



Übung zur Empirischen Wirtschaftsforschung

X. Einkommensfunktion II

- 6.1 [Overview of Egypt Labor Force Sample Surveys](#)
- 6.2 [Comparison between ELMPS 2012 & SOEP 2012](#)
- 6.3 [Data in Workfile Übung9.wf1](#)
- 6.4 [The Econometric Model](#)

Literatur

Assaad, R., Krafft, C., (2013), *The Egypt Labor Market Panel Survey: Introducing the 2012 Round*. Economic Research Forum (ERF) Working Paper Series 758.

Hyclak, T., Johnes, G., Thornton, R. (2005), *Fundamentals of Labor Economics*, Houghton Mifflin Company, Boston.

Ikram, K. (2006), *The Egyptian Economy, 1952-2000: Performance, policies, and issues*. London & New York, Routledge, 2006.

Polachek W. (2007), *Earnings Over the Lifecycle: The Mincer Earnings Function and Its Applications*. IZA discussion paper 3181, Bonn.

Wikipedia, the Free Encyclopedia, *List of Countries by Population*. Access date: 6/7/2014

6.1 Overview of Egypt Labor Force Sample Surveys

The Central Agency for Public Mobilization and Statistics (CAPMAS) is the only governmental body responsible for conducting national wide surveys in Egypt. CAPMAS has conducted Labor Force Sample Surveys (LFSS) since the 1960s. The goal of these surveys was to gather in depth data on Egypt's labor market situation. However, the survey methodology was not constant throughout the years. To allow researchers to make reliable research across time, the Egypt Labor Market Survey was initiated in 1998 in cooperation with the Economic Research Forum (ERF) with the goal of collecting labor market and demographic information about households and individuals over time.

Two additional panel surveys were conducted since 1998, which are the Egypt Labor Market Panel Survey (ELMPS) 2006 and the ELMPS 2012. The three panel surveys replicated the same methodology and variable definitions to allow for comparison over time. All the surveys contain an individual survey and a household survey. We will use the ELMPS 2012 for our analysis. The ELMPS 2012 succeeded to interview 77% of those interviewed in 2006, in addition to a new sample of 20,416 of individuals. The categories covered by the survey include:

- Basic Characteristics
- Housing, Service & Durables
- Parents and Siblings Characteristics
- Education
- Paid and Nonpaid Work
- Employment and Unemployment
- Job Characteristics of Primary and Secondary jobs
- Formality of job
- Earnings
- Household Enterprises
- Migration, Transfers and Non-labor income

We will use some variables from the ELMPS 2012 to estimate earning functions for Egyptian wage workers. The variables are found in the work file Übung9.wfi. All variables are calculated for a reference period of the last three months prior to the survey. But first we will compare ELMPS 2012 with SOEP 2012 in the next section.

6.2 Comparison between ELMPS 2012 & SOEP 2012

SOEP is a socio-economic survey while ELMPS is a labor market survey. Therefore SOEP covers many social dimensions such as the level of happiness and satisfaction with various life aspects, opinions about social and economic matters, and future prospects of respondents, which is not covered in ELMPS:

- The breadth of the survey depends on the level of economic development of a country. Germany is more developed in various economic, social, and institutional measures relative to Egypt. Therefore issues such as the level of happiness, personal wellbeing inside and outside work, and opinions in political and social matters is also measured, in addition to labor market measures. This is also reflected in asking about the health situation of the respondent and his health insurance characteristics, which are not covered in ELMPS.
- Egypt suffers from illiteracy rates of 34% among women and 17.5% among men. In addition, over 65% of working females work in agricultural farms with their families in order to survive (i.e. unpaid family workers). In terms of employment, many small firms in the private sector of Egypt do not provide their employees with job contracts or social security. Consequently, ELMPS targets to collect more 'basic' information relative to SOEP. For example, ELMPS collects information about illiteracy, school interruptions, subsistence work of women and unpaid family work, and the formality of the job (whether an employee has a work contract or social security), among others.

