not doing well, which would discourage women from entering the labor force - decreasing the female labor force participation rate.
$FE_t$	+	The higher the median annual earnings for women, the more likely a woman will be to seek employment -increasing the female labor force participation rate.
$SPBA_t$	+	If women are pursuing higher education, they are likely to enter the labor market upon completion, so if the share of females with a bachelor's degree or higher increases, the female labor force participation rate will increase as well.
$ROE_t$	+	When women have more control over when they have children, they will be more likely to enter the labor force, which would increase the female labor force participation rate.
$PDA_t$	+	If a woman knows there is guaranteed job security for when they do make the decision to start a family, women will be more likely to enter the labor force, increasing the female labor force participation rate.

# Results

Variable	Version 1	Version 2
C (Constant)	9.4520*** (2.78)	9.4321*** (3.66)
FE <sub>t</sub>	0.0012*** (9.94)	0.0012*** (11.78)
SPBA <sub>t</sub>	-0.4494*** (-7.65)	-0.4599*** (-8.33)
UN <sub>t</sub>	0.0647 (0.61)	-
ROE <sub>t</sub>	0.5602 (0.82)	-
PDA <sub>t</sub>	6.1096*** (5.72)	6.4402*** (6.13)
R-Squared (Adjusted)	0.9831	0.9825

\*\*\* indicates significance at 1% level

\*\* indicates significance at 5%

\* indicates level at 10% level

T-statistics shown in parentheses

Estimated with Newey-West

# Obstacles Encountered

## Anticipated spurious correlation as a result of using time-series data

- Performed Dickey-Fuller test on each variable
- Step 1: graphical inspection of each explanatory variable's data
- Step 2: run DF test with trend, intercept, or both
  - Null hypothesis: variable contains a unit root
  - UN - reject null at 5% level (conclude stationary)
  - FLFP, FE, SPBA - fail to reject null
- Step 3: test for cointegration
  - Gather residuals
  - Run DF test on residuals
  - Null hypothesis: residuals contain unit root
  - Reject null at 5% level (conclude there is a cointegrating relationship, regression not spurious)

## Anticipated serial correlation of residuals

- Performed LaGrange multiplier test
- Null hypothesis: no serial correlation
- Reject null, conclude serial correlation is present
- Run regression with HAC (Newey-West)

## Sign reversal for coefficient of SPBA

- Hypothesized positive relationship
- Results showed negative coefficient
- Possible omitted relevant variable

# Conclusion

*The results suggest that the Discrimination Act had a positive effect on the female labor force participation rate.*

- Over the years during which PDA was in effect, the FLFP rate was **6.1%** higher than years it was not in effect.

*Version 1 of regression shows the coefficient for ROE is statistically insignificant.*

- Although ROE doesn't exert an influence on FLFP, there is evidence that PDA does have an effect.
  - PDA variable may be capturing some effects of ROE due to the time period overlap.

# Extensions

- Continue theoretical thinking and investigating potential omitted relevant variables
- Work through bias formula when considering what variables could have caused downward bias in SPBA
  - Formula:  $\text{Bias} = \beta_{om} * \rho_{om,inc}$





# Data Sources

- “Labor Force Participation Rate - Women” FRED  
<https://fred.stlouisfed.org/series/LNS11300002>
- “Unemployment Rate: Aged 15-64: All Persons for the United States” FRED  
<https://fred.stlouisfed.org/series/LRUN64TTUSA156N>
- “Median Annual Earnings by Sex” - U.S. Department of Labor, Women’s Bureau  
<https://www.dol.gov/agencies/wb/data/facts-over-time/earnings-and-earnings-ratios#median-annual-earnings-by-sex-race-and-hispanic-ethnicity>
- Educational Attainment - United States Census Bureau  
<https://www.census.gov/data/tables/time-series/demo/educational-attainment/cps-historical-time-series.html>
- Working Age Population: Aged 25-54: Females for the United States  
<https://fred.stlouisfed.org/series/LFWA25FEUSA647S>
- “Roe V Wade”  
<https://www.oyez.org/cases/1971/70-18>
- “Efforts to Combat Pregnancy Discrimination”  
<https://www.americanprogress.org/issues/women/news/2018/11/02/460353/efforts-combat-pregnancy-discrimination/#:~:text=Forty%20years%20ago%2C%20on%20October,childbirth%2C%20or%20related%20medical%20conditions>

# Questions?

THANK YOU