

# Econ 753 HW3

Evan Wasner

10/16/2020

## Part 1 - Berndt Exercises

Should summarize all of question 1 here

### Question 1a

In part a, we calculate the mean hourly and annual wage using two methods. The first takes the arithmetic mean of the logarithm of hourly wages and exponentiates it to get the geometric mean. The second method *begins* by exponentiating the logarithm of hourly wages and *then* takes the arithmetic mean. The annual wage is computed by multiplying the two derived mean hourly wages by 2,000 (assuming a working year contains 2,000 hours). The results are given in Table 1. The arithmetic mean is 13% larger than the geometric mean. The fact that there is a difference between the two is due to the fact that performing a logarithm (and its inverse, exponentiation) is not a linear transformation, and so the exponent of a mean logarithm does not equal the mean of an exponentiated logarithm. The fact that the geometric mean is smaller is due to the fact that the logarithm operator decreases the values of large numbers more than it decreases the values of small numbers, thus taking the logarithm of a set of numbers greater than one will decrease the mean.

In Table 2, the means and standard deviations of years of schooling and years of potential experience are given. We can see that the mean years of education is 12.54, which indicates that the average worker does not have a college education. The mean years of experience is 18.7, and the average age is likely the around the sum of the average years of education and the average years of experience. The standard deviation for years of experience is quite high (13.4), which indicates a wide range of ages in the sample. The standard deviation for years of education is lower (2.7), as the years of education will likely hover around the number of years of a high school education.

Table 1: Geometric and Arithmetic Mean for 1978 Wages

	Geometric Mean	Arithmetic Mean
Hourly	5.37	6.06
Annual	10741.87	12125.53

Table 2: Mean and Standard Deviation of Education and Experience

	Mean	Standard Deviation
Education	12.54	2.77
Experience	18.72	13.35

Table 4: Years of Education and Mean Wages by Race

	Education		lnWage		
	Mean	SD	Mean Hourly	SD	Mean Annual
<b>Gender</b>					
Male	12.40	3.05	6.13	3.42	12256.64
Female	12.76	2.22	4.32	2.50	8632.72
<b>Race</b>					
Whites	12.81	2.49	5.55	3.38	11100.34
NonWhites	11.72	3.44	4.54	2.55	9084.33
Hispanic	10.31	3.66	4.62	1.96	9233.10

### Question 1b

In part b, we calculate the mean values for the dummy variables nonwh (indicates whether the individual is nonwhite and non-Hispanic), hisp (indicates whether the individual is nonwhite and Hispanic), and fe (indicates whether the individual is female). Since they are dummy variables, these means give the proportion of individuals in the sample that are Black, nonwhite Hispanic, and female, respectively. We can then multiply these proportions by the sample size (550) in order to find the number of individuals in the sample in each demographic group. The results are given in Table 3. There are 57 Black individuals, 36 nonwhite Hispanic individuals, and 207 female individuals (nearly half of the sample) in the sample.

Table 3: Means and Number of Individuals in Demographic Groups

	Mean	Count
nonwh	0.10	57
hisp	0.07	36
fe	0.38	207

### Question 1c

In part c, we subdivide the data first by gender and then by race. Means and standard deviations for years of education as well as geometric mean wages and standard deviations are calculated for all demographic groups. This data provides means and standard deviations of the raw data, without controlling for factors such as human capital. The results are given in table4.

We can see that, on average, men make more than \$1.50 more than women despite having slightly less years of education. Whites make around \$1 more than both Blacks and Hispanics, although Whites also on average have more years of education than the other two groups. Males have a higher standard deviation of wages than women, and Whites have a high standard deviation of wages than Blacks and Hispanics. This may be due to the fact that women and racial minorities are often excluded from certain occupations and thus may be more crowded into certain occupations with similar wage rates, as opposed to Whites who have access to a wide spectrum of pay grades.