The SOEP has a set of questions about immigrants living in Germany, while ELMPS includes a section inquiring about Egyptian emigrants. This is again due to country specific needs:

- For Germany, immigrants represent an important human resource given that Germany has a low fertility rate of 1.45 (births per mother). In turn, it is important to collect in-depth information about immigrants' characteristics, opinions and degree of integration in the German society.
- Egypt has a fertility rate of 2.9 and suffers from high population concentration in its three largest cities of Cairo, Alexandria and Suez due to the concentration of economic activities there. Therefore, many people migrate from rural to urban regions, or outside Egypt, to find better work opportunities. These persons represent a major source of income for the rest of the household, as they provide them with money transfers. The questionnaire thus inquires about household members who emigrated, the location of their emigration and the amount of money they send to the household (i.e. Remittances).

What is the replacement fertility rate (i.e. fertility rate that keeps a country's population stable)?

- In developed countries the replacement rate is 2.1, in developing countries it is 2.3 or more due to worse health care leading to a higher probability of death before the age of 15. In turn Germany's fertility rate means that the population size will shrink over time.

What is the total population size of Egypt as compared to Germany?

Rank ↕	Country (or dependent territory) ↕	Population ↕	Date ↕	% of world population
1	 China ^[8]	1,365,480,000	July 9, 2014	19
2	 India	1,246,420,000	July 9, 2014	17.4
3	 United States	318,355,000	July 9, 2014	4.44
4	 Indonesia	252,164,800	July 1, 2014	3.51
5	 Brazil	202,823,000	July 9, 2014	2.83
6	 Pakistan	188,020,000	July 1, 2014	2.62
7	 Nigeria	178,517,000	July 1, 2014	2.49
8	 Bangladesh	156,591,000	July 9, 2014	2.18
9	 Russia ^[9]	146,048,500	May 1, 2014	2.04
10	 Japan	127,090,000	June 1, 2014	1.77
11	 Mexico	119,713,203	July 1, 2014	1.67
12	 Philippines	99,833,600	July 9, 2014	1.39
13	 Vietnam	89,708,900	July 1, 2013	1.25
14	 Ethiopia	87,952,991	July 1, 2014	1.23
15	 Egypt	86,770,500	July 9, 2014	1.21
16	 Germany	80,716,000	September	1.13

http://en.wikipedia.org/wiki/List_of_countries_by_population

However the relevant measure here is the population growth rate. It is quite different between Germany and Egypt!

- In 2013, it was 0.2% for Germany and 1.6% for Egypt.

6.3 Data in Workfile Übung9.wf1

WW 1 if respondent is a wage worker, 0 if non wage worker

Y Net basic income per 3 months in EGP

XYR Years of experience in the labor market

F 1 if respondent is Female, 0 if Male

ILLITERATE Cannot read or write

READ&WRITE Literate but without a certificate

PREPARATORYORLESS Primary or Preparatory certificate

VSECONDARY (Reference group) Vocational secondary certificate

GSECONDARY General secondary certificate

DIPLOMA Diploma certificate

UNIVERSITY University certificate

PRIVATE 1 if respondent works in Private sector, 0 if works in the Government

URBAN 1 if respondent living in Urban area, 0 if lives in Rural area

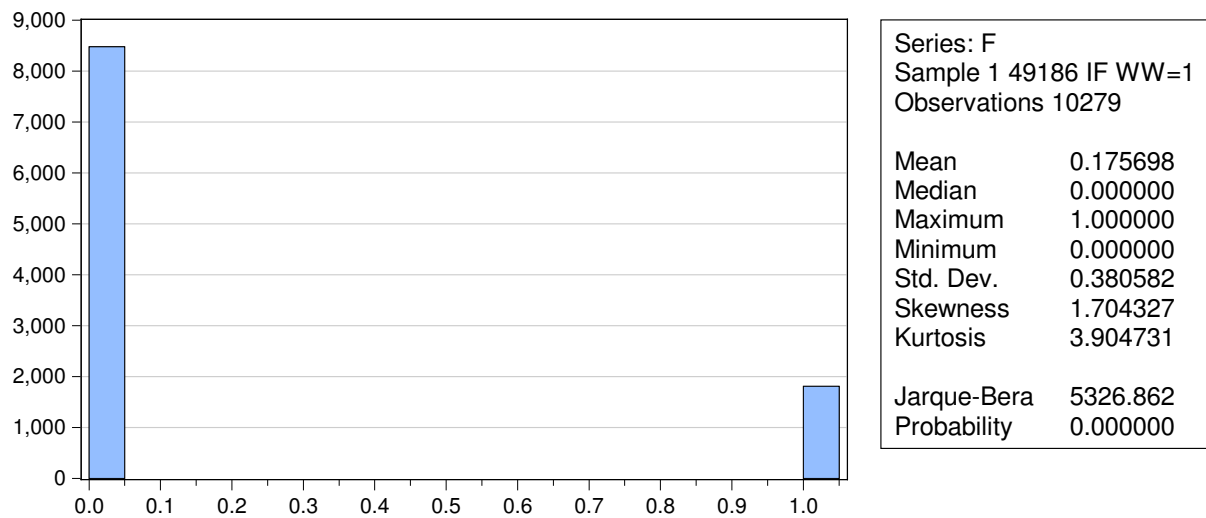
- The educational dummies refer to the *highest* educational certificate earned by an individual. Primary is finishing Grade 1 to 6, Preparatory is finishing Grades 7 to 9 and Secondary is finishing Grades 9 to 12. General Secondary is similar to 'Abitur'. Vocational Secondary and Diploma refer to the 'Ausbildung' track.

