

IDS 690: Unifying Data Science Gender Discrimination Problem Set

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Question One:

Begin by downloading and importing 2018 CPS data

```
In [1]: import pandas as pd
import numpy as np
import statsmodels.api as sm
import statsmodels.formula.api as smf
from statsmodels.formula.api import ols
import pyarrow
import pyarrow.parquet
import patsy
from plotnine import *

# Removing the copy/view warning
pd.set_option('mode.chained_assignment', None)
```

```
In [2]: morg_df = pd.read_stata('morg18.dta')
morg_df.head(3)
```

Out[2]:

| | county | smsastat | age | sex | grade92 | race | ethnic | marital | uhouse | earnhre | ... | yrroll | gr |
|---|--------|----------|-----|-----|---------|------|--------|---------|--------|---------|-----|--------|----|
| 0 | 0 | 1.0 | 71 | 1 | 42 | 1 | NaN | 1 | NaN | NaN | ... | 3.0 | ↑ |
| 1 | 0 | 1.0 | 64 | 2 | 40 | 1 | NaN | 1 | NaN | NaN | ... | 2.0 | ↑ |
| 2 | 0 | 1.0 | 52 | 2 | 39 | 2 | NaN | 5 | 40.0 | 2084.0 | ... | NaN | ↑ |

3 rows × 25 columns

```
In [3]: morg_df['lfsr94'].value_counts()
```

```
Out[3]: Employed-At Work          172378
Retired-Not In Labor Force      61161
Other-Not In Labor Force        37263
Disabled-Not In Labor Force     17052
Employed-Absent                 6443
Unemployed-Looking              5710
                                1279
Unemployed-On Layoff           1046
Name: lfsr94, dtype: int64
```

Question Two:

Subsetting to full time employees

```
In [4]: # Subsetting for full time work/more than 25hrs per week
morg_subset = morg_df[(morg_df['lfsr94'] == 'Employed-At Work') & (morg_df['uhouse'] >= 35)]
```

Question Three:

Now let's estimate the basic wage gap for the United States.

```
In [5]: # Converting Earned hire to dollars
morg_subset['earnhre'] = morg_subset['earnhre']/100
```

```
In [6]: # OLS on The earnhre
morg_subset.columns
```

```
Out[6]: Index(['county', 'smsastat', 'age', 'sex', 'grade92', 'race', 'ethnic',
               'marital', 'uhouse', 'earnhre', 'earnwke', 'chldpres', 'ownchild',
               'ged', 'gedhigr', 'yrcoll', 'grprof', 'gr6cor', 'ms123', 'occ2012',
               'lfsr94', 'class94', 'unioncov', 'ind02', 'stfips'],
              dtype='object')
```

```
In [7]: smf.ols('earnhre ~ C(sex)', data = morg_subset).fit().summary()
```

Out[7]: OLS Regression Results

| | | | |
|--------------------------|------------------|----------------------------|-------------|
| Dep. Variable: | earnhre | R-squared: | 0.015 |
| Model: | OLS | Adj. R-squared: | 0.015 |
| Method: | Least Squares | F-statistic: | 999.7 |
| Date: | Thu, 20 Feb 2020 | Prob (F-statistic): | 8.84e-218 |
| Time: | 21:53:20 | Log-Likelihood: | -2.4478e+05 |
| No. Observations: | 65755 | AIC: | 4.896e+05 |
| Df Residuals: | 65753 | BIC: | 4.896e+05 |
| Df Model: | 1 | | |
| Covariance Type: | nonrobust | | |

| | coef | std err | t | P> t | [0.025 | 0.975] |
|--------------------|---------|---------|---------|-------|--------|--------|
| Intercept | 20.5546 | 0.053 | 386.055 | 0.000 | 20.450 | 20.659 |
| C(sex)[T.2] | -2.4759 | 0.078 | -31.619 | 0.000 | -2.629 | -2.322 |

| | | | |
|-----------------------|-----------|--------------------------|------------|
| Omnibus: | 31043.263 | Durbin-Watson: | 1.852 |
| Prob(Omnibus): | 0.000 | Jarque-Bera (JB): | 210689.419 |
| Skew: | 2.182 | Prob(JB): | 0.00 |
| Kurtosis: | 10.606 | Cond. No. | 2.54 |

Warnings:

[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.

The wage gap is -\$2.48 per hour between men and women

Question Four:

What is the wage gap not per hour, but per year?

```
In [8]: morg_subset['yearly_wage_diff'] = morg_subset['uhouse'] * morg_subset['earnhre'] * 52
```

Question Five:

We just compared all full-time working men to all full-time working women. For this to be an accurate causal estimate of the effect of being a woman in the work place, what must be true of these two groups? What is one reason that this may not be true?

```
In [9]: smf.ols('yearly_wage_diff ~ C(sex)', data = morg_subset).fit().summary()
```

Out[9]: OLS Regression Results

| | | | |
|--------------------------|------------------|----------------------------|-------------|
| Dep. Variable: | yearly_wage_diff | R-squared: | 0.024 |
| Model: | OLS | Adj. R-squared: | 0.024 |
| Method: | Least Squares | F-statistic: | 1637. |
| Date: | Thu, 20 Feb 2020 | Prob (F-statistic): | 0.00 |
| Time: | 21:53:32 | Log-Likelihood: | -7.5335e+05 |
| No. Observations: | 65755 | AIC: | 1.507e+06 |
| Df Residuals: | 65753 | BIC: | 1.507e+06 |
| Df Model: | 1 | | |
| Covariance Type: | nonrobust | | |

| | coef | std err | t | P> t | [0.025 | 0.975] |
|--------------------|------------|---------|---------|-------|-----------|-----------|
| Intercept | 4.511e+04 | 121.688 | 370.664 | 0.000 | 4.49e+04 | 4.53e+04 |
| C(sex)[T.2] | -7240.6673 | 178.971 | -40.457 | 0.000 | -7591.450 | -6889.884 |

| | | | |
|-----------------------|-----------|--------------------------|------------|
| Omnibus: | 33612.087 | Durbin-Watson: | 1.863 |
| Prob(Omnibus): | 0.000 | Jarque-Bera (JB): | 291856.174 |
| Skew: | 2.309 | Prob(JB): | 0.00 |
| Kurtosis: | 12.230 | Cond. No. | 2.54 |

Warnings:

[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.

The wage gap is -\$7240.66 annually between men and women

In order to perform casual inference, there must be no baseline difference between the two groups. The above model does not consider age, which could be effecting the results.

Question Six:

To control for this difference, let's now regress annual earnings on gender and age. What is the implied average annual wage difference between women and men? Is it different from your raw estimate?

```
In [10]: smf.ols('yearly_wage_diff ~ C(sex) + age', data = morg_subset).fit().summary()
```

Out[10]:

OLS Regression Results

| | | | | | | |
|--------------------------|------------------|----------------------------|-------------|-----------------|---------------|---------------|
| Dep. Variable: | yearly_wage_diff | R-squared: | 0.057 | | | |
| Model: | OLS | Adj. R-squared: | 0.057 | | | |
| Method: | Least Squares | F-statistic: | 1974. | | | |
| Date: | Thu, 20 Feb 2020 | Prob (F-statistic): | 0.00 | | | |
| Time: | 21:53:38 | Log-Likelihood: | -7.5225e+05 | | | |
| No. Observations: | 65755 | AIC: | 1.504e+06 | | | |
| Df Residuals: | 65752 | BIC: | 1.505e+06 | | | |
| Df Model: | 2 | | | | | |
| Covariance Type: | nonrobust | | | | | |
| | coef | std err | t | P> t | [0.025 | 0.975] |
| Intercept | 3.265e+04 | 288.243 | 113.284 | 0.000 | 3.21e+04 | 3.32e+04 |
| C(sex)[T.2] | -7557.2936 | 176.107 | -42.913 | 0.000 | -7902.462 | -7212.125 |
| age | 304.1829 | 6.406 | 47.485 | 0.000 | 291.627 | 316.738 |
| Omnibus: | 33771.778 | Durbin-Watson: | 1.868 | | | |
| Prob(Omnibus): | 0.000 | Jarque-Bera (JB): | 307310.621 | | | |
| Skew: | 2.305 | Prob(JB): | 0.00 | | | |
| Kurtosis: | 12.535 | Cond. No. | 146. | | | |

Warnings:

[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.

