Estimating Gender Discrimination in the Workplace

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```python
In [ ]:   import numpy as np
          import pandas as pd
          import statsmodels.formula.api as smf

          import warnings
          warnings.filterwarnings('ignore')
```

Exercise 1

```python
In [ ]:   df = pd.read_stata("https://github.com/nickeubank/MIDS_Data/blob/master"
                             "/Current_Population_Survey/morg18.dta?raw=true")
          df.head()
```

Out[ ]:

	hhid	intmonth	huaspli	hrhtype	minsamp	hrlonglk	hrsample	hrhhid2	serial	hhnum	...	ym_file	ym	ch0:
0	000004795110719	January	1.0	Husband/wife primary fam (neither in Armed For...	MIS 8	MIS 2-4 Or MIS 6-8 (link To	0601	06011	1	1	...	696	681	
1	000004795110719	January	1.0	Husband/wife primary fam (neither in Armed For...	MIS 8	MIS 2-4 Or MIS 6-8 (link To	0601	06011	1	1	...	696	681	
2	000110339935453	January	1.0	Unmarried civilian female primary fam householder	MIS 4	MIS 2-4 Or MIS 6-8 (link To	0701	07011	1	1	...	696	693	
3	000110339935453	January	1.0	Unmarried civilian female primary fam householder	MIS 4	MIS 2-4 Or MIS 6-8 (link To	0701	07011	1	1	...	696	693	
4	000110359424339	January	1.0	Unmarried civilian female primary fam householder	MIS 4	MIS 2-4 Or MIS 6-8 (link To	0711	07111	1	1	...	696	693	

5 rows × 98 columns

Exercise 2

```python
# check what lfsr94 looks like
df['lfsr94'].value_counts()
```

Out[ ]:
```
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
Unemployed—On Layoff             1046
Name: lfsr94, dtype: int64
```

```
In [ ]:  # subset the data
         df_2 = df[(df['lfsr94'] == 'Employed-At Work') & (df['uhourse'] >= 35)]
```

Exercise 3

```
In [ ]:  # Earnings per week
         weekly_pay_by_gender = df_2.groupby("sex")["earnwke"].mean().values
         print(f"Average weekly pay of male is ${weekly_pay_by_gender[0]:.2f}")
         print(f"Average weekly pay of female is ${weekly_pay_by_gender[1]:.2f}")
```

Average weekly pay of male is $1204.73
Average weekly pay of female is $985.68

```
In [ ]:  # avg hourly pay
         avg_hourly_pay_m = (df_2.loc[df_2['sex']==1, 'earnwke']
                              / df_2.loc[df_2['sex']==1, 'uhourse']).mean()
         avg_hourly_pay_f = (df_2.loc[df_2['sex']==2, 'earnwke']
                              / df_2.loc[df_2['sex']==2, 'uhourse']).mean()
         print(f"Average hourly pay of male is ${avg_hourly_pay_m:.2f}")
         print(f"Average hourly pay of female is ${avg_hourly_pay_f:.2f}")
```

Average hourly pay of male is $27.88
Average hourly pay of female is $23.80

Exercise 4

```
In [ ]:  df_2["annual_earnings"] = df_2["earnwke"] * 48
         female_annual_earning = df_2.groupby("sex")["annual_earnings"].mean().values[1]
         male_annual_earning = df_2.groupby("sex")["annual_earnings"].mean().values[0]
         diff_percent = (male_annual_earning - female_annual_earning)/female_annual_earning
         print(f"Average annual pay of male is ${male_annual_earning:.2f}")
         print(f"Average annual pay of female is ${female_annual_earning:.2f}")
         print(f"Difference in percentage with regard to female annual earning is {diff_percent:.2%}")
```

Average annual pay of male is $57827.22
Average annual pay of female is $47312.79
Difference in percentage with regard to female annual earning is 22.22%

Exercise 5

For this to be an accurate causal estimate of the effect of being a woman in the work place, the two groups: full-time working man and full-time working women should be comparable in aspects that might affect wages, such as age, education, work experience, and other characteristics. Without holding other confounding variables constant, the estimated wage gap may be biased and may not solely due to gender discrimination.

Exercise 6

```
In [ ]:   df_2['age_sqrd'] = df_2['age'] ** 2
          mod1 = smf.ols("annual_earnings ~ sex + age + age_sqrd", df_2).fit()
          mod1.get_robustcov_results(cov_type="HC3").summary()
```

Out[ ]:

OLS Regression Results

Dep. Variable:	annual_earnings	**R-squared:**	0.060
Model:	OLS	**Adj. R-squared:**	0.060
Method:	Least Squares	**F-statistic:**	2670.
Date:	Tue, 21 Feb 2023	**Prob (F-statistic):**	0.00
Time:	14:46:07	**Log-Likelihood:**	-1.4441e+06
No. Observations:	122603	**AIC:**	2.888e+06
Df Residuals:	122599	**BIC:**	2.888e+06
Df Model:	3		
Covariance Type:	HC3		

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	4.895e+04	381.465	128.322	0.000	4.82e+04	4.97e+04
sex	-1.062e+04	178.706	-59.434	0.000	-1.1e+04	-1.03e+04
age	456.6349	6.641	68.761	0.000	443.619	469.651
age_sqrd	-0.2740	1.239	-0.221	0.825	-2.703	2.155

Omnibus:	18297.323	**Durbin-Watson:**	1.733
Prob(Omnibus):	0.000	**Jarque-Bera (JB):**	27620.546
Skew:	1.110	**Prob(JB):**	0.00
Kurtosis:	3.692	**Cond. No.**	353.

Notes:

[1] Standard Errors are heteroscedasticity robust (HC3)

In [ ]:
```python
raw_estimate = male_annual_earning - female_annual_earning
print(f"The raw estimate for average annual wage difference between women and men is {raw_estimate:.2f}")
```

The raw estimate for average annual wage difference between women and men is 10514.44

According to the report, the coefficient for the variable sex is 10620, which indicates that one unit increase in sex(2:f, 1:m) is associated with a $10620 decrease in annual salary. Our raw estimated difference is$ 10514.44, which is different.

Exercise 7

When we run this regression and interpreting the coefficient on female, we're basically pretending we are comparing full-time working men and full-time working women that differ only by gender. The two groups have the same age and age-squared distribution, but differ only in terms of gender.