6.4 The Econometric Model

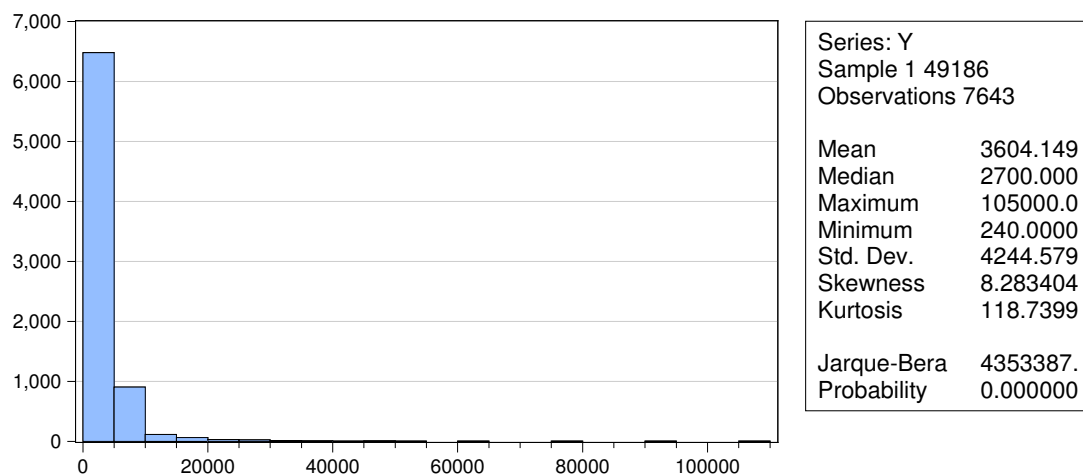
We will estimate a function that includes the basic Mincerian components of schooling, which are dummies in our case, HRS, XYR polynomial, the female dummy F, in addition to URBAN dummy and PRIVATE dummy.

$$\log(Y)_i = \beta_0 + \beta_1 XYR_i + \beta_2 XYR_i^2 + \beta_3 Illiterate_i + \beta_4 Read\&Write_i + \beta_5 Preparatoryorless_i + \beta_6 GeneralSecondary_i + \beta_7 Diploma_i + \beta_8 Uni_i + \beta_9 F_i + \beta_{10} Urban_i + \beta_{11} Private_i + \varepsilon_i \quad (1)$$

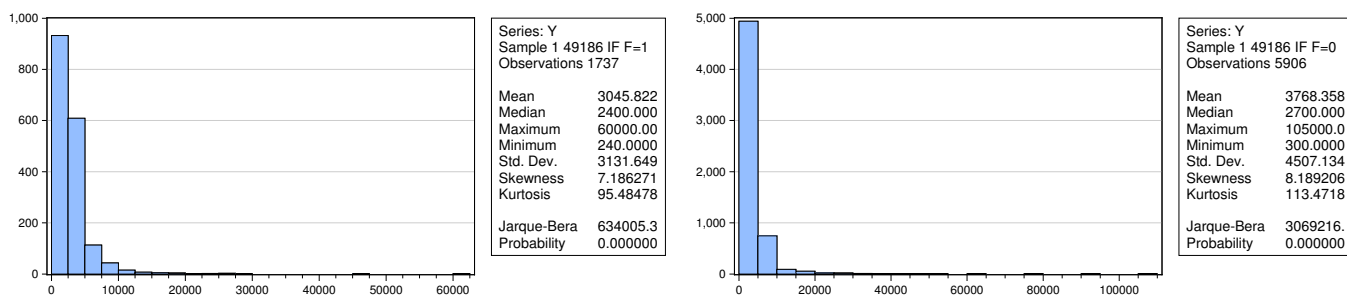
Let us first examine some descriptive statistics of the data.