When age is controlled for, women make 7557 less per year on average compared to men, as opposed to 7240 less per year when wage is not controlled for.

Question Seven:

In running this regression, what is the implicit comparison you are making? In other words, when we run this regression, we're basically pretending we are comparing two groups and assuming they are counter-factuals for one another. What are these two groups?

```
In [11]: smf.ols('yearly_wage_diff ~ C(sex)+age +C(grade92)', data = morg_subset).fit()  
.summary()
```

Out[11]:

OLS Regression Results

| | | | | | | |
|-------------------|------------------|---------------------|-------------|-------|-----------|-----------|
| Dep. Variable: | yearly_wage_diff | R-squared: | 0.173 | | | |
| Model: | OLS | Adj. R-squared: | 0.173 | | | |
| Method: | Least Squares | F-statistic: | 808.9 | | | |
| Date: | Thu, 20 Feb 2020 | Prob (F-statistic): | 0.00 | | | |
| Time: | 21:53:50 | Log-Likelihood: | -7.4792e+05 | | | |
| No. Observations: | 65755 | AIC: | 1.496e+06 | | | |
| Df Residuals: | 65737 | BIC: | 1.496e+06 | | | |
| Df Model: | 17 | | | | | |
| Covariance Type: | nonrobust | | | | | |
| | coef | std err | t | P> t | [0.025 | 0.975] |
| Intercept | 2.088e+04 | 1814.694 | 11.508 | 0.000 | 1.73e+04 | 2.44e+04 |
| C(sex)[T.2] | -9565.0085 | 166.814 | -57.339 | 0.000 | -9891.965 | -9238.053 |
| C(grade92)[T.32] | -1803.1261 | 2127.436 | -0.848 | 0.397 | -5972.902 | 2366.650 |
| C(grade92)[T.33] | -1247.3944 | 1938.392 | -0.644 | 0.520 | -5046.642 | 2551.853 |
| C(grade92)[T.34] | 1177.0358 | 1954.397 | 0.602 | 0.547 | -2653.583 | 5007.655 |
| C(grade92)[T.35] | 27.4385 | 1937.051 | 0.014 | 0.989 | -3769.181 | 3824.058 |
| C(grade92)[T.36] | 1607.9487 | 1924.614 | 0.835 | 0.403 | -2164.295 | 5380.193 |
| C(grade92)[T.37] | 1759.5315 | 1886.096 | 0.933 | 0.351 | -1937.217 | 5456.280 |
| C(grade92)[T.38] | 1779.8123 | 1926.053 | 0.924 | 0.355 | -1995.252 | 5554.877 |
| C(grade92)[T.39] | 8597.7933 | 1798.759 | 4.780 | 0.000 | 5072.225 | 1.21e+04 |
| C(grade92)[T.40] | 1.05e+04 | 1803.135 | 5.825 | 0.000 | 6968.501 | 1.4e+04 |
| C(grade92)[T.41] | 1.537e+04 | 1822.809 | 8.430 | 0.000 | 1.18e+04 | 1.89e+04 |
| C(grade92)[T.42] | 1.543e+04 | 1818.958 | 8.483 | 0.000 | 1.19e+04 | 1.9e+04 |
| C(grade92)[T.43] | 2.298e+04 | 1805.027 | 12.730 | 0.000 | 1.94e+04 | 2.65e+04 |
| C(grade92)[T.44] | 3.335e+04 | 1844.365 | 18.085 | 0.000 | 2.97e+04 | 3.7e+04 |
| C(grade92)[T.45] | 4.292e+04 | 2203.288 | 19.480 | 0.000 | 3.86e+04 | 4.72e+04 |
| C(grade92)[T.46] | 4.554e+04 | 2134.925 | 21.332 | 0.000 | 4.14e+04 | 4.97e+04 |
| age | 301.1445 | 6.026 | 49.972 | 0.000 | 289.333 | 312.956 |
| Omnibus: | 30642.596 | Durbin-Watson: | 1.901 | | | |
| Prob(Omnibus): | 0.000 | Jarque-Bera (JB): | 268847.869 | | | |
| Skew: | 2.046 | Prob(JB): | 0.00 | | | |
| Kurtosis: | 12.021 | Cond. No. | 3.83e+03 | | | |

Warnings:

[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.

[2] The condition number is large, $3.83e+03$. This might indicate that there are strong multicollinearity or other numerical problems.

The counterfactual is the group that is the same without the treatment. So in this case we are controlling for age we are comparing men and womens wages.

Question 8:

Now let's add to our regression an indicator variable for whether the respondent has at least graduated high school, and an indicator for whether the respondent at least has a BA.

In answering this question, use the following table of codes for the variable grade92.

Education is coded as follows:

```
In [14]: morg_subset['class_level'] = morg_subset['grade92'].apply(lambda x: 3 if x > 4
3 else x)

morg_subset['class_level'] = morg_subset['class_level'].apply(lambda x: 2 if
((x <= 43) and (x >= 39)) else x)
morg_subset['class_level'] = morg_subset['class_level'].apply(lambda x: 1 if
((x >= 31) and (x < 39)) else x)

morg_subset['class_level'].value_counts()

Out[14]: 2    105796
3     19844
1      8174
Name: class_level, dtype: int64
```

Question 9:

In running this regression, what is the implicit comparison you are making? In other words, when we run this regression, we are once more basically pretending we are comparing two groups and assuming they are counter-factuals for one another. What are these two groups?

```
In [15]: smf.ols('yearly_wage_diff ~ C(sex)+age +C(class_level)', data = morg_subset).fit().summary()
```

Out[15]: OLS Regression Results

| | | | |
|--------------------------|------------------|----------------------------|-------------|
| Dep. Variable: | yearly_wage_diff | R-squared: | 0.124 |
| Model: | OLS | Adj. R-squared: | 0.124 |
| Method: | Least Squares | F-statistic: | 2326. |
| Date: | Thu, 20 Feb 2020 | Prob (F-statistic): | 0.00 |
| Time: | 21:55:08 | Log-Likelihood: | -7.4981e+05 |
| No. Observations: | 65755 | AIC: | 1.500e+06 |
| Df Residuals: | 65750 | BIC: | 1.500e+06 |
| Df Model: | 4 | | |
| Covariance Type: | nonrobust | | |

| | coef | std err | t | P> t | [0.025 | 0.975] |
|----------------------------|------------|---------|---------|-------|-----------|-----------|
| Intercept | 2.147e+04 | 386.755 | 55.506 | 0.000 | 2.07e+04 | 2.22e+04 |
| C(sex)[T.2] | -8519.9765 | 170.311 | -50.026 | 0.000 | -8853.786 | -8186.167 |
| C(class_level)[T.2] | 1.199e+04 | 295.497 | 40.577 | 0.000 | 1.14e+04 | 1.26e+04 |
| C(class_level)[T.3] | 3.455e+04 | 486.246 | 71.063 | 0.000 | 3.36e+04 | 3.55e+04 |
| age | 296.9207 | 6.180 | 48.043 | 0.000 | 284.807 | 309.034 |

| | | | |
|-----------------------|-----------|--------------------------|------------|
| Omnibus: | 31830.713 | Durbin-Watson: | 1.892 |
| Prob(Omnibus): | 0.000 | Jarque-Bera (JB): | 276371.416 |
| Skew: | 2.152 | Prob(JB): | 0.00 |
| Kurtosis: | 12.074 | Cond. No. | 296. |

Warnings:

[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.

Now instead of controlling for age, we now controlling for age and education level. Meaning we are comparing men and women of the same age who either, did not finish high school, did not finish college, or have at least a BA.

Question 10:

Given how the coefficient on female has changed between Exercise 6 and Exercise 8, what can you infer about the educational attainment of the women in your survey data (as compared to the educational attainment of men)?

Controlling for age and sex there is 7557 dollars wage difference per year on average. However, when controlling for education level, the gap worsen to 8519 dollars per year. This means that the wage gap increases with education.

Question 11:

What does that tell you about the potential outcomes of men and women before you added education as a control?