Exercise 8

```python
In [ ]:  df_2['hs_indicator'] = np.where(df_2['grade92'] >= 39, 1, 0)
         df_2['ba_indicator'] = np.where(df_2['grade92'] >= 43, 1, 0)
```

```python
In [ ]:  mod2 = smf.ols("annual_earnings ~ sex + age + age_sqrd + "
                         "hs_indicator + ba_indicator", df_2).fit()
         mod2.get_robustcov_results(cov_type="HC3").summary()
```

Out[ ]:

OLS Regression Results

Dep. Variable:	annual_earnings	**R-squared:**	0.259
Model:	OLS	**Adj. R-squared:**	0.259
Method:	Least Squares	**F-statistic:**	8122.
Date:	Mon, 20 Feb 2023	**Prob (F-statistic):**	0.00
Time:	17:55:37	**Log-Likelihood:**	-1.4296e+06
No. Observations:	122603	**AIC:**	2.859e+06
Df Residuals:	122597	**BIC:**	2.859e+06
Df Model:	5		
Covariance Type:	HC3		

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	2.878e+04	381.954	75.358	0.000	2.8e+04	2.95e+04
sex	-1.3e+04	159.534	-81.457	0.000	-1.33e+04	-1.27e+04
age	445.9737	5.919	75.352	0.000	434.373	457.574
age_sqrd	-0.3958	1.100	-0.360	0.719	-2.552	1.760
hs_indicator	1.373e+04	220.792	62.195	0.000	1.33e+04	1.42e+04
ba_indicator	2.756e+04	179.287	153.741	0.000	2.72e+04	2.79e+04

Omnibus:	14257.428	**Durbin-Watson:**	1.849
Prob(Omnibus):	0.000	**Jarque-Bera (JB):**	20565.673
Skew:	0.890	**Prob(JB):**	0.00
Kurtosis:	3.926	**Cond. No.**	507.

Notes:

[1] Standard Errors are heteroscedasticity robust (HC3)

Exercise 9

When we run this regression and interpreting the coefficient on female, we are once more basically pretending we are comparing full-time working men and full-time working women. They have the same education level distribution and age distribution while the only difference is gender.

Exercise 10

annual_earnings ~ sex + age + age_sqrd: -1.062e+04

annual_earnings ~ sex + age + age_sqrd + hs_indicator + ba_indicator: -1.3e+04

The coefficient of gender is -10620 in Exercise 6, indicating tha a femle earns $10620 less than a male when they are in the same age. The coefficient of gender is -13000 in Exercise 8, indicating thaa femle$ 13000 less than a male when they have equal age and education level. Since education level(hs_indicator and ba_indicator) has positive efffect on annual earnings and is statistically significant, we can infer that the women in the survey data generally have higher education compared to men. That's why the gender gap in Exercise 6 is smaller than that in Exercise 8 since education narrows the gap.

Exercise 11

Before adding education as a control, the difference in earnings between men and women was underestimated since the unobserved effect of education on earnings was not taken into account. This means that without controlling for education, the comparison between men and women was not based on a counterfactual scenario where they have the same level of education. As a result, the difference in earnings between men and women in the uncontrolled regression was influenced not only by gender, but also by differences in educational attainment.

Exercise 12

```
In [ ]:  df_2.ind02.value_counts()
```

```
Out[ ]: ** 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
                                                                               ...
        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
        Armed Forces                                                             0
        Name: ind02, Length: 260, dtype: int64
```

```python
mod3 = smf.ols("annual_earnings ~ sex + age + age_sqrd "
               "+ hs_indicator + ba_indicator + C(ind02)", df_2).fit()
mod3.get_robustcov_results(cov_type="HC3").summary()
```

Out[ ]:

OLS Regression Results

Dep. Variable:	annual_earnings	**R-squared:**	0.309
Model:	OLS	**Adj. R-squared:**	0.308
Method:	Least Squares	**F-statistic:**	205.1
Date:	Mon, 20 Feb 2023	**Prob (F-statistic):**	0.00
Time:	17:56:09	**Log-Likelihood:**	-1.4253e+06
No. Observations:	122603	**AIC:**	2.851e+06
Df Residuals:	122339	**BIC:**	2.854e+06
Df Model:	263		
Covariance Type:	HC3		

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	2.186e+04	936.015	23.352	0.000	2e+04	2.37e+04
C(ind02)[T.Animal production (112)]	-857.9634	1392.233	-0.616	0.538	-3586.717	1870.790
C(ind02)[T.Forestry except logging (1131, 1132)]	923.8666	3357.658	0.275	0.783	-5657.088	7504.821
C(ind02)[T.Logging (1133)]	5656.2100	2585.668	2.188	0.029	588.344	1.07e+04
C(ind02)[T.Fishing, hunting, and trapping (114)]	3510.2980	3922.821	0.895	0.371	-4178.366	1.12e+04
C(ind02)[T.Support activities for agriculture and forestry (115)]	6207.2024	2549.581	2.435	0.015	1210.066	1.12e+04
C(ind02)[T.Oil and gas extraction (211)]	3.392e+04	3664.787	9.256	0.000	2.67e+04	4.11e+04
C(ind02)[T.Coal mining (2121)]	2.528e+04	2463.318	10.263	0.000	2.05e+04	3.01e+04
C(ind02)[T.Metal ore mining (2122)]	3.384e+04	5893.590	5.742	0.000	2.23e+04	4.54e+04