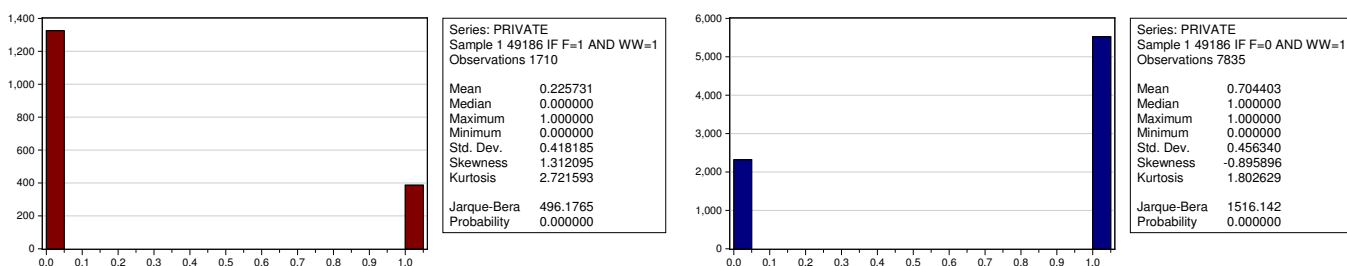
The figure shows that 17.5% of the total sample of wage workers are females, while 82.4% are males. This shows that wage work is not the primary work type for the majority of females, as most females work as unpaid family workers. On the other hand, wage work is the main work type for males in Egypt.



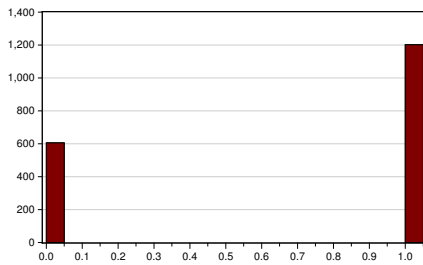
The mean earnings for all sample is 3,604 EGP per 3 months. There is a very big difference between the minimum and maximum wage value. The standard deviation from the mean is 4,656 EGP.



Looking at earnings per gender, the average wages of females are much lower than those of males, with a difference of 723 EGP per 3 months. The maximum income value for female wage workers are also lower than that for males, at 60,000 relative to 105,000, respectively. Comparing the number of observations highlights the much higher number of males engaged in wage worker relative to females.

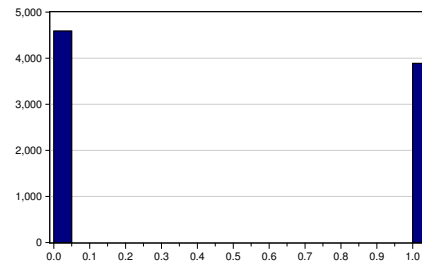


Examining sector of employment by gender shows that males are much more concentrated in the private sector relative to females. More specifically, 70.4% of total male wage workers are employed in the private sector, relative to 22.5% of females. In turn, 77.5% of female wage workers are employed in the government sector.



Series: URBAN
Sample 1 49186 IF F=1 AND WW=1
Observations 1806

Mean	0.665006
Median	1.000000
Maximum	1.000000
Minimum	0.000000
Std. Dev.	0.472119
Skewness	-0.699193
Kurtosis	1.488871
Jarque-Bera	318.9844
Probability	0.000000



Series: URBAN
Sample 1 49186 IF F=0 AND WW=1
Observations 8473

Mean	0.458633
Median	0.000000
Maximum	1.000000
Minimum	0.000000
Std. Dev.	0.498315
Skewness	0.166036
Kurtosis	1.027568
Jarque-Bera	1412.435
Probability	0.000000