There is a 8519 dollar wage gap between the sexes.

Question 12:

Finally, let's include fixed effects for the type of job held by each respondent.

```
In [16]: morg_subset['ind02'].value_counts()
```

```
Out[16]: ** Construction (23)                                10277
          Elementary and secondary schools (6111)             8026
          Hospitals (622)                                     6741
          Restaurants and other food services (722 exc. 7224) 5053
          Colleges and universities, including junior colleges (6112, 6113) 3105
          ...
          Tobacco manufacturing (3122)                        15
          Textile and fabric finishing and coating mills (3133) 13
          Fiber, yarn, and thread mills (3131)                 11
          Apparel accessories and other apparel manufacturing (3159) 10
          Video tape and disk rental (53223)                   7
          Name: ind02, Length: 251, dtype: int64
```

```
In [17]: smf.ols('yearly_wage_diff ~ C(sex)+age +C(class_level) + C(ind02)', data = mor  
g_subset).fit().summary()
```

Out[17]:

OLS Regression Results

| | | | |
|--------------------------|------------------|----------------------------|-------------|
| Dep. Variable: | yearly_wage_diff | R-squared: | 0.219 |
| Model: | OLS | Adj. R-squared: | 0.216 |
| Method: | Least Squares | F-statistic: | 72.38 |
| Date: | Thu, 20 Feb 2020 | Prob (F-statistic): | 0.00 |
| Time: | 21:57:39 | Log-Likelihood: | -7.4603e+05 |
| No. Observations: | 65755 | AIC: | 1.493e+06 |
| Df Residuals: | 65500 | BIC: | 1.495e+06 |
| Df Model: | 254 | | |
| Covariance Type: | nonrobust | | |

| | coef | std err | t | P> t | [0.025 | 0.975] |
|--|------------|----------|---------|-------|-----------|-----------|
| Intercept | 1.995e+04 | 723.275 | 27.576 | 0.000 | 1.85e+04 | 2.14e+04 |
| C(sex)[T.2] | -6977.1286 | 188.492 | -37.015 | 0.000 | -7346.574 | -6607.683 |
| C(class_level)[T.2] | 9126.4769 | 289.800 | 31.492 | 0.000 | 8558.469 | 9694.485 |
| C(class_level)[T.3] | 2.864e+04 | 480.480 | 59.603 | 0.000 | 2.77e+04 | 2.96e+04 |
| C(ind02)[T.** Alcoholic beverages, merchant wholesalers (*4248)] | -2832.4442 | 3154.740 | -0.898 | 0.369 | -9015.735 | 3350.846 |
| C(ind02)[T.** Apparel, fabrics, and notions, merchant wholesalers (*4243)] | -1283.6520 | 3026.216 | -0.424 | 0.671 | -7215.036 | 4647.733 |
| C(ind02)[T.** Construction (23)] | 1.144e+04 | 685.105 | 16.697 | 0.000 | 1.01e+04 | 1.28e+04 |
| C(ind02)[T.** Drugs, sundries, and chemical and allied products, merchant (wholesalers*4242, 4246)] | 5858.0567 | 2419.874 | 2.421 | 0.015 | 1115.103 | 1.06e+04 |
| C(ind02)[T.** Farm product raw materials, merchant wholesalers (*4245)] | -342.5732 | 2835.431 | -0.121 | 0.904 | -5900.019 | 5214.873 |
| C(ind02)[T.** Farm supplies, merchant wholesalers (*42491)] | 432.6850 | 3926.262 | 0.110 | 0.912 | -7262.790 | 8128.160 |
| C(ind02)[T.** Furniture and home furnishing, merchant wholesalers (*4232)] | 1376.9173 | 4232.919 | 0.325 | 0.745 | -6919.606 | 9673.440 |
| C(ind02)[T.** Groceries and related products, merchant wholesalers (*4244)] | 285.9216 | 1181.783 | 0.242 | 0.809 | -2030.373 | 2602.216 |
| C(ind02)[T.** Lumber and other construction materials, merchant wholesalers (*4233)] | 1610.0176 | 2262.428 | 0.712 | 0.477 | -2824.343 | 6044.378 |
| C(ind02)[T.** Machinery, equipment, and supplies, merchant wholesalers (*4238)] | 6043.1143 | 1706.166 | 3.542 | 0.000 | 2699.030 | 9387.199 |
| C(ind02)[T.** Mail order houses (*454113)] | 868.0917 | 3475.421 | 0.250 | 0.803 | -5943.733 | 7679.917 |

| | | | | | | |
|--|------------|----------|--------|-------|-----------|-----------|
| C(ind02)[T.** Metals and minerals, except petroleum, merchant wholesalers (*4235)] | 109.9126 | 4519.563 | 0.024 | 0.981 | -8748.433 | 8968.258 |
| C(ind02)[T.** Miscellaneous (nondurable goods, merchant wholesalers*4249 exc. 42491)] | 798.4175 | 2481.136 | 0.322 | 0.748 | -4064.610 | 5661.445 |
| C(ind02)[T.** Miscellaneous durable goods, merchant wholesalers (*4239 exc. 42393)] | -107.3624 | 4070.738 | -0.026 | 0.979 | -8086.010 | 7871.285 |
| C(ind02)[T.** Motor vehicles, parts and supplies, merchant wholesalers (*4231)] | 857.8476 | 2349.888 | 0.365 | 0.715 | -3747.933 | 5463.628 |
| C(ind02)[T.** Paper and paper products, merchant wholesalers (*4241)] | -3155.6482 | 4070.923 | -0.775 | 0.438 | -1.11e+04 | 4823.362 |
| C(ind02)[T.** Petroleum and petroleum products, merchant wholesalers (*4247)] | 1.084e+04 | 2530.205 | 4.283 | 0.000 | 5876.967 | 1.58e+04 |
| C(ind02)[T.** Professional and commercial equipment and supplies, merchant wholesalers (*4234)] | 4161.9877 | 2174.583 | 1.914 | 0.056 | -100.195 | 8424.171 |
| C(ind02)[T.** Recyclable material, merchant wholesalers (*42393)] | -1215.8453 | 2659.027 | -0.457 | 0.647 | -6427.539 | 3995.849 |
| C(ind02)[T.** Services to buildings and dwellings (5617 exc. 56173)] | -3970.1611 | 1062.469 | -3.737 | 0.000 | -6052.600 | -1887.722 |
| C(ind02)[T.*** Electronic auctions (New industrys*454112)] | 1754.3719 | 6215.603 | 0.282 | 0.778 | -1.04e+04 | 1.39e+04 |
| C(ind02)[T.*** Electronic shopping (New industry *454111)] | -38.1584 | 1762.813 | -0.022 | 0.983 | -3493.272 | 3416.956 |
| C(ind02)[T.*** Wholesale electronic markets, agents and brokers New industry (*4251)] | -3470.0297 | 3624.860 | -0.957 | 0.338 | -1.06e+04 | 3634.696 |
| C(ind02)[T.**** Data processing, hosting, and related services (*5182)] | 2164.9924 | 3736.564 | 0.579 | 0.562 | -5158.674 | 9488.659 |
| C(ind02)[T.****Department stores and discount stores (s45211)] | -4819.9446 | 883.721 | -5.454 | 0.000 | -6552.038 | -3087.851 |
| C(ind02)[T.**Newspaper publishers (51111)] | 2210.0603 | 2497.500 | 0.885 | 0.376 | -2685.040 | 7105.160 |
| C(ind02)[T.**Not specified wholesale trade (Part of 42)] | -1517.6959 | 3926.285 | -0.387 | 0.699 | -9213.215 | 6177.823 |
| C(ind02)[T.**Publishing, except newspapers and software (5111 exc. 51111)] | 1564.7567 | 2886.365 | 0.542 | 0.588 | -4092.518 | 7222.032 |
| C(ind02)[T.Accounting, tax preparation, bookkeeping, and payroll services (5412)] | 1.082e+04 | 1387.487 | 7.799 | 0.000 | 8101.462 | 1.35e+04 |
| C(ind02)[T.Administration of economic programs and space research (926, 927)] | 1.684e+04 | 1330.760 | 12.651 | 0.000 | 1.42e+04 | 1.94e+04 |
| C(ind02)[T.Administration of environmental quality and housing programs (924, 925)] | 1.187e+04 | 1663.137 | 7.137 | 0.000 | 8610.804 | 1.51e+04 |

