

Occupational Sex Segregation and Earning Differences¹

LEARNING OBJECTIVES:

Skill

- Using software to access and analyze census data
- Identifying independent and dependent variables
- Employing control variables
- Forming testable hypotheses using quantitative data
- Learning how to construct, read, and interpret bivariate tables displaying frequencies and percentages
- Identifying population trends over time
- Using real world data to enhance and support key course concepts

Substance

- Examine sex segregation in employment from 1950 to 2000
- Examine trends within three specific occupations of your choosing
- For either doctors or lawyers, investigate gender and race differences on earnings and see if these differences change when we control for age

As we have studied, the percent of women in the labor force has increased in recent decades. Contemporary women have a wider range of choices about what careers to pursue. However, to a considerable extent, men and women tend to have different kinds of jobs. For many of the occupations we will examine, you may be able to guess which are male-dominated and which are female-dominated jobs. The segregation of men and women into different occupations is called “occupational sex segregation.”

The patterns of occupational sex segregation have changed somewhat since 1970. Women have made substantial in-roads into several previously male-dominated occupations. Some previously male-dominated occupations have even become predominantly female. Other occupations have remained predominantly female.

For this exercise we will: 1) examine sex segregation in employment from 1950 to 2000. 2) examine trends within three specific occupations of your choosing, and 3) for either doctors or lawyers, investigate gender and race differences on earnings and see if these differences change when we control for age.

A. Gender Composition of the Labor Force

We will begin by examining changes in the sex composition of the labor force over the past 50 years. To do so, you will need to follow the steps below:

GETTING STARTED:

1. Go to <http://www.ssdan.net/datacounts>
2. Click on the “Data” in the menu bar
3. From there, click “Browse” on the left sidebar. Find “**centrend**” in the drop-down box and select it.

¹ Thanks to Theodore Fuller, Virginia Tech, for the original template of this exercise.

4. Scroll down through the list of data sets until you find “emp502k.dat” Highlight and click “submit.”
5. You can also click [here](#) to launch the dataset in WebCHIP.

A) FREQUENCIES

A frequency table gives an overall sense of the distribution of a particular variable or set of variables. **To examine the frequencies of each variable, click on “marginals.”**

B) After examining the frequency tables for age, gender and income, answer the following questions:

- What percentage of the sample is Black? _____ Non-black? _____
- For the combined years of 1950, 60, 70, 80, 90 and 2000, what percentage of the population 16+ was employed _____ Unemployed _____ Not in the labor force _____
- What are some reasons people would be counted as “not in the labor force”? _____

The frequencies show the combined data for six different years. What we want to do is compare employment statistics for men and women across the decades. First, begin by making a couple hypotheses:

1. Is a higher percentage of men or women employed? _____
2. In which year(from 1950-2000) do you think the highest percentage of women worked? _____

To answer these questions, you’ll need to create a series of tables, or cross-tabulations. Begin by looking at the effect of gender on employment status. To do so, you need to run a cross-tabulation:

1. Select “Command” > “Crosstab”
2. Put “EMP” as the ROW variable
3. Put “GENDER” as the COLUMN variable
4. Click on “Table” > “Percent Down”

From this table, what percentage of men were employed for the combined 6 years? _____

What percentage of women were employed for these 6 years? _____:

As we can see, a much smaller proportion of women have been in the labor force, when we combine all decades. Now let’s look at each decade and see if the proportion has changed over time. To do so:

1. Select “Command” > “Crosstab”
2. Put “EMP” as the ROW variable
3. Put “GENDER” as the COLUMN variable
4. Select “Table” > “Control”, and select “YEAR” as the control variable.
5. Click on “Table” > “Percent Down”

You will now get a series of 6 tables, one for each year. Use the information from these tables to fill out the following:

	% Employed	
	Men	Women
1950	_____	_____
1960	_____	_____
1970	_____	_____
1980	_____	_____
1990	_____	_____

Below, please describe the trend that you see in the employment rates of men and women. Why do you find these trends?

B. Occupational Sex Segregation

Now we are going to look at trend data for different occupations. (Unfortunately, these data have not yet been updated with the 2000 census, so you will be looking at the years 1970, 1980, and 1990). To examine different occupations, you'll need to get into a different series of data sets:

1. Go to <http://www.ssdan.net/datacounts>
2. Click on the "Data" in the menu bar
3. From there, click "Browse" on the left sidebar. Find "**custom**" in the drop-down box and select it.
4. Scroll down through the list of data sets until you find "**occuptns.dat**" Highlight and click "submit."
5. Under the next drop-down menu, you will see a series of data sets, each of which has data on a different profession.

