Elliot Tu

1a. There are 191 union members and 416 people not in a union. The average age, experience, and tenure of union workers is greater than that of non-members.

Union Members

Variable	Obs	Mean	Std. Dev.	Min	Max
age	191	39.115	12.213	19	66
exper	191	20.874	12.078	1	50
tenure	191	10.72	8.575	.5	25

Non-Union Members

Variable	Obs	Mean	Std. Dev.	Min	Max
age	416	36.921	12.845	16	80
exper	416	17.488	12.291	0	60
tenure	416	6.332	6.929	.5	25

1b. Holding all else constant, being in a union reduces annual earnings by $2,731.01. This coefficient is not statistically significant at the 95% level.

Effects on Annual Earnings

VARIABLES	annearn
union	-2,731.010
	(4,363.588)
exper	942.700***
	(349.769)
age	-237.094
	(339.043)
tenure	-367.047
	(314.987)
educ	325.619
	(725.085)
Constant	7,465.777
	(13,124.109)
Observations	607
R-squared	0.027

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

1c. The top 3 annual earnings are $503,500, $627,000, and $859,880. None of these top 3 individuals are in a union, possibly because they are in senior management. This would cause upward bias in our data for non-union individuals as these salaries are far above the average salary of non-union members ($17,063.99), and it would interfere with the effectiveness of union membership predicting earnings.

Top 3 Annual Earnings

annual earnings, $	Freq.	Percent	Cum.
503500	1	33.33	33.33
627000	1	33.33	66.67
859880	1	33.33	100.00
Total	3	100.00	

1d. Union membership is now significant at the 99% level.

Trimmed at 5% Effects on Annual Earnings

VARIABLES	(1) Trim_annearn
union	2,899.376***
	(427.450)
exper	203.877***
	(39.222)
age	-134.336***
	(38.244)
tenure	116.781***
	(32.492)
educ	682.877***
	(72.580)
Constant	3,431.670**
	(1,374.596)
Observations	547
R-squared	0.274

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

1e. Union membership is still significant at the 99% level.

Winsorized Effects on Annual Earnings

VARIABLES	(1) Wins_annearn
union	3,047.590***
	(464.040)
exper	267.649***
	(37.196)
age	-156.220***
	(36.055)
tenure	103.770***
	(33.497)
educ	795.588***
	(77.108)
Constant	1,931.495
	(1,395.665)
Observations	607
R-squared	0.295

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

2a. The SSR is 1.350e12

Effects on Annual Earnings

VARIABLES	annearn
union	-4,009.620
	(4,160.247)
exper	584.900***
	(156.997)
Constant	6,835.275*
	(3,590.998)
Observations	607
R-squared	0.023
SSR	1.350e+12

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

2b. The SSR is 234.2.

Effects on Natural Log of Annual Earnings

VARIABLES	ln_annearn
union	0.263***
	(0.055)
exper	0.015***
	(0.002)
Constant	8.985***
	(0.047)
Observations	607
R-squared	0.121
SSR	234.2

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

2c. The chi-squared value of 2506.27 is greater than the crit. Value of 3.841, so we reject the null that the larger RSS is the better model. The natural log model is better.

Box-Cox Regression

VARIABLES	Annual Earnings	Ln Annual Earnings
union	-0.353	0.028***
	(0.366)	(0.006)
exper	0.051***	0.002***
	(0.014)	(0.000)
Constant	0.601*	0.964***
	(0.316)	(0.005)
Observations	607	607
R-squared	0.023	0.121
SSR	10412	2.699

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

3a. All coefficients are statistically significant at the 99% level. Holding all else constant: An additional year of age increases the number of children a woman would have by .144, an additional year of education reduces the number of a children would have by .101, and whether or not they've been married increases the number of children a woman would have by .663.

3b. **N** = 1099

Unrestricted SSR = 2319 **Restricted SSR** = 2328

F-stat = 2.172 **F-Crit** = 3.07 @ 1094 degrees of freedom and alpha = .05

F-stat < F-crit so we fail to reject the Null hypothesis that the polynomial terms have statistical significance at the 95% confidence level.

Question 3 Regression Results

VARIABLES	Standard	Unrestricted
age	0.144***	0.107***
	(0.006)	(0.030)
educ	-0.101***	-0.075***
	(0.012)	(0.023)
evermarr	0.663***	0.461***
	(0.102)	(0.154)
Yhat_2		0.155*
		(0.089)
Yhat_3		-0.021*
		(0.011)
Constant	-1.503***	-1.047**
	(0.182)	(0.426)
Observations	1,099	1,099
R-squared	0.517	0.519
SSR	2328	2319

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1