C(ind02)[T.Nonmetallic mineral mining and quarrying (2123)]	1.538e+04	2256.627	6.815	0.000	1.1e+04	1.98e+04
C(ind02)[T.Support activities for mining (213)]	2.773e+04	1626.176	17.053	0.000	2.45e+04	3.09e+04
C(ind02)[T.Electric power generation, transmission and distribution (Pt. 2211)]	2.162e+04	1388.161	15.572	0.000	1.89e+04	2.43e+04
C(ind02)[T.Natural gas distribution (Pt.s2212)]	1.588e+04	2568.260	6.183	0.000	1.08e+04	2.09e+04
C(ind02)[T.Electric and gas, and other combinations (Pts. 2211, 2212)]	2.171e+04	3001.532	7.234	0.000	1.58e+04	2.76e+04
C(ind02)[T.Water, steam, air-conditioning, and irrigation systems (22131, 22133)]	5944.3370	1887.266	3.150	0.002	2245.327	9643.347

C(ind02)[T.Sewage treatment facilities (22132)]	8219.6616	2792.673	2.943	0.003	2746.068	1.37e+04
C(ind02)[T.Not specified utilities (Part of 22)]	1.986e+04	5472.920	3.628	0.000	9131.521	3.06e+04
C(ind02)[T.** Construction (23)]	1.056e+04	923.191	11.434	0.000	8745.890	1.24e+04
C(ind02)[T.Animal food, grain and oilseed milling (3111, 3112)]	1e+04	2398.867	4.170	0.000	5301.425	1.47e+04
C(ind02)[T.Sugar and confectionery products (3113)]	4619.8933	2629.613	1.757	0.079	-534.104	9773.891
C(ind02)[T.Fruit and vegetable preserving and specialty food manufacturing (3114)]	2238.7515	2097.729	1.067	0.286	-1872.763	6350.266
C(ind02)[T.Dairy product manufacturing (3115)]	6859.3658	1852.110	3.704	0.000	3229.260	1.05e+04
C(ind02)[T.Animal slaughtering and processing (3116)]	313.8284	1164.845	0.269	0.788	-1969.248	2596.905
C(ind02)[T.Retail bakeries (311811)]	-1774.8294	1856.089	-0.956	0.339	-5412.733	1863.075
C(ind02)[T.Bakeries, except retail (3118 exc. 311811)]	2000.4588	2022.039	0.989	0.323	-1962.703	5963.621
C(ind02)[T.Seafood and other miscellaneous foods, n.e.c. (3117, 3119)]	9160.3042	1912.007	4.791	0.000	5412.801	1.29e+04
C(ind02)[T.Not specified food industries (Part of 311)]	2859.0902	2904.807	0.984	0.325	-2834.283	8552.463
C(ind02)[T.Beverage manufacturing (3121)]	9058.7802	1953.676	4.637	0.000	5229.609	1.29e+04
C(ind02)[T.Tobacco manufacturing (3122)]	1.29e+04	9663.088	1.335	0.182	-6037.444	3.18e+04
C(ind02)[T.Fiber, yarn, and thread mills (3131)]	5169.8050	8557.837	0.604	0.546	-1.16e+04	2.19e+04
C(ind02)[T.Fabric mills, except knitting (3132 exc. 31324)]	3205.4471	3013.052	1.064	0.287	-2700.084	9110.978
C(ind02)[T.Textile and fabric finishing and coating mills (3133)]	-2429.8272	5780.791	-0.420	0.674	-1.38e+04	8900.428
C(ind02)[T.Carpet and rug mills (31411)]	1980.1664	2658.424	0.745	0.456	-3230.301	7190.633
C(ind02)[T.Textile product mills, except carpets and rugs (314 exc. 31411)]	3206.0346	2944.800	1.089	0.276	-2565.725	8977.794
C(ind02)[T.Knitting mills (31324, 3151)]	-5465.8039	4986.471	-1.096	0.273	-1.52e+04	4307.596
C(ind02)[T.Cut and sew apparel manufacturing (3152)]	3536.0852	2183.091	1.620	0.105	-742.737	7814.907
C(ind02)[T.Apparel accessories and other apparel manufacturing (3159)]	1030.1607	3345.873	0.308	0.758	-5527.694	7588.016
C(ind02)[T.Footwear manufacturing (3162)]	1.478e+04	5868.748	2.519	0.012	3280.768	2.63e+04
C(ind02)[T.Leather tanning and products, except footwear manufacturing (3161, 3169)]	2374.0553	5301.782	0.448	0.654	-8017.349	1.28e+04

C(ind02)[T.Pulp, paper, and paperboard mills (3221)]	1.264e+04	1933.057	6.538	0.000	8849.292	1.64e+04
C(ind02)[T.Paperboard containers and boxes (32221)]	6252.9113	2759.685	2.266	0.023	843.974	1.17e+04
C(ind02)[T.Miscellaneous paper and pulp products (32222,32223, 32229)]	7723.9346	2906.539	2.657	0.008	2027.166	1.34e+04
C(ind02)[T.Printing and related support activities (3231)]	3648.2945	1447.607	2.520	0.012	811.009	6485.581
C(ind02)[T.Petroleum refining (32411)]	2.739e+04	2443.314	11.210	0.000	2.26e+04	3.22e+04
C(ind02)[T.Miscellaneous petroleum and coal products (32419)]	8945.7389	5743.733	1.557	0.119	-2311.883	2.02e+04
C(ind02)[T.Resin, synthetic rubber and fibers, and filaments manufacturing (3252)]	7943.2560	2251.648	3.528	0.000	3530.063	1.24e+04
C(ind02)[T.Agricultural chemical manufacturing (3253)]	1.754e+04	5666.398	3.095	0.002	6429.996	2.86e+04
C(ind02)[T.Pharmaceutical and medicine manufacturing (3254)]	2.377e+04	1721.875	13.807	0.000	2.04e+04	2.71e+04
C(ind02)[T.Paint, coating, and adhesive manufacturing B46 (3255)]	1.586e+04	3860.557	4.107	0.000	8289.902	2.34e+04
C(ind02)[T.Soap, cleaning compound, and cosmetics manufacturing (3256)]	1.137e+04	3037.643	3.743	0.000	5417.225	1.73e+04
C(ind02)[T.Industrial and miscellaneous chemicals (3251, 3259)]	1.824e+04	1642.208	11.104	0.000	1.5e+04	2.15e+04
C(ind02)[T.Plastics product manufacturing (3261)]	4034.0463	1564.865	2.578	0.010	966.936	7101.157
C(ind02)[T.Tire manufacturing (32621)]	1.298e+04	2984.650	4.350	0.000	7134.073	1.88e+04
C(ind02)[T.Rubber products, except tires, manufacturing (32622, 32629)]	3975.2268	2578.060	1.542	0.123	-1077.728	9028.181
