

## Mother Wage Penalty

Across industrialized countries, it is a well-studied phenomenon that childless women are paid more on average than mothers. In this exercise, we use survey data to investigate and measure the wage gap between women with children and childless women.

The exercise is based on: Wei-hsin Yu and Janet Chen-Lan Kuo. 2017. The Motherhood Wage Penalty by Work Conditions: How Do Occupational Characteristics Hinder or Empower Mothers?" *American Sociological Review* 82(4): 744-769.

In this paper, the authors examine the association between the so-called *mother wage penalty* (i.e., the pay gap between mothers and non-mothers) and occupational characteristics. Three prominent explanations for the motherhood wage penalty—"stressing work-family conflict and job performance," "compensating differentials," and "employer discrimination"—provide hypotheses about the relationship between penalty changes and occupational characteristics. The authors use data from 16 waves of the National Longitudinal Survey of Youth to estimate the effects of five occupational characteristics on the mother wage penalty and to test these hypotheses.

This paper uses a type of data known as 'panel data.' Panel data consist of observations on the same people over time. In this example, we are going to analyze the same women over multiple years. When analyzing panel data, each time period is referred to as a *wave*, so here each year is a wave.

The data file is `yu2017sample.csv`, which is a CSV file. The names and descriptions of variables are:

Name	Description
PUBID	ID of woman
year	Year of observation
wage	Hourly wage, in cents
numChildren	Number of children that the woman has (in this wave)
age	Age in years
region	Name of region (North East = 1, North Central = 2, South = 3, West = 4)
urban	Geographical classification (urban = 1, otherwise = 0)
marstat	Marital status
educ	Level of education
school	School enrollment (enrolled = TRUE, otherwise = FALSE)
experience	Experience since 14 years old, in days
tenure	Current job tenure, in years
tenure2	Current job tenure in years, squared
fullTime	Employment status (employed full-time = TRUE, otherwise = FALSE)
firmSize	Size of the firm
multipleLocations	Multiple locations indicator (firm with multiple locations = 1, otherwise = 0)
unionized	Job unionization status (job is unionized = 1, otherwise = 0)
industry	Job's industry type
hazardous	Hazard measure for the job (between 1 and 2)
regularity	Regularity measure for the job (between 1 and 5)

### Question 1

How many different women are in the data? How many observations per year? We will refer to each row as a ‘person-year observation’ since the row contains data on a given person in a particular year. In a few sentences, describe one advantage and one disadvantage of using a contemporary cohort of women rather than an older cohort in estimating the predictors of the mother wage gap.

### Question 2

`numChildren` is the variable representing how many children the woman had at the time of an observation. Please provide a table that shows the proportion of observations by the number of children. Provide a brief substantive interpretation of the results.

### Question 3

Create a new indicator variable `isMother` that takes a value of 1 if the woman has at least one child in that year and a value of 0 otherwise. Tabulate the new variable. Briefly comment on the results.

### Question 4

Create a new variable called `logwage` that is the log of `wage`. Make two boxplots, one for `wage` and the other for `logwage`, as a function of educational level (`educ`). Compare the two boxplots and discuss the purpose of the log transformation.

### Question 5

In the same graph, plot the mean `logwage` against year for mothers, then for non-mothers in a different color or line type. Include a legend and a proper title. Make sure the figure and axes are clearly labeled. Give a brief interpretation of the results.

### Question 6

Create a quantile-quantile plot comparing the distribution of log wages of mothers and non-mothers. Comment briefly on the resulting plot.