<u>Occupation</u>	<u>Data Files Needed</u>	<u>Occupation</u>	<u>Data Files Needed</u>
Lawyers	LAWYER79.new	Real estate agents	ESTATE79.new
Registered nurses	NURSE79.new	Secretaries	SCRTRY79.new
Public relations specialists	PUBREL79.new	Insurance adjusters	INSURE79.new
Physicians	DOCTOR79.new	Elementary school teachers	TEACHR79.new
Librarians	LBRARY79.new	Carpenters	CRPNTR79.new
Pharmacists	DRUGST79.new	Bank tellers	BTELLR79.new
Engineers	ENGNER79.new	Auto mechanics	MECHNC79.new
Bus drivers	BUSDRV79.new		

You and your partner will choose three of these occupations to examine. Please choose one which you expect to be female-dominated, and one which you expect to be male-dominated. Write the three occupations you want to examine below:

1) _____ 2) _____ 3) _____

For each of these, you will need to go into the specified data set, so simply click on the given set to get into the data. You might want to examine the frequencies (marginals) to determine the basic characteristics of workers within this occupation. Then, you need to determine the sex distribution. To do so, simply run the following cross-tabs:

- 1) Select "Command" > "Crosstab"
- 2) Put "GENDER" as the ROW variable
- 3) Put "YEAR" as the COLUMN variable
- 4) Click on "Table" > "Percent Down"
- 5) Fill out the following table:

PERCENT FEMALE

	1970	1980	1990
Occup: #1 _____:	_____	_____	_____
Occup #2 _____:	_____	_____	_____
Occup #3 _____:	_____	_____	_____
All workers:	<u>26.6</u>	<u>32.7</u>	<u>38.3</u>

Please describe what you see in each of the tables above. Did your occupations remain male-dominated, female-dominated, become increasingly female or increasingly male? Explain possible reasons for the patterns you see. Examine changes in the percent female in the overall civilian work force, shown in the last row. As you see, the percent female in the full-time year-round workforce increased substantially from 1970 to 1990. Did the percent female in your occupations increase more, less, or the about same as for the overall workforce?

Now calculate the actual percent change in female workers in your occupations from 1970 to 1990. To calculate percent change, use the following formula:

$$\% \text{ Change} = \frac{\text{time 2} - \text{time 1}}{\text{Time 1}} \times 100$$

For example, the percent change in female workers in the overall labor force from 1970 to 1990 would be:

$$\% \text{ change of female workers in overall labor force from 1970-90} = \frac{T2 - T1}{T1} \times 100\% = \frac{38.3 - 26.6}{26.6} \times 100\% = 44\%$$

So, we see the percentage of women in the labor force increased by 44% from 1970 to 1990.

Calculate the Percent Change of Percent Female for each of your occupations from 1970-90:

	Formula	% change
Occup #1 _____ :	_____	_____
Occup #2 _____ :	_____	_____
Occup #3 _____ :	_____	_____

For which occupation do you see the greatest percent change? The least? Speculate why this might be. (Note that if your occupation saw an increase in males over time, then the percent change for females will be negative.)

C. Gender Differences in Earnings

Now we are going to examine differences in earnings. For your assigned occupations, you will calculate the percent of men and percent of women who earned \$30,000 or more in each year. First, here are the data for all full-time year-round workers for the years 1970, 1980, and 1990. Earnings from the 1970 and 1980 censuses refer to earnings for 1969 and 1979 respectively, but they have been translated into equivalent 1989 dollars for easy comparison.

Percent of full-time year-round workers who earned \$30,000 or more, adjusted into 1989 dollars

	1970		1980		1990	
	Women	Men	Women	Men	Women	Men
All workers	8%	49%	11%	53%	21%	51%
Gender gap:	_____		_____		_____	

For the above table, calculate the gender gap in income by subtracting the percent of women making \$30,000 and above from the percent of men making \$30,000 and above. Did the gender gap in income increase, decrease, or remain about the same from 1970 to 1990? (You'll need to add categories.)

Now it's your turn to examine the gender gap for each of your chosen occupations. For the other three occupations, did the gender gap in income change more or less than for the overall workforce? You'll need to go into each of the data bases for your occupations and do the following:

1. Select "Command" > "Crosstab"
2. Put "EARNINGS" as the ROW variable
3. Put "GENDER" as the COLUMN variable
4. Select "Table" > "Control", and select "YEAR" as the control variable.
5. Click on "Table" > "Percent Down"

Use the data from the tables you have just generated to fill in the following table:

Percent of fulltime year-round workers earning \$30,000 or more, adjusted into 1989 dollars

	1970		1980		1990	
	Women	Men	Women	Men	Women	Men
All workers	8%	49%	11%	53%	21%	51%
Occupation 1	_____	_____	_____	_____	_____	_____
Gender gap:	_____		_____		_____	
Occupation 2	_____	_____	_____	_____	_____	_____
Gender gap:	_____		_____		_____	
Occupation 3	_____	_____	_____	_____	_____	_____
Gender gap:	_____		_____		_____	

Please describe the gender gap in income for each of your occupations. Did the gender gap in income narrow, expand, or stay the same over time? Was the change for each occupation greater than, less than, or about the same for all workers in the paid labor force. Do you notice any especially noteworthy differences across the different occupations, compared to all workers?

Now that we have examined trends in earnings for from 1970-1990, let's examine contemporary earnings differences for men and women. Here are the data for all full-time year-round workers in 2000.