C(ind02)[T.Pottery, ceramics, and related products manufacturing (32711)]	2984.4031	4403.328	0.678	0.498	-5646.046	1.16e+04
C(ind02)[T.Structural clay product manufacturing (32712)]	-2829.7680	3913.951	-0.723	0.470	-1.05e+04	4841.512
C(ind02)[T.Glass and glass product manufacturing (3272)]	2191.7411	2111.196	1.038	0.299	-1946.168	6329.650
C(ind02)[T.Cement, concrete, lime, and gypsum product manufacturing (3273, 3274)]	6765.1364	1755.651	3.853	0.000	3324.089	1.02e+04
C(ind02)[T.Miscellaneous nonmetallic mineral product manufacturing (3279)]	3390.5201	2201.149	1.540	0.123	-923.695	7704.735
C(ind02)[T.Iron and steel mills and steel product manufacturing (3311, 3312)]	1.098e+04	1852.828	5.926	0.000	7348.781	1.46e+04
C(ind02)[T.Aluminum production and processing (3313)]	1.307e+04	3405.404	3.839	0.000	6398.346	1.97e+04

C(ind02)[T.Nonferrous metal, except aluminum, production and processing (3314)]	9701.8019	4042.287	2.400	0.016	1778.986	1.76e+04
C(ind02)[T.Foundries (3315)]	5445.2055	2825.059	1.927	0.054	-91.864	1.1e+04
C(ind02)[T.Metal forgings and stampings (3321)]	1715.0691	3093.529	0.554	0.579	-4348.196	7778.335
C(ind02)[T.Cutlery and hand tool manufacturing (3322)]	8808.3925	4159.553	2.118	0.034	655.737	1.7e+04
C(ind02)[T.Structural metals, and tank and shipping container manufacturing (3323, 3324)]	7136.9478	1571.806	4.541	0.000	4056.233	1.02e+04
C(ind02)[T.Machine shops; turned product; screw, nut and bolt manufacturing (3327)]	3821.6903	1532.541	2.494	0.013	817.936	6825.445
C(ind02)[T.Coating, engraving, heat treating and allied activities (3328)]	5874.3997	3207.457	1.831	0.067	-412.162	1.22e+04
C(ind02)[T.Ordnance (332992 to 332995)]	1.139e+04	3098.286	3.678	0.000	5321.964	1.75e+04
C(ind02)[T.Miscellaneous fabricated metal products manufacturing (3325, 3326, 3329 exc. 332992, 332993, 332994, 332995)]	5931.6094	1606.492	3.692	0.000	2782.911	9080.308
C(ind02)[T.Not specified metal industries (Part of 331 and 332)]	4324.5660	4473.338	0.967	0.334	-4443.103	1.31e+04
C(ind02)[T.Agricultural implement manufacturing (33311)]	1.009e+04	2073.951	4.864	0.000	6023.499	1.42e+04
C(ind02)[T.Construction, mining and oil field machinery manufacturing (33312, 33313)]	1.421e+04	2187.179	6.498	0.000	9925.153	1.85e+04
C(ind02)[T.3095.0]	1.177e+04	3729.251	3.156	0.002	4460.807	1.91e+04
C(ind02)[T.Metalworking machinery manufacturing (3335)]	6886.4830	2156.510	3.193	0.001	2659.759	1.11e+04
C(ind02)[T.Engines, turbines, and power transmission equipment manufacturing (3336)]	8186.2951	3656.029	2.239	0.025	1020.540	1.54e+04
C(ind02)[T.Machinery manufacturing, n.e.c. (3332, 3334, 3339)]	9758.8177	1317.749	7.406	0.000	7176.052	1.23e+04
C(ind02)[T.3365.0]	2.389e+04	2705.109	8.833	0.000	1.86e+04	2.92e+04
C(ind02)[T.Communications, audio, and video equipment manufacturing (3342, 3343)]	1.728e+04	3107.106	5.561	0.000	1.12e+04	2.34e+04
C(ind02)[T.Navigational, measuring, electromedical, and control instruments manufacturing (3345)]	1.876e+04	2099.252	8.936	0.000	1.46e+04	2.29e+04
C(ind02)[T.Electronic component and product manufacturing, n.e.c. (3344, 3346)]	1.893e+04	1556.118	12.166	0.000	1.59e+04	2.2e+04
C(ind02)[T.Household appliance manufacturing (3352)]	9869.3063	2909.868	3.392	0.001	4166.013	1.56e+04

C(ind02)[T.Electrical lighting, equipment, and supplies manufacturing, n.e.c. (3351, 3353, 3359)]	1.092e+04	1819.976	5.999	0.000	7351.298	1.45e+04
C(ind02)[T.Motor vehicles and motor vehicle equipment manufacturing (3361, 3362, 3363)]	8944.8727	1121.583	7.975	0.000	6746.588	1.11e+04
C(ind02)[T.Aircraft and parts manufacturing (336411 to 336413)]	1.999e+04	1370.536	14.588	0.000	1.73e+04	2.27e+04
C(ind02)[T.Aerospace products and parts manufacturing (336414, 336415, 336419)]	2.932e+04	4394.385	6.672	0.000	2.07e+04	3.79e+04
C(ind02)[T.Railroad rolling stock manufacturing (3365)]	1.102e+04	3799.266	2.900	0.004	3569.543	1.85e+04
C(ind02)[T.Ship and boat building (3366)]	1.141e+04	2000.016	5.703	0.000	7485.434	1.53e+04
C(ind02)[T.Other transportation equipment manufacturing (3369)]	551.8638	4500.550	0.123	0.902	-8269.140	9372.867
C(ind02)[T.Sawmills and wood preservation (3211)]	4960.2021	2099.468	2.363	0.018	845.280	9075.125
C(ind02)[T.Veneer, plywood, and engineered wood products (3212)]	5189.9036	4041.515	1.284	0.199	-2731.398	1.31e+04
C(ind02)[T.Prefabricated wood buildings and mobile homes (321991, 321992)]	5435.6788	3478.840	1.562	0.118	-1382.790	1.23e+04
C(ind02)[T.3875.0]	3523.3936	1898.851	1.856	0.064	-198.322	7245.109
C(ind02)[T.3895.0]	2156.9836	1433.970	1.504	0.133	-653.574	4967.541
C(ind02)[T.Medical equipment and supplies manufacturing (3391)]	1.411e+04	1475.088	9.568	0.000	1.12e+04	1.7e+04
C(ind02)[T.Toys, amusement, and sporting goods manufacturing (33992, 33993)]	2138.4970	2576.835	0.830	0.407	-2912.057	7189.052