| | | | | | | |
|--|------------|----------|--------|-------|-----------|----------|
| C(ind02)[T.Administration of human resource programs (923)] | 1.095e+04 | 1126.545 | 9.719 | 0.000 | 8740.789 | 1.32e+04 |
| C(ind02)[T.Advertising and related services (5418)] | 5789.7293 | 2135.231 | 2.712 | 0.007 | 1604.675 | 9974.783 |
| C(ind02)[T.Aerospace products and parts manufacturing (336414, 336415, 336419)] | 2.784e+04 | 4150.266 | 6.709 | 0.000 | 1.97e+04 | 3.6e+04 |
| C(ind02)[T.Agricultural chemical manufacturing (3253)] | 1.704e+04 | 4874.663 | 3.497 | 0.000 | 7490.266 | 2.66e+04 |
| C(ind02)[T.Agricultural implement manufacturing (33311)] | 7292.0468 | 2323.665 | 3.138 | 0.002 | 2737.663 | 1.18e+04 |
| C(ind02)[T.Air transportation (481)] | 1.343e+04 | 1391.016 | 9.654 | 0.000 | 1.07e+04 | 1.62e+04 |
| C(ind02)[T.Aircraft and parts manufacturing (336411 to 336413)] | 1.616e+04 | 1223.835 | 13.205 | 0.000 | 1.38e+04 | 1.86e+04 |
| C(ind02)[T.Aluminum production and processing (3313)] | 7054.0236 | 3121.206 | 2.260 | 0.024 | 936.460 | 1.32e+04 |
| C(ind02)[T.Animal food, grain and oilseed milling (3111, 3112)] | 2002.0712 | 2088.170 | 0.959 | 0.338 | -2090.742 | 6094.884 |
| C(ind02)[T.Animal production (112)] | 747.1543 | 1451.663 | 0.515 | 0.607 | -2098.106 | 3592.414 |
| C(ind02)[T.Animal slaughtering and processing (3116)] | -177.0576 | 1096.834 | -0.161 | 0.872 | -2326.853 | 1972.738 |
| C(ind02)[T.Apparel accessories and other apparel manufacturing (3159)] | 3004.1741 | 6866.071 | 0.438 | 0.662 | -1.05e+04 | 1.65e+04 |
| C(ind02)[T.Architectural, engineering, and related services (5413)] | 2.047e+04 | 1075.817 | 19.028 | 0.000 | 1.84e+04 | 2.26e+04 |
| C(ind02)[T.Auto parts, accessories, and tire stores (4413)] | -3512.6203 | 1341.315 | -2.619 | 0.009 | -6141.598 | -883.643 |
| C(ind02)[T.Automobile dealers (4411)] | 509.9563 | 1037.382 | 0.492 | 0.623 | -1523.312 | 2543.224 |
| C(ind02)[T.Automotive equipment rental and leasing (5321)] | 2231.3187 | 2363.292 | 0.944 | 0.345 | -2400.734 | 6863.372 |
| C(ind02)[T.Automotive repair and maintenance (8111 exc. 811192)] | 4554.8114 | 1008.717 | 4.515 | 0.000 | 2577.727 | 6531.896 |
| C(ind02)[T.Bakeries, except retail (3118 exc. 311811)] | 1063.9931 | 1898.427 | 0.560 | 0.575 | -2656.924 | 4784.910 |
| C(ind02)[T.Banking and related activities (521, 52211, 52219)] | 5392.6971 | 939.487 | 5.740 | 0.000 | 3551.302 | 7234.092 |
| C(ind02)[T.Barber shops (812111)] | -4811.5281 | 6515.786 | -0.738 | 0.460 | -1.76e+04 | 7959.413 |
| C(ind02)[T.Beauty salons (812112)] | -3278.1560 | 1644.788 | -1.993 | 0.046 | -6501.940 | -54.371 |
| C(ind02)[T.Beer, wine, and liquor stores (4453)] | -2834.0344 | 3429.344 | -0.826 | 0.409 | -9555.549 | 3887.480 |
| C(ind02)[T.Beverage manufacturing (3121)] | 6028.9949 | 1733.544 | 3.478 | 0.001 | 2631.248 | 9426.742 |
| C(ind02)[T.Book stores and news dealers (45121)] | -5536.3240 | 3860.443 | -1.434 | 0.152 | -1.31e+04 | 2030.146 |
| C(ind02)[T.Bowling centers (71395)] | -9288.4576 | 4519.014 | -2.055 | 0.040 | -1.81e+04 | -431.188 |
| C(ind02)[T.Building material and supplies dealers (4441 exc. 44413)] | -1436.2618 | 1055.403 | -1.361 | 0.174 | -3504.852 | 632.328 |

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| C(ind02)[T.Bus service and urban transit (4851, 4852, 4854, 4855, 4859)] | 1687.7310 | 1379.898 | 1.223 | 0.221 | -1016.870 | 4392.332 |
| C(ind02)[T.Business support services (5614)] | -1963.3962 | 1280.130 | -1.534 | 0.125 | -4472.451 | 545.658 |
| C(ind02)[T.Business, professional, political, and similar organizations (8139 exc. 81393)] | 1.043e+04 | 3122.469 | 3.339 | 0.001 | 4305.793 | 1.65e+04 |
| C(ind02)[T.Business, technical, and trade schools and training (6114, 6115)] | 7069.2781 | 4233.727 | 1.670 | 0.095 | -1228.828 | 1.54e+04 |
| C(ind02)[T.Car washes (811192)] | -6007.7916 | 2547.698 | -2.358 | 0.018 | -1.1e+04 | -1014.302 |
| C(ind02)[T.Carpet and rug mills (31411)] | -1568.9304 | 3154.721 | -0.497 | 0.619 | -7752.184 | 4614.323 |
| C(ind02)[T.Cement, concrete, lime, and gypsum product manufacturing (3273, 3274)] | 4647.7841 | 1831.889 | 2.537 | 0.011 | 1057.281 | 8238.288 |
| C(ind02)[T.Child day care services (6244)] | -2708.3927 | 1064.881 | -2.543 | 0.011 | -4795.559 | -621.227 |
| C(ind02)[T.Civic, social, advocacy organizations, and grantmaking and giving services (8132, 8133, 8134)] | 4995.2501 | 1433.761 | 3.484 | 0.000 | 2185.079 | 7805.421 |
| C(ind02)[T.Clothing and accessories, except shoe, stores (448 exc. 44821, 4483)] | -1482.0525 | 1333.572 | -1.111 | 0.266 | -4095.855 | 1131.750 |
| C(ind02)[T.Coal mining (2121)] | 2.377e+04 | 2088.790 | 11.380 | 0.000 | 1.97e+04 | 2.79e+04 |
| C(ind02)[T.Coating, engraving, heat treating and allied activities (3328)] | 853.2331 | 2835.564 | 0.301 | 0.763 | -4704.473 | 6410.940 |
| C(ind02)[T.Colleges and universities, including junior colleges (6112, 6113)] | 4125.5655 | 989.868 | 4.168 | 0.000 | 2185.423 | 6065.708 |
| C(ind02)[T.Commercial and industrial machinery and equipment repair and maintenance (8113)] | 1.006e+04 | 1618.617 | 6.213 | 0.000 | 6884.680 | 1.32e+04 |
| C(ind02)[T.Commercial, industrial, and other intangible assets rental and leasing (5324, 533)] | 7499.5430 | 2699.660 | 2.778 | 0.005 | 2208.209 | 1.28e+04 |
| C(ind02)[T.Communications, audio, and video equipment manufacturing (3342, 3343)] | 1041.3979 | 2835.685 | 0.367 | 0.713 | -4516.546 | 6599.342 |
| C(ind02)[T.Community food and housing, and emergency services (6242)] | 1222.3446 | 2659.515 | 0.460 | 0.646 | -3990.306 | 6434.995 |
| C(ind02)[T.Computer systems design and related services (5415)] | 1.816e+04 | 1080.308 | 16.812 | 0.000 | 1.6e+04 | 2.03e+04 |
| C(ind02)[T.Construction, mining and oil field machinery manufacturing (33312, 33313)] | 8847.6506 | 2070.687 | 4.273 | 0.000 | 4789.104 | 1.29e+04 |
| C(ind02)[T.Couriers and messengers (492)] | 9108.5047 | 1241.968 | 7.334 | 0.000 | 6674.246 | 1.15e+04 |
| C(ind02)[T.Crop production (111)] | -597.0093 | 1189.101 | -0.502 | 0.616 | -2927.647 | 1733.629 |
| C(ind02)[T.Cut and sew apparel manufacturing (3152)] | -1210.3662 | 2219.473 | -0.545 | 0.586 | -5560.533 | 3139.801 |