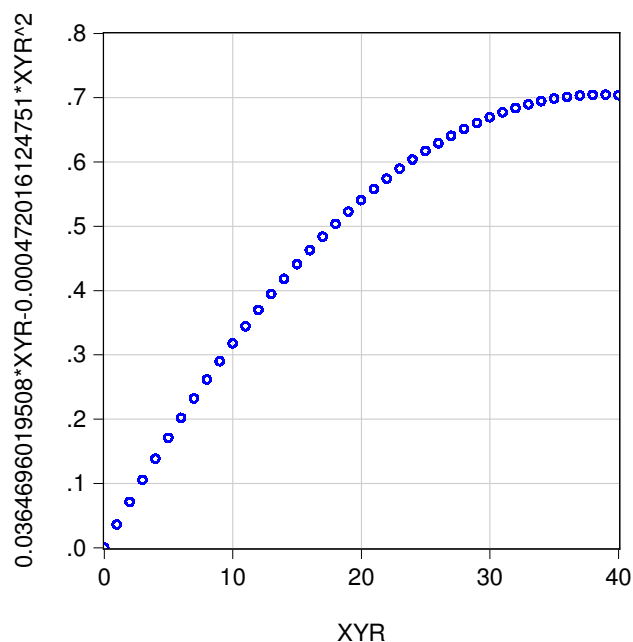
Around 46% of males wage workers live in urban regions, relative to 66.5% of female wage workers. Hence, the majority of females wage workers live in urban regions relative to male wage workers, who are more evenly distributed across both regions.

We now show the estimation results from equation 1 (model1):

Dependent Variable: LOG(Y) Method: Least Squares Date: 07/11/17 Time: 13:27 Sample (adjusted): 10 49176 Included observations: 6768 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	7.377433	0.029249	252.2243	0.0000
ILLITERATE	-0.369947	0.029945	-12.35431	0.0000
READWRITE	-0.272286	0.044327	-6.142713	0.0000
PREPARATORYORLES	-0.203057	0.025445	-7.980325	0.0000
GSECONDARY	0.019387	0.049262	0.393554	0.6939
DIPLOMA	0.099085	0.036119	2.743302	0.0061
UNI	0.307753	0.019528	15.75959	0.0000
XYR	0.036470	0.002393	15.24116	0.0000
XYR^2	-0.000472	5.69E-05	-8.292763	0.0000
URBAN	0.143258	0.015737	9.103389	0.0000
PRIVATE	0.095346	0.018323	5.203669	0.0000
F	-0.252627	0.019655	-12.85303	0.0000
R-squared	0.158860	Mean dependent var	7.887112	
Adjusted R-squared	0.157490	S.D. dependent var	0.681738	
S.E. of regression	0.625756	Akaike info criterion	1.902059	
Sum squared resid	2645.451	Schwarz criterion	1.914151	
Log likelihood	-6424.568	Hannan-Quinn criter.	1.906233	
F-statistic	115.9961	Durbin-Watson stat	1.445410	
Prob(F-statistic)	0.000000			

- Looking at the educational dummy results shows that returns are positively related to education, as explained by the human capital theory. Specifically, wage workers with UNI certificate receive the highest earnings, which are 30.7% higher than those with a vocational secondary certificate (reference group). The second highest earnings are for wage workers with DIPLOMA, who earn around 10% higher than the reference group.
- Wage workers whose educational attainment is below the reference group receive significantly lower earnings, with the lowest earnings shown for the Illiterate category which receive 30% less income than the reference group.

- Wage workers living in URBAN regions earn 14.3% higher earnings relative to those living in rural regions. This is because urban regions have much better development, infrastructure, and job opportunities due to the large concentration of economic activity in these regions.
- Working in the PRIVATE sector provides 9.5% higher earnings relative to working in the government sector.
- Females earn 25% less than what is earned by males Given that this F coefficient is large and significant, it is a good idea to estimate earning functions for males and females separately. We do this in the coming estimations.
- The experience and experience squared coefficients are significant and have the expected signs. This shows that experience profiles of wage workers are inversely U-shaped, as explained by human capital theory. We can plot the *total effect* of experience on income to allow for graphical visualization:



- Returns to experience are 30% for a person having ten years of experience, but then the rate of increase falls as the years of experience increase. For example, the following ten years of experience provide an increase in returns of 26%, and with thirty years of experience the rate of increase is only 13%.