C(ind02)[T.Miscellaneous manufacturing, n.e.c. (3399 exc. 33992, 33993)]	4899.8913	1466.431	3.341	0.001	2025.712	7774.071
C(ind02)[T.Not specified manufacturing industries (Part of 31, 32, 33)]	2872.9191	1847.393	1.555	0.120	-747.941	6493.779
C(ind02)[T.** Motor vehicles, parts and supplies, merchant wholesalers (*4231)]	8269.6204	2533.084	3.265	0.001	3304.818	1.32e+04
C(ind02)[T.** Furniture and home furnishing, merchant wholesalers (*4232)]	2706.7603	3630.638	0.746	0.456	-4409.230	9822.751
C(ind02)[T.** Lumber and other construction materials, merchant wholesalers (*4233)]	7793.7344	2431.879	3.205	0.001	3027.291	1.26e+04
C(ind02)[T.** Professional and commercial equipment and supplies, merchant wholesalers (*4234)]	1.616e+04	2050.412	7.880	0.000	1.21e+04	2.02e+04
C(ind02)[T.** Metals and minerals, except petroleum, merchant wholesalers (*4235)]	-820.2031	3132.515	-0.262	0.793	-6959.880	5319.473

C(ind02)[T.4195.0]	1.076e+04	2348.922	4.580	0.000	6153.078	1.54e+04
C(ind02)[T.4265.0]	7256.2580	2553.109	2.842	0.004	2252.207	1.23e+04
C(ind02)[T.** Machinery, equipment, and supplies, merchant wholesalers (*4238)]	1.16e+04	1811.588	6.402	0.000	8046.576	1.51e+04
C(ind02)[T.** Recyclable material, merchant wholesalers (*42393)]	-40.9854	2065.342	-0.020	0.984	-4089.021	4007.050
C(ind02)[T.** Miscellaneous durable goods, merchant wholesalers (*4239 exc. 42393)]	9834.9299	4387.515	2.242	0.025	1235.473	1.84e+04
C(ind02)[T.** Paper and paper products, merchant wholesalers (*4241)]	9631.5826	4921.249	1.957	0.050	-13.984	1.93e+04
C(ind02)[T.** Drugs, sundries, and chemical and allied products, merchant (wholesalerss*4242, 4246)]	1.663e+04	2377.279	6.994	0.000	1.2e+04	2.13e+04
C(ind02)[T.** Apparel, fabrics, and notions, merchant wholesalers (*4243)]	8318.9813	3319.917	2.506	0.012	1811.998	1.48e+04
C(ind02)[T.** Groceries and related products, merchant wholesalers (*4244)]	5788.8515	1250.298	4.630	0.000	3338.289	8239.414
C(ind02)[T.** Farm product raw materials, merchant wholesalers (*4245)]	2950.5444	2679.148	1.101	0.271	-2300.542	8201.631
C(ind02)[T.** Petroleum and petroleum products, merchant wholesalers (*4247)]	1.555e+04	2576.711	6.034	0.000	1.05e+04	2.06e+04
C(ind02)[T.** Alcoholic beverages, merchant wholesalers (*4248)]	5327.6504	2351.038	2.266	0.023	719.656	9935.645
C(ind02)[T.** Farm supplies, merchant wholesalers (*42491)]	1.083e+04	4557.918	2.377	0.017	1899.942	1.98e+04
C(ind02)[T.** Miscellaneous (nondurable goods, merchant wholesalerss*4249 exc. 42491)]	5692.3790	2788.406	2.041	0.041	227.151	1.12e+04
C(ind02)[T.*** Wholesale electronic markets, agents and brokers New industry (*4251)]	1193.5585	3361.862	0.355	0.723	-5395.635	7782.752
C(ind02)[T.**Not specified wholesale trade (Part of 42)]	39.3868	4056.677	0.010	0.992	-7911.634	7990.407
C(ind02)[T.Automobile dealers (4411)]	8101.2705	1193.687	6.787	0.000	5761.663	1.04e+04
C(ind02)[T.Other motor vehicle dealers (4412)]	7648.0634	2420.531	3.160	0.002	2903.863	1.24e+04
C(ind02)[T.Auto parts, accessories, and tire stores (4413)]	-292.2963	1323.638	-0.221	0.825	-2886.605	2302.012
C(ind02)[T.Furniture and home furnishings stores (442)]	1227.7563	1482.792	0.828	0.408	-1678.490	4134.003
C(ind02)[T.Household appliance stores (443111)]	-414.5737	2672.390	-0.155	0.877	-5652.414	4823.267

C(ind02)[T.4795.0]	7784.0374	1686.848	4.615	0.000	4477.842	1.11e+04
C(ind02)[T.Building material and supplies dealers (4441 exc. 44413)]	1277.4693	1213.471	1.053	0.292	-1100.913	3655.852
C(ind02)[T.Hardware stores (44413)]	-780.1004	2045.055	-0.381	0.703	-4788.374	3228.173
C(ind02)[T.Lawn and garden equipment and supplies stores (4442)]	2166.6162	1913.667	1.132	0.258	-1584.139	5917.372
C(ind02)[T.Grocery stores (4451)]	-861.2386	1009.560	-0.853	0.394	-2839.959	1117.482
C(ind02)[T.Specialty food stores (4452)]	2629.8689	2594.971	1.013	0.311	-2456.231	7715.969
C(ind02)[T.Beer, wine, and liquor stores (4453)]	1459.5086	2970.645	0.491	0.623	-4362.906	7281.923
C(ind02)[T.Pharmacies and drug stores (44611)]	8999.4348	1400.511	6.426	0.000	6254.456	1.17e+04
C(ind02)[T.Health and personal care, except drug, stores (446 exc. 44611)]	8283.4951	1839.722	4.503	0.000	4677.671	1.19e+04
C(ind02)[T.Gasoline stations (447)]	-1103.5162	1549.761	-0.712	0.476	-4141.022	1933.990
C(ind02)[T.Clothing and accessories, except shoe, stores (448 exc. 44821, 4483)]	2557.3712	1464.151	1.747	0.081	-312.341	5427.083
C(ind02)[T.Shoe stores (44821)]	1941.5779	2824.110	0.688	0.492	-3593.630	7476.786
C(ind02)[T.Jewelry, luggage, and leather goods stores (4483)]	-655.2215	2763.527	-0.237	0.813	-6071.689	4761.246
C(ind02)[T.5275.0]	2639.7650	1831.926	1.441	0.150	-950.780	6230.310
C(ind02)[T.Sewing, needlework, and piece goods stores (45113)]	-1.668e+04	4679.524	-3.565	0.000	-2.59e+04	-7511.630
C(ind02)[T.5295.0]	-3178.1476	4284.083	-0.742	0.458	-1.16e+04	5218.584