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| C(ind02)[T.Cutlery and hand tool manufacturing (3322)] | 9138.7865 | 4628.455 | 1.974 | 0.048 | 67.014 | 1.82e+04 |
| C(ind02)[T.Dairy product manufacturing (3115)] | 4094.4341 | 1843.114 | 2.221 | 0.026 | 481.929 | 7706.939 |
| C(ind02)[T.Drinking places, alcoholic beverages (7224)] | -9446.9758 | 2299.008 | -4.109 | 0.000 | -1.4e+04 | -4940.920 |
| C(ind02)[T.Drycleaning and laundry services (8123)] | -3939.7056 | 1816.013 | -2.169 | 0.030 | -7499.091 | -380.320 |
| C(ind02)[T.Electric and gas, and other combinations (Pts. 2211, 2212)] | 1.946e+04 | 2860.503 | 6.803 | 0.000 | 1.39e+04 | 2.51e+04 |
| C(ind02)[T.Electric power generation, transmission and distribution (Pt. 2211)] | 2.23e+04 | 1159.841 | 19.227 | 0.000 | 2e+04 | 2.46e+04 |
| C(ind02)[T.Electrical lighting, equipment, and supplies manufacturing, n.e.c. (3351, 3353, 3359)] | 5118.2894 | 1600.195 | 3.199 | 0.001 | 1981.907 | 8254.672 |
| C(ind02)[T.Electronic and precision equipment repair and maintenance (8112)] | 5967.9864 | 2939.383 | 2.030 | 0.042 | 206.794 | 1.17e+04 |
| C(ind02)[T.Electronic component and product manufacturing, n.e.c. (3344, 3346)] | 8884.4554 | 1429.208 | 6.216 | 0.000 | 6083.208 | 1.17e+04 |
| C(ind02)[T.Elementary and secondary schools (6111)] | 2629.0318 | 775.592 | 3.390 | 0.001 | 1108.871 | 4149.193 |
| C(ind02)[T.Employment services (5613)] | 3123.5262 | 1137.245 | 2.747 | 0.006 | 894.526 | 5352.527 |
| C(ind02)[TEngines, turbines, and power transmission equipment manufacturing (3336)] | 6289.4351 | 3996.434 | 1.574 | 0.116 | -1543.576 | 1.41e+04 |
| C(ind02)[T.Executive offices and legislative bodies (92111, 92112, 92114, pt. 92115)] | 7639.4904 | 1011.699 | 7.551 | 0.000 | 5656.561 | 9622.420 |
| C(ind02)[T.Fabric mills, except knitting (3132 exc. 31324)] | -2770.7557 | 2886.401 | -0.960 | 0.337 | -8428.102 | 2886.590 |
| C(ind02)[T.Fiber, yarn, and thread mills (3131)] | -7748.5723 | 1.03e+04 | -0.754 | 0.451 | -2.79e+04 | 1.24e+04 |
| C(ind02)[T.Fishing, hunting, and trapping (114)] | -5693.9349 | 5165.479 | -1.102 | 0.270 | -1.58e+04 | 4430.405 |
| C(ind02)[T.Footwear manufacturing (3162)] | -1070.1150 | 5516.956 | -0.194 | 0.846 | -1.19e+04 | 9743.119 |
| C(ind02)[T.Forestry except logging (1131, 1132)] | 9224.0214 | 3385.736 | 2.724 | 0.006 | 2587.979 | 1.59e+04 |
| C(ind02)[T.Foundries (3315)] | 7003.5031 | 2860.569 | 2.448 | 0.014 | 1396.787 | 1.26e+04 |
| C(ind02)[T.Fruit and vegetable preserving and specialty food manufacturing (3114)] | 1941.8294 | 1967.058 | 0.987 | 0.324 | -1913.605 | 5797.264 |
| C(ind02)[T.Fuel dealers (45431)] | 830.1037 | 2721.057 | 0.305 | 0.760 | -4503.169 | 6163.377 |
| C(ind02)[T.Funeral homes, cemeteries, and crematories (8122)] | -2174.6575 | 2913.429 | -0.746 | 0.455 | -7884.979 | 3535.664 |

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| C(ind02)[T.Furniture and home furnishings stores (442)] | -1303.8696 | 1501.182 | -0.869 | 0.385 | -4246.187 | 1638.448 |
| C(ind02)[T.Gasoline stations (447)] | -5952.7487 | 1420.789 | -4.190 | 0.000 | -8737.495 | -3168.002 |
| C(ind02)[T.Gift, novelty, and souvenir shops (45322)] | -6364.5237 | 3264.987 | -1.949 | 0.051 | -1.28e+04 | 34.852 |
| C(ind02)[T.Glass and glass product manufacturing (3272)] | -138.2115 | 2262.550 | -0.061 | 0.951 | -4572.811 | 4296.388 |
| C(ind02)[T.Grocery stores (4451)] | -3641.0725 | 836.794 | -4.351 | 0.000 | -5281.190 | -2000.955 |
| C(ind02)[T.Hardware stores (44413)] | -6143.0012 | 2020.445 | -3.040 | 0.002 | -1.01e+04 | -2182.929 |
| C(ind02)[T.Health and personal care, except drug, stores (446 exc. 44611)] | 1767.7838 | 1678.144 | 1.053 | 0.292 | -1521.380 | 5056.947 |
| C(ind02)[T.Home health care services (6216)] | 142.2918 | 1029.617 | 0.138 | 0.890 | -1875.759 | 2160.342 |
| C(ind02)[T.Hospitals (622)] | 1.542e+04 | 708.030 | 21.779 | 0.000 | 1.4e+04 | 1.68e+04 |
| C(ind02)[T.Household appliance manufacturing (3352)] | 3609.1123 | 3056.347 | 1.181 | 0.238 | -2381.329 | 9599.554 |
| C(ind02)[T.Household appliance stores (443111)] | -2779.5621 | 3679.127 | -0.755 | 0.450 | -9990.652 | 4431.528 |
| C(ind02)[T.Independent artists, performing arts, spectator sports, and related industries (711)] | 7845.1930 | 1974.415 | 3.973 | 0.000 | 3975.340 | 1.17e+04 |
| C(ind02)[T.Individual and family services (6241)] | 1621.7011 | 1008.507 | 1.608 | 0.108 | -354.973 | 3598.375 |
| C(ind02)[T.Industrial and miscellaneous chemicals (3251, 3259)] | 1.496e+04 | 1487.929 | 10.057 | 0.000 | 1.2e+04 | 1.79e+04 |
| C(ind02)[T.Insurance carriers and related activities (524)] | 7120.9380 | 917.172 | 7.764 | 0.000 | 5323.281 | 8918.595 |
| C(ind02)[T.Internet publishing and broadcasting and web search portals (51913)] | 2.968e+04 | 4322.602 | 6.866 | 0.000 | 2.12e+04 | 3.82e+04 |
| C(ind02)[T.Investigation and security services (5616)] | -1709.3541 | 1132.865 | -1.509 | 0.131 | -3929.770 | 511.062 |
| C(ind02)[T.Iron and steel mills and steel product manufacturing (3311, 3312)] | 9549.4298 | 1580.304 | 6.043 | 0.000 | 6452.033 | 1.26e+04 |
| C(ind02)[T.Jewelry, luggage, and leather goods stores (4483)] | -3439.7270 | 2812.149 | -1.223 | 0.221 | -8951.540 | 2072.086 |
| C(ind02)[T.Justice, public order, and safety activities (922, pt. 92115)] | 1.146e+04 | 809.553 | 14.157 | 0.000 | 9874.365 | 1.3e+04 |
| C(ind02)[T.Knitting mills (31324, 3151)] | -4645.7813 | 5332.621 | -0.871 | 0.384 | -1.51e+04 | 5806.158 |
| C(ind02)[T.Labor unions (81393)] | 1.644e+04 | 4417.396 | 3.721 | 0.000 | 7779.876 | 2.51e+04 |
| C(ind02)[T.Landscaping services (56173)] | -1867.0061 | 1077.556 | -1.733 | 0.083 | -3979.016 | 245.004 |
| C(ind02)[T.Lawn and garden equipment and supplies stores (4442)] | -1113.3664 | 1803.788 | -0.617 | 0.537 | -4648.791 | 2422.059 |
| C(ind02)[T.Leather tanning and products, except footwear manufacturing (3161, 3169)] | -6539.3146 | 6215.978 | -1.052 | 0.293 | -1.87e+04 | 5644.003 |