Earnings	Male	Female	All
<15K	9.2%	16.7%	12.3%
15-25k	17.9%	28.5%	22.3%
25-35K	19.1%	23.4%	20.9%
35-50K	21.9%	18.3%	20.4%
50-75K	18.6%	9.3%	14.7%
75K+	13.3%	3.9%	9.4%
100% =	56,212,420	39,610,636	95,823,032

From this table, we can see that female full-time workers typically make less than male full-time workers. For example, 45.2% of women make \$25,000 or less, compared to only 27.1% of men. By contrast, 31.9% of full-time male workers make \$50,000 or more, compared to only 13.2% of women.

Note how I have described the data. I started with a broad, generalized statement: "female full-time workers typically make less than male full-time workers." Then I used specific statistics from the table to make my case. This is the model for you to follow: start with a generalized statement, without numbers, and then use the statistics to support your case. You do not need to report every number – use the numbers in a comprehensible manner that helps bolster your argument. It may take you several tries to write statements that make sense. Try reading aloud what you have written to see if it is clear and concise. A big part of this assignment is to help you learn to use and interpret basic statistics in a clear, easy to understand manner.

Investigating reasons for Differences in Earnings

What are some of the reasons you think women make less than men? Discrimination in pay is probably one, but there are many other, structural reasons. Make a list of at least four reasons, other than discrimination, that women make less than men:

It's possible that men and women make different incomes for a variety of reasons. As we saw above, men and women often go into very different jobs – and the jobs in which women concentrate tend to be lower-paying. Other reasons might include lower educational attainment of women, less experience, less time in the labor market, or different ages at which women enter the work force. One of the problems in comparing incomes for all men and women is that we are often comparing very different workers. One of the best ways to try to look at income differences is to try to control for potential differences. So, rather than comparing all female workers to all male workers, we can try to examine just one occupation, for example doctors, and then compare male and female doctors. They should have comparable educations, though there might be other differences we would want to control for (for example, specialty, region, age, years of experience, etc.).

We can test each of these by CONTROLLING for the variables. For your final exercise, you will examine the earnings of either doctors or lawyers (these are the only occupations for which the data in our database have been updated). We will start by comparing the earnings of male and female doctors or lawyers and then introduce one simply control variable – age. It may be that most of the female doctors (or lawyers) are fairly young, because women have only recently begun going into medicine (or law). It may thus be that female doctors make less overall, because they are younger overall. We will get around this problem by controlling for age. What this means is that we will split up all the doctors into their different age groups. In this data set, age is split into four categories: 25-34, 35-44, 45-54, 55-64. What we will do is compare men and women in each of

these age groups. Do male and female doctors aged 25-34 make the same amount? What about those aged 35-44? 45-54? 55-64? To do this, follow the steps below:

1. Go to <http://www.ssdan.net/datacounts>
2. Click on the "Data" in the menu bar
3. From there, click "Browse" on the left sidebar. Find "**census2000**" in the drop-down box and select it.
4. Under the next drop-down menu, choose either "doctors2k.dat" or "lawyers2k.dat"

You will now be in the data set. You might first want to look at the frequencies, to determine basic background characteristics of your sample. Now, to look at earnings differences:

- 1) Put "EARNINGS" as the ROW variable
- 2) Put "GENDER" as the COLUMN variable
- 3) Select "Table" > "Control", and select "AGE" as the control variable.
- 4) Create a "Percent Down" Crosstab

Interpreting your output:

- a) Your output will include four sets of tables, one for each age level. The first table will show only the doctors (or lawyers) aged 25-34. You can now compare the earnings of men and women in this group. What do you find?
- b) The next table shows the earnings of all doctors/lawyers aged 35-44. Are there differences between the earnings of men and women in this group? Describe what you find:
- c) Similarly, compare the earnings for men and women aged 45-54:
- d) Finally, compare the earnings for men and women aged 54-65:
- e) Overall, what have you found? When controlling for age, do male and female doctors or lawyers make the same amount?
- f) When you have finished this, repeat the exercise, this time examining the effect of RACE on earnings, again controlling for age. (Note that race is now recategorized, with many more categories.) What do you find?

Now that you have walked through a number of exercises examining occupational sex segregation and earnings differences, please write a paper that answers the following:

- 1) **Changes in Female Labor Force Participation over time:** First, discuss changes in female labor force participation over time. From 1950-2000, how has the composition of the labor force changed? Discuss some of the reasons for this, referring to literature.
- 2) **Occupational Sex Segregation:** Describe the three occupations you examined. How has the gender composition of each of these occupations changed over time? Which has seen the greatest change? Speculate a bit why this might be and do a little outside research to try to discover what might be behind these patterns.
- 3) **Gender Gap in Earnings over Time:** Discuss briefly the gender gap in earnings over time, both for all occupations and for your three specific occupations. Do you find any consistent trends? Describe your findings.
- 4) **Gender/Race Gap in Earnings for Doctors or Lawyers:** Finally, discuss either the gender gap or race gap in earnings for either doctors or lawyers. Begin by describing the population of doctors or lawyers, then describe the cross-tab of earnings by gender or earnings by race, and finally describe whether controlling for age changes the effect of race or gender on earnings. (Note, you only need to analyze the data for doctors OR lawyers, and you can either analyze the effect of gender OR race.)