C(ind02)[T.Book stores and news dealers (45121)]	-2523.8203	3730.492	-0.677	0.499	-9835.523	4787.882
C(ind02)[T.****Department stores and discount stores (s45211)]	-2063.7215	1068.389	-1.932	0.053	-4157.747	30.304
C(ind02)[T.Miscellaneous general merchandise stores (4529)]	1100.8602	1392.372	0.791	0.429	-1628.167	3829.887
C(ind02)[T.Retail florists (4531)]	-3223.3240	4321.550	-0.746	0.456	-1.17e+04	5246.843
C(ind02)[T.Office supplies and stationery stores (45321)]	5986.0326	2700.295	2.217	0.027	693.499	1.13e+04
C(ind02)[T.Used merchandise stores (4533)]	-8427.7584	2041.397	-4.128	0.000	-1.24e+04	-4426.655
C(ind02)[T.Gift, novelty, and souvenir shops (45322)]	-3744.5060	2751.915	-1.361	0.174	-9138.214	1649.202
C(ind02)[T.Miscellaneous retail stores (4539)]	4518.5257	1819.495	2.483	0.013	952.346	8084.705
C(ind02)[T.*** Electronic shopping (New industry *454111)]	8738.1999	2153.360	4.058	0.000	4517.650	1.3e+04
C(ind02)[T.*** Electronic auctions (New industrys*454112)]	1.616e+04	8902.963	1.816	0.069	-1285.109	3.36e+04

C(ind02)[T.** Mail order houses (*454113)]	4505.5161	3089.487	1.458	0.145	-1549.827	1.06e+04
C(ind02)[T.Vending machine operators (4542)]	7982.6144	5470.633	1.459	0.145	-2739.736	1.87e+04
C(ind02)[T.Fuel dealers (45431)]	2713.1999	2457.480	1.104	0.270	-2103.420	7529.820
C(ind02)[T.Other direct selling establishments (45439)]	4085.6284	4293.962	0.951	0.341	-4330.465	1.25e+04
C(ind02)[T.Not specified retail trade (Part of 44, 45)]	533.4490	2020.821	0.264	0.792	-3427.326	4494.224
C(ind02)[T.Air transportation (481)]	1.208e+04	1637.274	7.377	0.000	8869.610	1.53e+04
C(ind02)[T.Rail transportation (482)]	2.337e+04	1986.244	11.766	0.000	1.95e+04	2.73e+04
C(ind02)[T.Water transportation (483)]	1.727e+04	4249.209	4.064	0.000	8940.605	2.56e+04
C(ind02)[T.Truck transportation (484)]	7630.0133	1097.088	6.955	0.000	5479.740	9780.287
C(ind02)[T.Bus service and urban transit (4851, 4852, 4854, 4855, 4859)]	2458.9145	1612.500	1.525	0.127	-701.558	5619.387
C(ind02)[T.Taxi and limousine service (4853)]	-8472.8000	1820.173	-4.655	0.000	-1.2e+04	-4905.291
C(ind02)[T.Pipeline transportation (486)]	2.673e+04	3207.128	8.333	0.000	2.04e+04	3.3e+04
C(ind02)[T.Scenic and sightseeing transportation (487)]	-1373.2172	4567.483	-0.301	0.764	-1.03e+04	7578.973
C(ind02)[T.Services incidental to transportation (488)]	8203.6852	1432.591	5.726	0.000	5395.831	1.1e+04
C(ind02)[T.Postal Service (491)]	6028.1519	1245.939	4.838	0.000	3586.132	8470.172
C(ind02)[T.Couriers and messengers (492)]	7625.2671	1413.370	5.395	0.000	4855.085	1.04e+04
C(ind02)[T.Warehousing and storage (493)]	-953.2103	1313.166	-0.726	0.468	-3526.995	1620.574
C(ind02)[T.**Newspaper publishers (51111)]	1191.4348	2597.716	0.459	0.646	-3900.045	6282.915
C(ind02)[T.**Publishing, except newspapers and software (5111 exc. 51111)]	1.023e+04	2564.243	3.990	0.000	5206.657	1.53e+04
C(ind02)[T.Software publishing (5112)]	4.297e+04	4314.723	9.958	0.000	3.45e+04	5.14e+04
C(ind02)[T.Motion pictures and video industries (5121)]	1.588e+04	2327.321	6.823	0.000	1.13e+04	2.04e+04
C(ind02)[T.Sound recording industries (5122)]	6398.3136	1.01e+04	0.631	0.528	-1.35e+04	2.63e+04
C(ind02)[T.Radio and television broadcasting and cable (5151, 5152, 5175)]	1.177e+04	1660.321	7.090	0.000	8518.202	1.5e+04
C(ind02)[T.Internet publishing and broadcasting and web search portals (51913)]	4.618e+04	3219.688	14.342	0.000	3.99e+04	5.25e+04
C(ind02)[T.Wired telecommunications carriers (*5171)]	1.524e+04	1602.451	9.511	0.000	1.21e+04	1.84e+04

C(ind02)[T.Other telecommunications services (*517 exc. 5171, 5175)]	1.515e+04	1746.609	8.673	0.000	1.17e+04	1.86e+04
C(ind02)[T.**** Data processing, hosting, and related services (*5182)]	1.263e+04	3597.904	3.512	0.000	5582.990	1.97e+04
C(ind02)[T.Libraries and archives (*51912)]	-4295.1435	2559.879	-1.678	0.093	-9312.465	722.178
C(ind02)[T.Other information services (*5191 exc. 51912)]	1.951e+04	6467.185	3.017	0.003	6833.568	3.22e+04
C(ind02)[T.Banking and related activities (521, 52211,52219)]	1.436e+04	1111.452	12.921	0.000	1.22e+04	1.65e+04
C(ind02)[T.Savings institutions, including credit unions (52212, 52213)]	5783.7155	1633.005	3.542	0.000	2583.052	8984.379
C(ind02)[T.Non-depository credit and related activities (5222, 5223)]	1.814e+04	1398.592	12.967	0.000	1.54e+04	2.09e+04
C(ind02)[T.Securities, commodities, funds, trusts, and other financial investments (523, 525)]	2.411e+04	1427.027	16.898	0.000	2.13e+04	2.69e+04
C(ind02)[T.Insurance carriers and related activities (524)]	1.233e+04	1065.359	11.574	0.000	1.02e+04	1.44e+04
C(ind02)[T.Real estate (531)]	9190.2280	1148.621	8.001	0.000	6938.950	1.14e+04
C(ind02)[T.Automotive equipment rental and leasing (5321)]	2069.0345	2241.858	0.923	0.356	-2324.971	6463.040
C(ind02)[T.Video tape and disk rental (53223)]	-3044.6701	1.02e+04	-0.298	0.766	-2.31e+04	1.7e+04