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| C(ind02)[T.Legal services (5411)] | 1.227e+04 | 1249.410 | 9.821 | 0.000 | 9821.000 | 1.47e+04 |
| C(ind02)[T.Libraries and archives (*51912)] | 3455.0423 | 2502.223 | 1.381 | 0.167 | -1449.315 | 8359.400 |
| C(ind02)[T.Logging (1133)] | 5956.1442 | 2811.808 | 2.118 | 0.034 | 444.999 | 1.15e+04 |
| C(ind02)[T.Machine shops; turned product; screw, nut and bolt manufacturing (3327)] | 4042.3318 | 1504.370 | 2.687 | 0.007 | 1093.765 | 6990.898 |
| C(ind02)[T.Machinery manufacturing, n.e.c. (3332, 3334, 3339)] | 5862.2230 | 1199.679 | 4.886 | 0.000 | 3510.852 | 8213.594 |
| C(ind02)[T.Management of companies and enterprises (551)] | 4332.1419 | 2497.025 | 1.735 | 0.083 | -562.028 | 9226.312 |
| C(ind02)[T.Management, scientific, and technical consulting services (5416)] | 1.214e+04 | 1370.157 | 8.861 | 0.000 | 9455.714 | 1.48e+04 |
| C(ind02)[T.Medical equipment and supplies manufacturing (3391)] | 6598.9719 | 1345.547 | 4.904 | 0.000 | 3961.699 | 9236.245 |
| C(ind02)[T.Metal forgings and stampings (3321)] | -1116.7033 | 3120.964 | -0.358 | 0.720 | -7233.794 | 5000.387 |
| C(ind02)[T.Metal ore mining (2122)] | 3.857e+04 | 3303.173 | 11.676 | 0.000 | 3.21e+04 | 4.5e+04 |
| C(ind02)[T.Metalworking machinery manufacturing (3335)] | 8482.9575 | 2217.219 | 3.826 | 0.000 | 4137.208 | 1.28e+04 |
| C(ind02)[T.Miscellaneous fabricated metal products manufacturing (3325, 3326, 3329 exc. 332992, 332993, 332994, 332995)] | 2472.1506 | 1535.629 | 1.610 | 0.107 | -537.682 | 5481.983 |
| C(ind02)[T.Miscellaneous general merchandise stores (4529)] | -3651.1447 | 1369.607 | -2.666 | 0.008 | -6335.575 | -966.714 |
| C(ind02)[T.Miscellaneous manufacturing, n.e.c. (3399 exc. 33992, 33993)] | 3352.8163 | 1363.125 | 2.460 | 0.014 | 681.092 | 6024.541 |
| C(ind02)[T.Miscellaneous nonmetallic mineral product manufacturing (3279)] | 3511.0097 | 2720.939 | 1.290 | 0.197 | -1822.032 | 8844.052 |
| C(ind02)[T.Miscellaneous paper and pulp products (32222,32223, 32229)] | 6526.9223 | 3026.104 | 2.157 | 0.031 | 595.759 | 1.25e+04 |
| C(ind02)[T.Miscellaneous petroleum and coal products (32419)] | 7917.4075 | 4628.498 | 1.711 | 0.087 | -1154.450 | 1.7e+04 |
| C(ind02)[T.Miscellaneous retail stores (4539)] | -576.5536 | 1783.164 | -0.323 | 0.746 | -4071.556 | 2918.449 |
| C(ind02)[T.Motion pictures and video industries (5121)] | 1.717e+04 | 2481.001 | 6.920 | 0.000 | 1.23e+04 | 2.2e+04 |
| C(ind02)[T.Motor vehicles and motor vehicle equipment manufacturing (3361, 3362, 3363)] | 4981.2451 | 921.123 | 5.408 | 0.000 | 3175.844 | 6786.646 |
| C(ind02)[T.Museums, art galleries, historical sites, and similar institutions (712)] | 2103.2929 | 1793.330 | 1.173 | 0.241 | -1411.634 | 5618.220 |
| C(ind02)[T.Nail salons and other personal care services (812113, 81219)] | 2637.6547 | 1969.083 | 1.340 | 0.180 | -1221.749 | 6497.058 |

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| C(ind02)[T.National security and international affairs (928)] | 1.639e+04 | 1098.090 | 14.929 | 0.000 | 1.42e+04 | 1.85e+04 |
| C(ind02)[T.Natural gas distribution (Pt.s2212)] | 1.582e+04 | 2298.725 | 6.883 | 0.000 | 1.13e+04 | 2.03e+04 |
| C(ind02)[T.Navigational, measuring, electromedical, and control instruments manufacturing (3345)] | 1.571e+04 | 2164.563 | 7.257 | 0.000 | 1.15e+04 | 2e+04 |
| C(ind02)[T.Non-depository credit and related activities (5222, 5223)] | 5187.9865 | 1328.184 | 3.906 | 0.000 | 2584.746 | 7791.227 |
| C(ind02)[T.Nonferrous metal, except aluminum, production and processing (3314)] | 5436.8404 | 3475.233 | 1.564 | 0.118 | -1374.617 | 1.22e+04 |
| C(ind02)[T.Nonmetallic mineral mining and quarrying (2123)] | 1.496e+04 | 1905.381 | 7.850 | 0.000 | 1.12e+04 | 1.87e+04 |
| C(ind02)[T.Not specified food industries (Part of 311)] | 1223.3559 | 3189.856 | 0.384 | 0.701 | -5028.762 | 7475.474 |
| C(ind02)[T.Not specified manufacturing industries (Part of 31, 32, 33)] | 1099.1257 | 1738.269 | 0.632 | 0.527 | -2307.883 | 4506.134 |
| C(ind02)[T.Not specified metal industries (Part of 331 and 332)] | 3028.0582 | 5166.247 | 0.586 | 0.558 | -7097.788 | 1.32e+04 |
| C(ind02)[T.Not specified retail trade (Part of 44, 45)] | -2066.5084 | 1855.722 | -1.114 | 0.265 | -5703.723 | 1570.707 |
| C(ind02)[T.Not specified utilities (Part of 22)] | 1.162e+04 | 7777.119 | 1.494 | 0.135 | -3620.698 | 2.69e+04 |
| C(ind02)[T.Nursing care facilities (6231)] | 1435.3442 | 888.188 | 1.616 | 0.106 | -305.504 | 3176.192 |
| C(ind02)[T.Office supplies and stationery stores (45321)] | -1275.4110 | 2619.905 | -0.487 | 0.626 | -6410.425 | 3859.603 |
| C(ind02)[T.Offices of chiropractors (62131)] | 7199.5727 | 3681.219 | 1.956 | 0.050 | -15.617 | 1.44e+04 |
| C(ind02)[T.Offices of dentists (6212)] | 6303.5809 | 1233.835 | 5.109 | 0.000 | 3885.264 | 8721.898 |
| C(ind02)[T.Offices of optometrists (62132)] | 2202.7543 | 2289.041 | 0.962 | 0.336 | -2283.766 | 6689.275 |
| C(ind02)[T.Offices of other health practitioners (6213 exc. 62131, 62132)] | 1.305e+04 | 2723.303 | 4.793 | 0.000 | 7714.431 | 1.84e+04 |
| C(ind02)[T.Offices of physicians (6211)] | 7856.3739 | 972.129 | 8.082 | 0.000 | 5951.001 | 9761.747 |
| C(ind02)[T.Oil and gas extraction (211)] | 2.537e+04 | 3343.513 | 7.588 | 0.000 | 1.88e+04 | 3.19e+04 |
| C(ind02)[T.Ordnance (332992 to 332995)] | 1.155e+04 | 3088.164 | 3.740 | 0.000 | 5495.526 | 1.76e+04 |
| C(ind02)[T.Other administrative and other support services (5611, 5612, 5619)] | 1077.4994 | 1831.973 | 0.588 | 0.556 | -2513.169 | 4668.168 |
| C(ind02)[T.Other amusement, gambling, and recreation industries (713 exc. 71395)] | -3071.7956 | 943.558 | -3.256 | 0.001 | -4921.170 | -1222.421 |
| C(ind02)[T.Other consumer goods rental (53221, 53222, 53229, 5323)] | -32.7800 | 2912.232 | -0.011 | 0.991 | -5740.755 | 5675.195 |