The R^2 of the model is only 15.8% although we considered the most important human capital variables. What does this mean economically? How is this result different to that of Germany?

We now estimate equation 1 for males and females separately. We start by estimating model 2 for females (i.e. $f=1$).

Dependent Variable: LOG(Y) Method: Least Squares Date: 07/11/17 Time: 13:29 Sample: 1 49186 IF F=1 Included observations: 1596				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.993888	0.051630	135.4614	0.0000
ILLITERATE	-0.442667	0.086236	-5.133225	0.0000
READWRITE	-0.200932	0.160171	-1.254486	0.2099
PREPARATORYORLES	-0.008123	0.088700	-0.091581	0.9270
GSECONDARY	0.022166	0.102400	0.216463	0.8287
DIPLOMA	0.095869	0.066686	1.437621	0.1507
UNI	0.317653	0.036633	8.671136	0.0000
XYR	0.048290	0.005289	9.130841	0.0000
XYR^2	-0.000567	0.000145	-3.905181	0.0001
URBAN	0.155746	0.033486	4.651032	0.0000
PRIVATE	-0.037931	0.045094	-0.841141	0.4004
R-squared	0.267134	Mean dependent var	7.746657	
Adjusted R-squared	0.262510	S.D. dependent var	0.707441	
S.E. of regression	0.607531	Akaike info criterion	1.848042	
Sum squared resid	585.0141	Schwarz criterion	1.885089	
Log likelihood	-1463.737	Hannan-Quinn criter.	1.861800	
F-statistic	57.77404	Durbin-Watson stat	2.051089	
Prob(F-statistic)	0.000000			

Comparing the results to the first estimation, we note that the second estimation provides a better fit given by R^2 . Additionally the values of the coefficients and their statistical significance has also changed relative to model 1:

- Female wage workers with UNI receive the highest earnings, with 31.7% higher earnings the reference group. Females with lower education level do not receive significantly different earnings compared to the reference group. This shows the high importance of having university education for females.
- The experience polynomial is significant and has the expected signs of a positive linear term and a negative polynomial term. This shows that females face an inverse U-shape earnings experience profile.
- Living in an URBAN region provides 15.5% higher earnings relative to living in a rural region,
- Working in the PRIVATE sector does not provide significantly higher returns relative to working in the GOVERNMENT sector.

Let us now show the results of model 3 for males:

Dependent Variable: LOG(Y) Method: Least Squares Date: 07/11/17 Time: 13:32 Sample: 1 49186 IF F=0 Included observations: 5172				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	7.455539	0.033585	221.9874	0.0000
ILLITERATE	-0.323766	0.032403	-9.991820	0.0000
READWRITE	-0.244156	0.046486	-5.252234	0.0000
PREPARATORYORLES	-0.192122	0.026933	-7.133242	0.0000
GSECONDARY	0.025069	0.055825	0.449072	0.6534
DIPLOMA	0.107725	0.042604	2.528549	0.0115
UNI	0.320209	0.023094	13.86571	0.0000
XYR	0.027662	0.002779	9.953165	0.0000
XYR^2	-0.000333	6.36E-05	-5.239074	0.0000
URBAN	0.134888	0.017765	7.593083	0.0000
PRIVATE	0.106794	0.020096	5.314296	0.0000
R-squared	0.120865	Mean dependent var	7.930455	
Adjusted R-squared	0.119162	S.D. dependent var	0.667739	
S.E. of regression	0.626693	Akaike info criterion	1.905405	
Sum squared resid	2026.953	Schwarz criterion	1.919338	
Log likelihood	-4916.377	Hannan-Quinn criter.	1.910280	
F-statistic	70.95433	Durbin-Watson stat	1.509340	
Prob(F-statistic)	0.000000			

- Males with UNI receive the highest earnings, followed by those with DIPLOMA, compared to reference group.
- Males working in the PRIVATE sector earn 10.67% higher than those working in the GOVERNMENT sector. This shows that the private sector provides an earnings advantage for males, but not for females.
- The experience polynomial is significant and with the expected signs. Comparing the polynomial to that of females shows that females have higher returns to experience than males. This could be due to the fact that female wage workers are much more concentrated in the government sector, where income is more dependent on seniority level.
- The estimation quality for the males earning function shows a low explanatory power, given by an R^2 of only 12%. What does this result show compared to the females' result?