C(ind02)[T.Other consumer goods rental (53221, 53222, 53229, 5323)]	1012.0036	2463.877	0.411	0.681	-3817.155	5841.163
C(ind02)[T.Commercial, industrial, and other intangible assets rental and leasing (5324, 533)]	1.446e+04	2982.329	4.849	0.000	8615.320	2.03e+04
C(ind02)[T.Legal services (5411)]	2.004e+04	1316.673	15.218	0.000	1.75e+04	2.26e+04
C(ind02)[T.Accounting, tax preparation, bookkeeping, and payroll services (5412)]	1.386e+04	1401.467	9.887	0.000	1.11e+04	1.66e+04
C(ind02)[T.Architectural, engineering, and related services (5413)]	1.585e+04	1170.800	13.538	0.000	1.36e+04	1.81e+04
C(ind02)[T.Specialized design services (5414)]	6793.0642	2267.098	2.996	0.003	2349.590	1.12e+04
C(ind02)[T.Computer systems design and related services (5415)]	2.509e+04	1084.418	23.135	0.000	2.3e+04	2.72e+04
C(ind02)[T.Management, scientific, and technical consulting services (5416)]	2.045e+04	1345.317	15.199	0.000	1.78e+04	2.31e+04
C(ind02)[T.Scientific research and development services (5417)]	1.997e+04	1537.315	12.989	0.000	1.7e+04	2.3e+04
C(ind02)[T.Advertising and related services (5418)]	1.627e+04	1767.307	9.205	0.000	1.28e+04	1.97e+04
C(ind02)[T.Veterinary services (54194)]	5952.7522	1727.021	3.447	0.001	2567.820	9337.684

C(ind02)[T.Other professional, scientific, and technical services (5419 exc. 54194)]	1.226e+04	2266.107	5.411	0.000	7819.858	1.67e+04
C(ind02)[T.Management of companies and enterprises (551)]	7092.9170	2103.822	3.371	0.001	2969.461	1.12e+04
C(ind02)[T.Employment services (5613)]	5211.0769	1325.200	3.932	0.000	2613.707	7808.447
C(ind02)[T.Business support services (5614)]	2759.4388	1405.436	1.963	0.050	4.808	5514.070
C(ind02)[T.Travel arrangements and reservation services (5615)]	8363.5104	2129.693	3.927	0.000	4189.348	1.25e+04
C(ind02)[T.Investigation and security services (5616)]	124.6381	1275.183	0.098	0.922	-2374.699	2623.975
C(ind02)[T.** Services to buildings and dwellings (5617 exc. 56173)]	-2131.7452	1127.076	-1.891	0.059	-4340.796	77.305
C(ind02)[T.Landscaping services (56173)]	-2910.8531	1086.279	-2.680	0.007	-5039.942	-781.765
C(ind02)[T.Other administrative and other support services (5611, 5612, 5619)]	3873.4186	1837.136	2.108	0.035	272.662	7474.175
C(ind02)[T.Waste management and remediation services (562)]	6367.7567	1484.516	4.289	0.000	3458.131	9277.383
C(ind02)[T.Elementary and secondary schools (6111)]	675.0227	936.379	0.721	0.471	-1160.265	2510.311
C(ind02)[T.Colleges and universities, including junior colleges (6112, 6113)]	7708.6187	1046.427	7.367	0.000	5657.638	9759.599
C(ind02)[T.Business, technical, and trade schools and training (6114, 6115)]	8042.8479	2947.690	2.729	0.006	2265.424	1.38e+04
C(ind02)[T.Other schools, instruction, and educational services (6116, 6117)]	7034.8796	1896.830	3.709	0.000	3317.123	1.08e+04
C(ind02)[T.Offices of physicians (6211)]	1.086e+04	1193.406	9.098	0.000	8518.463	1.32e+04
C(ind02)[T.Offices of dentists (6212)]	7495.9965	1369.998	5.472	0.000	4810.823	1.02e+04
C(ind02)[T.Offices of chiropractors (62131)]	2199.3757	3217.110	0.684	0.494	-4106.107	8504.858
C(ind02)[T.Offices of optometrists (62132)]	3748.7228	2418.133	1.550	0.121	-990.778	8488.224
C(ind02)[T.Offices of other health practitioners (6213 exc. 62131, 62132)]	4644.4511	2421.205	1.918	0.055	-101.070	9389.972
C(ind02)[T.Outpatient care centers (6214)]	6209.2211	1093.291	5.679	0.000	4066.388	8352.054
C(ind02)[T.Home health care services (6216)]	1292.3263	1167.832	1.107	0.268	-996.605	3581.257
C(ind02)[T.Other health care services (6215, 6219)]	9278.7353	1161.838	7.986	0.000	7001.552	1.16e+04
C(ind02)[T.Hospitals (622)]	1.12e+04	951.167	11.773	0.000	9334.245	1.31e+04
C(ind02)[T.Nursing care facilities (6231)]	1585.6208	1045.957	1.516	0.130	-464.438	3635.679

C(ind02)[T.Residential care facilities, without nursing (6232, 6233, 6239)]	107.0647	1212.341	0.088	0.930	-2269.104	2483.233
C(ind02)[T.Individual and family services (6241)]	-1112.7260	1094.194	-1.017	0.309	-3257.329	1031.877
C(ind02)[T.Community food and housing, and emergency services (6242)]	3755.9218	2920.437	1.286	0.198	-1968.086	9479.929
C(ind02)[T.Vocational rehabilitation services (6243)]	-7802.1419	2397.793	-3.254	0.001	-1.25e+04	-3102.507
C(ind02)[T.Child day care services (6244)]	-3177.7836	1127.169	-2.819	0.005	-5387.016	-968.552
C(ind02)[T.Independent artists, performing arts, spectator sports, and related industries (711)]	5905.7767	2001.072	2.951	0.003	1983.708	9827.845
C(ind02)[T.Museums, art galleries, historical sites, and similar institutions (712)]	-275.4334	1886.133	-0.146	0.884	-3972.222	3421.355
C(ind02)[T.Bowling centers (71395)]	-8548.7123	2664.595	-3.208	0.001	-1.38e+04	-3326.150
C(ind02)[T.Other amusement, gambling, and recreation industries (713 exc. 71395)]	-1693.8607	1106.217	-1.531	0.126	-3862.028	474.307
C(ind02)[T.Traveler accommodation (7211)]	-181.2165	1087.245	-0.167	0.868	-2312.199	1949.766