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| C(ind02)[T.Other direct selling establishments (45439)] | -1861.4877 | 4070.601 | -0.457 | 0.647 | -9839.866 | 6116.891 |
| C(ind02)[T.Other general government and support (92119)] | 9811.7253 | 2565.035 | 3.825 | 0.000 | 4784.257 | 1.48e+04 |
| C(ind02)[T.Other health care services (6215, 6219)] | 1.031e+04 | 975.284 | 10.566 | 0.000 | 8393.617 | 1.22e+04 |
| C(ind02)[T.Other information services (*5191 exc. 51912)] | 2.064e+04 | 7777.230 | 2.653 | 0.008 | 5392.703 | 3.59e+04 |
| C(ind02)[T.Other motor vehicle dealers (4412)] | 2905.2945 | 2336.797 | 1.243 | 0.214 | -1674.829 | 7485.418 |
| C(ind02)[T.Other personal services (8129)] | -2963.1675 | 1989.854 | -1.489 | 0.136 | -6863.282 | 936.947 |
| C(ind02)[T.Other professional, scientific, and technical services (5419 exc. 54194)] | 6620.4252 | 2337.135 | 2.833 | 0.005 | 2039.640 | 1.12e+04 |
| C(ind02)[T.Other schools, instruction, and educational services (6116, 6117)] | 6301.3161 | 1940.506 | 3.247 | 0.001 | 2497.923 | 1.01e+04 |
| C(ind02)[T.Other telecommunications services (*517 exc. 5171, 5175)] | 8919.6668 | 1610.866 | 5.537 | 0.000 | 5762.369 | 1.21e+04 |
| C(ind02)[T.Other transportation equipment manufacturing (3369)] | 819.9570 | 4417.328 | 0.186 | 0.853 | -7838.006 | 9477.920 |
| C(ind02)[T.Outpatient care centers (6214)] | 7784.4316 | 908.684 | 8.567 | 0.000 | 6003.410 | 9565.453 |
| C(ind02)[T.Paint, coating, and adhesive manufacturing B46 (3255)] | 8378.7533 | 3679.380 | 2.277 | 0.023 | 1167.167 | 1.56e+04 |
| C(ind02)[T.Paperboard containers and boxes (32221)] | 944.1146 | 2678.852 | 0.352 | 0.725 | -4306.437 | 6194.666 |
| C(ind02)[T.Personal and household goods repair and maintenance (8114 exc. 81143)] | 3162.6923 | 2742.451 | 1.153 | 0.249 | -2212.513 | 8537.898 |
| C(ind02)[T.Petroleum refining (32411)] | 2.544e+04 | 2036.936 | 12.488 | 0.000 | 2.14e+04 | 2.94e+04 |
| C(ind02)[T.Pharmaceutical and medicine manufacturing (3254)] | 8074.2624 | 1693.796 | 4.767 | 0.000 | 4754.421 | 1.14e+04 |
| C(ind02)[T.Pharmacies and drug stores (44611)] | 5322.2419 | 1147.231 | 4.639 | 0.000 | 3073.669 | 7570.815 |
| C(ind02)[T.Pipeline transportation (486)] | 2.295e+04 | 2912.523 | 7.879 | 0.000 | 1.72e+04 | 2.87e+04 |
| C(ind02)[T.Plastics product manufacturing (3261)] | 1254.0196 | 1442.830 | 0.869 | 0.385 | -1573.927 | 4081.966 |
| C(ind02)[T.Postal Service (491)] | 7618.2187 | 1199.278 | 6.352 | 0.000 | 5267.634 | 9968.804 |
| C(ind02)[T.Pottery, ceramics, and related products manufacturing (32711)] | -378.0149 | 5517.404 | -0.069 | 0.945 | -1.12e+04 | 1.04e+04 |
| C(ind02)[T.Prefabricated wood buildings and mobile homes (321991, 321992)] | -1918.1996 | 3737.708 | -0.513 | 0.608 | -9244.108 | 5407.709 |
| C(ind02)[T.Printing and related support activities (3231)] | 1473.5399 | 1370.864 | 1.075 | 0.282 | -1213.353 | 4160.433 |
| C(ind02)[T.Private households (814)] | -2478.9700 | 1540.681 | -1.609 | 0.108 | -5498.706 | 540.766 |

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|---|------------|----------|--------|-------|-----------|-----------|
| C(ind02)[T.Public finance activities (92113)] | 1.007e+04 | 1750.330 | 5.755 | 0.000 | 6642.673 | 1.35e+04 |
| C(ind02)[T.Pulp, paper, and paperboard mills (3221)] | 1.205e+04 | 1783.133 | 6.755 | 0.000 | 8550.262 | 1.55e+04 |
| C(ind02)[T.Radio and television broadcasting and cable (5151, 5152, 5175)] | 1.076e+04 | 1503.925 | 7.154 | 0.000 | 7811.523 | 1.37e+04 |
| C(ind02)[T.Rail transportation (482)] | 1.786e+04 | 1793.837 | 9.954 | 0.000 | 1.43e+04 | 2.14e+04 |
| C(ind02)[T.Railroad rolling stock manufacturing (3365)] | 8614.9722 | 4746.855 | 1.815 | 0.070 | -688.864 | 1.79e+04 |
| C(ind02)[T.Real estate (531)] | 3621.4482 | 1015.636 | 3.566 | 0.000 | 1630.802 | 5612.095 |
| C(ind02)[T.Recreational vehicle parks and camps, and rooming and boarding houses (7212, 7213)] | -6560.8753 | 3385.472 | -1.938 | 0.053 | -1.32e+04 | 74.651 |
| C(ind02)[T.Religious organizations (8131)] | 1220.6916 | 1711.432 | 0.713 | 0.476 | -2133.716 | 4575.100 |
| C(ind02)[T.Residential care facilities, without nursing (6232, 6233, 6239)] | -636.8590 | 1089.884 | -0.584 | 0.559 | -2773.031 | 1499.313 |
| C(ind02)[T.Resin, synthetic rubber and fibers, and filaments manufacturing (3252)] | 3989.7517 | 2070.497 | 1.927 | 0.054 | -68.422 | 8047.926 |
| C(ind02)[T.Restaurants and other food services (722 exc. 7224)] | -6171.8327 | 718.617 | -8.588 | 0.000 | -7580.322 | -4763.343 |
| C(ind02)[T.Retail bakeries (311811)] | -2855.0087 | 2006.214 | -1.423 | 0.155 | -6787.189 | 1077.172 |
| C(ind02)[T.Retail florists (4531)] | -6205.6884 | 4629.649 | -1.340 | 0.180 | -1.53e+04 | 2868.425 |
| C(ind02)[T.Rubber products, except tires, manufacturing (32622, 32629)] | 4853.4783 | 2582.616 | 1.879 | 0.060 | -208.449 | 9915.406 |
| C(ind02)[T.Savings institutions, including credit unions (52212, 52213)] | 5197.5871 | 1679.020 | 3.096 | 0.002 | 1906.709 | 8488.466 |
| C(ind02)[T.Sawmills and wood preservation (3211)] | 4065.7141 | 1861.575 | 2.184 | 0.029 | 417.027 | 7714.401 |
| C(ind02)[T.Scenic and sightseeing transportation (487)] | -2270.9420 | 4746.698 | -0.478 | 0.632 | -1.16e+04 | 7032.587 |
| C(ind02)[T.Scientific research and development services (5417)] | 1.617e+04 | 1657.214 | 9.760 | 0.000 | 1.29e+04 | 1.94e+04 |
| C(ind02)[T.Seafood and other miscellaneous foods, n.e.c. (3117, 3119)] | 2491.1371 | 1867.084 | 1.334 | 0.182 | -1168.348 | 6150.622 |
| C(ind02)[T.Securities, commodities, funds, trusts, and other financial investments (523, 525)] | 1.028e+04 | 1468.867 | 6.999 | 0.000 | 7402.210 | 1.32e+04 |
| C(ind02)[T.Services incidental to transportation (488)] | 7024.9600 | 1187.755 | 5.914 | 0.000 | 4696.959 | 9352.961 |
| C(ind02)[T.Sewage treatment facilities (22132)] | 8689.5064 | 2659.436 | 3.267 | 0.001 | 3477.012 | 1.39e+04 |
| C(ind02)[T.Sewing, needlework, and piece goods stores (45113)] | -3931.6437 | 5723.112 | -0.687 | 0.492 | -1.51e+04 | 7285.658 |
| C(ind02)[T.Ship and boat building (3366)] | 6947.1410 | 1924.811 | 3.609 | 0.000 | 3174.511 | 1.07e+04 |

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| C(ind02)[T.Shoe stores (44821)] | -1744.6906 | 3121.473 | -0.559 | 0.576 | -7862.779 | 4373.398 |
| C(ind02)[T.Soap, cleaning compound, and cosmetics manufacturing (3256)] | 1083.9752 | 2886.091 | 0.376 | 0.707 | -4572.764 | 6740.715 |
| C(ind02)[T.Software publishing (5112)] | 2.709e+04 | 5953.830 | 4.550 | 0.000 | 1.54e+04 | 3.88e+04 |
| C(ind02)[T.Sound recording industries (5122)] | 1.647e+04 | 1.03e+04 | 1.603 | 0.109 | -3665.278 | 3.66e+04 |
| C(ind02)[T.Specialized design services (5414)] | 1.162e+04 | 2836.050 | 4.098 | 0.000 | 6062.786 | 1.72e+04 |
| C(ind02)[T.Specialty food stores (4452)] | -3098.6401 | 2449.961 | -1.265 | 0.206 | -7900.563 | 1703.283 |
| C(ind02)[T.Structural clay product manufacturing (32712)] | 227.7560 | 4874.488 | 0.047 | 0.963 | -9326.242 | 9781.754 |
| C(ind02)[T.Structural metals, and tank and shipping container manufacturing (3323, 3324)] | 5549.6119 | 1457.611 | 3.807 | 0.000 | 2692.694 | 8406.530 |
| C(ind02)[T.Sugar and confectionery products (3113)] | 1591.1682 | 2639.167 | 0.603 | 0.547 | -3581.600 | 6763.936 |
| C(ind02)[T.Support activities for agriculture and forestry (115)] | 2250.9570 | 2531.321 | 0.889 | 0.374 | -2710.432 | 7212.346 |
| C(ind02)[T.Support activities for mining (213)] | 2.624e+04 | 1208.659 | 21.708 | 0.000 | 2.39e+04 | 2.86e+04 |
| C(ind02)[T.Taxi and limousine service (4853)] | -4676.7000 | 2062.148 | -2.268 | 0.023 | -8718.510 | -634.890 |
| C(ind02)[T.Textile and fabric finishing and coating mills (3133)] | -4956.3677 | 8397.049 | -0.590 | 0.555 | -2.14e+04 | 1.15e+04 |
| C(ind02)[T.Textile product mills, except carpets and rugs (314 exc. 31411)] | -3285.8426 | 2967.860 | -1.107 | 0.268 | -9102.850 | 2531.164 |
| C(ind02)[T.Tire manufacturing (32621)] | 1.382e+04 | 3385.503 | 4.084 | 0.000 | 7189.164 | 2.05e+04 |
| C(ind02)[T.Tobacco manufacturing (3122)] | 2.241e+04 | 8396.291 | 2.670 | 0.008 | 5957.907 | 3.89e+04 |
| C(ind02)[T.Toys, amusement, and sporting goods manufacturing (33992, 33993)] | -607.8681 | 2638.974 | -0.230 | 0.818 | -5780.257 | 4564.521 |
| C(ind02)[T.Travel arrangements and reservation services (5615)] | 2498.3023 | 2229.157 | 1.121 | 0.262 | -1870.846 | 6867.451 |
| C(ind02)[T.Traveler accommodation (7211)] | -2561.2634 | 937.046 | -2.733 | 0.006 | -4397.874 | -724.653 |
| C(ind02)[T.Truck transportation (484)] | 5909.9295 | 962.467 | 6.140 | 0.000 | 4023.495 | 7796.364 |
| C(ind02)[T.Used merchandise stores (4533)] | -8726.0339 | 2420.569 | -3.605 | 0.000 | -1.35e+04 | -3981.718 |
| C(ind02)[T.Vending machine operators (4542)] | 3102.9426 | 4519.093 | 0.687 | 0.492 | -5754.481 | 1.2e+04 |
| C(ind02)[T.Veneer, plywood, and engineered wood products (3212)] | 4694.1887 | 3796.672 | 1.236 | 0.216 | -2747.289 | 1.21e+04 |
| C(ind02)[T.Veterinary services (54194)] | 1847.5721 | 1618.421 | 1.142 | 0.254 | -1324.534 | 5019.678 |
| C(ind02)[T.Video tape and disk rental (53223)] | 2.388e+04 | 1.45e+04 | 1.645 | 0.100 | -4570.178 | 5.23e+04 |

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|--|------------|----------|--------|-------|-----------|----------|
| C(ind02)[T.Vocational rehabilitation services (6243)] | -3275.7945 | 3121.158 | -1.050 | 0.294 | -9393.264 | 2841.675 |
| C(ind02)[T.Warehousing and storage (493)] | -2347.5296 | 1204.780 | -1.949 | 0.051 | -4708.899 | 13.840 |
| C(ind02)[T.Waste management and remediation services (562)] | 4075.1873 | 1314.987 | 3.099 | 0.002 | 1497.812 | 6652.563 |
| C(ind02)[T.Water transportation (483)] | 1.575e+04 | 3679.382 | 4.280 | 0.000 | 8537.059 | 2.3e+04 |
| C(ind02)[T.Water, steam, air-conditioning, and irrigation systems (22131, 22133)] | 9026.2743 | 1720.164 | 5.247 | 0.000 | 5654.753 | 1.24e+04 |
| C(ind02)[T.Wired telecommunications carriers (*5171)] | 1.488e+04 | 1467.224 | 10.142 | 0.000 | 1.2e+04 | 1.78e+04 |
| age | 255.8053 | 5.984 | 42.750 | 0.000 | 244.077 | 267.533 |

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|-----------------------|-----------|--------------------------|------------|
| Omnibus: | 32243.470 | Durbin-Watson: | 1.906 |
| Prob(Omnibus): | 0.000 | Jarque-Bera (JB): | 317113.748 |
| Skew: | 2.141 | Prob(JB): | 0.00 |
| Kurtosis: | 12.870 | Cond. No. | 7.93e+03 |

Warnings:

- [1] Standard Errors assume that the covariance matrix of the errors is correctly specified.
 [2] The condition number is large, 7.93e+03. This might indicate that there are strong multicollinearity or other numerical problems.

Question 13:

Now that we've added industry fixed effects, what groups are we implicitly treated as counter-factuals for one another now?

When controlling for age, education, and industry the wage gape decreases from 8519 to 6977 dollars.

Question 14:

What happened to your estimate of the gender wage gap when you added industry fixed effects? What does that tell you about the industries chosen by women as opposed to men?

The results above suggests that women tend to go into lower paying industries like education. We know this because adding the fiexed effects for industry reduced the gender wage gap.