C(ind02)[T.Recreational vehicle parks and camps, and rooming and boarding houses (7212, 7213)]	-6767.1990	2805.143	-2.412	0.016	-1.23e+04	-1269.166
C(ind02)[T.Restaurants and other food services (722 exc. 7224)]	-889.3845	931.746	-0.955	0.340	-2715.591	936.822
C(ind02)[T.Drinking places, alcoholic beverages (7224)]	-6277.0522	2192.398	-2.863	0.004	-1.06e+04	-1979.989
C(ind02)[T.Automotive repair and maintenance (8111 exc. 811192)]	4106.0577	1136.958	3.611	0.000	1877.638	6334.477
C(ind02)[T.Car washes (811192)]	-3871.3298	1963.953	-1.971	0.049	-7720.645	-22.015
C(ind02)[T.Electronic and precision equipment repair and maintenance (8112)]	2980.8832	2849.817	1.046	0.296	-2604.711	8566.477
C(ind02)[T.Commercial and industrial machinery and equipment repair and maintenance (8113)]	8898.5347	1897.412	4.690	0.000	5179.639	1.26e+04
C(ind02)[T.Personal and household goods repair and maintenance (8114 exc. 81143)]	4203.0746	3361.209	1.250	0.211	-2384.839	1.08e+04
C(ind02)[T.Barber shops (812111)]	-1199.9681	3131.121	-0.383	0.702	-7336.913	4936.977
C(ind02)[T.Beauty salons (812112)]	1135.6788	1329.509	0.854	0.393	-1470.137	3741.494
C(ind02)[T.Nail salons and other personal care services (812113, 81219)]	-266.8031	1546.057	-0.173	0.863	-3297.049	2763.442

C(ind02)[T.Drycleaning and laundry services (8123)]	-2282.7262	1833.987	-1.245	0.213	-5877.310	1311.858
C(ind02)[T.Funeral homes, cemeteries, and crematories (8122)]	-2626.2434	2690.181	-0.976	0.329	-7898.954	2646.467
C(ind02)[T.Other personal services (8129)]	-199.1535	1919.135	-0.104	0.917	-3960.625	3562.318
C(ind02)[T.Religious organizations (8131)]	-2863.7055	1388.701	-2.062	0.039	-5585.536	-141.875
C(ind02)[T.Civic, social, advocacy organizations, and grantmaking and giving services (8132, 8133, 8134)]	8513.9769	1388.142	6.133	0.000	5793.242	1.12e+04
C(ind02)[T.Labor unions (81393)]	1.934e+04	3904.230	4.953	0.000	1.17e+04	2.7e+04
C(ind02)[T.Business, professional, political, and similar organizations (8139 exc. 81393)]	1.646e+04	2412.312	6.825	0.000	1.17e+04	2.12e+04
C(ind02)[T.Private households (814)]	-3089.5909	1435.829	-2.152	0.031	-5903.792	-275.390
C(ind02)[T.Executive offices and legislative bodies (92111, 92112, 92114, pt. 92115)]	6798.3444	1149.652	5.913	0.000	4545.046	9051.642
C(ind02)[T.Public finance activities (92113)]	1.374e+04	1724.982	7.964	0.000	1.04e+04	1.71e+04
C(ind02)[T.Other general government and support (92119)]	9480.3343	2521.239	3.760	0.000	4538.747	1.44e+04
C(ind02)[T.Justice, public order, and safety activities (922, pt. 92115)]	8924.4905	1025.286	8.704	0.000	6914.946	1.09e+04
C(ind02)[T.Administration of human resource programs (923)]	6796.9979	1216.849	5.586	0.000	4411.994	9182.002
C(ind02)[T.Administration of environmental quality and housing programs (924, 925)]	8922.8101	1718.021	5.194	0.000	5555.518	1.23e+04
C(ind02)[T.Administration of economic programs and space research (926, 927)]	1.53e+04	1474.725	10.372	0.000	1.24e+04	1.82e+04
C(ind02)[T.National security and international affairs (928)]	1.755e+04	1248.787	14.051	0.000	1.51e+04	2e+04
C(ind02)[T.Armed Forces]	-3.692e-12	1.29e-12	-2.860	0.004	-6.22e-12	-1.16e-12
sex	-1.086e+04	179.345	-60.559	0.000	-1.12e+04	-1.05e+04
age	431.3093	5.901	73.093	0.000	419.744	442.875
age_sqrd	-0.2084	1.066	-0.195	0.845	-2.298	1.881
hs_indicator	1.116e+04	229.861	48.540	0.000	1.07e+04	1.16e+04
ba_indicator	2.484e+04	193.189	128.568	0.000	2.45e+04	2.52e+04

Omnibus:	14403.878	Durbin-Watson:	1.863
Prob(Omnibus):	0.000	Jarque-Bera (JB):	21479.137

Skew:	0.874	**Prob(JB):**	0.00
Kurtosis:	4.070	**Cond. No.**	1.27e+16

Notes:

[1] Standard Errors are heteroscedasticity robust (HC3)

[2] The smallest eigenvalue is 4.37e-24. This might indicate that there are strong multicollinearity problems or that the design matrix is singular.

Exercise 13

After adding the industry fixed effects, we are implicitly comparing a group of full-time working man and a group of full-time working women. The two groups have the same age, education and working industry distribution.

Exercise 14

annual_earnings ~ sex + age + age_sqrd: -1.062e+04

annual_earnings ~ sex + age + age_sqrd + hs_indicator + ba_indicator: -1.3e+04

annual_earnings ~ sex + age + age_sqrd + hs_indicator + ba_indicator + ind02: -1.086e+04

After adding industry fixed effects, the gender wage gap is decreased from 13000 to 10860. This implies that there are differences in the industries chosen by men and women, and that these differences contribute to the gender wage gap. Specifically, it suggests that women are more likely to be working in industries that have lower average wages compared to those in which men are more likely to work. This could be due to a variety of factors, such as differences in education, job preferences, or discrimination.