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A STUDY ON THE MEASUREMENT OF THE COMPENSATING WAGE DIFFERENTIALS IN EUROPEAN COUNTRIES

Bachelor's Thesis

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SUMMARY

According to the economic theory, the differences of working conditions are compensated by wage differentials at the equilibrium in a perfect competition setting. Earlier studies failed to find significant results for the effect of most of the working conditions on wages, which could be possibly caused by several different biases, and focused on the effect of the risk of fatal or non-fatal accident. In this direction, the effect of risk perception on wages has been tried to be estimated by using 2010 and 2015 waves of the data set European Working Conditions Survey (EWCS) which includes a wide set of data from 25 countries. The estimation gave unexpected insignificant results for most of the cases. However, a negative effect of risk perception on wages has been received for a group of less developed countries, which can be the sign of a segmented labor market across European countries in terms of compensation of working conditions.

1. Introduction

The discussion around the working conditions and their effects on wages has not been recently appeared, but the roots of it can be found in Adam Smith's (1976) famous book *"The Wealth of Nations"*: "*The whole of the advantages and disadvantages of the different employments of labour and stock must, in the same neighborhood, be either perfectly equal or continually tending to equality. If in the same neighborhood, there was any employment evidently either more or less advantageous than the rest, so many people would crowd into it in the one case, and so many would desert it in the other, that its advantages would soon return to the level of other employments."*

In reality, workers and jobs are not homogeneous: Working conditions differ heavily across all jobs and at the same time workers have different preferences as well. According to the hedonic theory of wages, these differences are compensated by wage differentials at the equilibrium of a perfect competition setting. Such an equilibrium allows an optimal resource allocation to happen, so that workers who have high tolerance for risk and difficulty would work in risky and difficult jobs and obtain higher wages than workers in less risky and less difficult jobs. (Cahuc, Zylleberg 2014) In other words, workers, in jobs with undesirable non-wage characteristics, should earn compensating premiums. (Brown, 1980)

This topic is especially important in developing countries, such as Turkey, where both fatal and non-fatal occupational accidents take place in large numbers. There has been a massive increase in the number of non-fatal accidents in Turkey, as the country adapted its

statistical methodology to European Union's standards. Figure 1.1 shows the evolution in the number of non-fatal occupational accidents from 2010 to 2015 in Turkey.

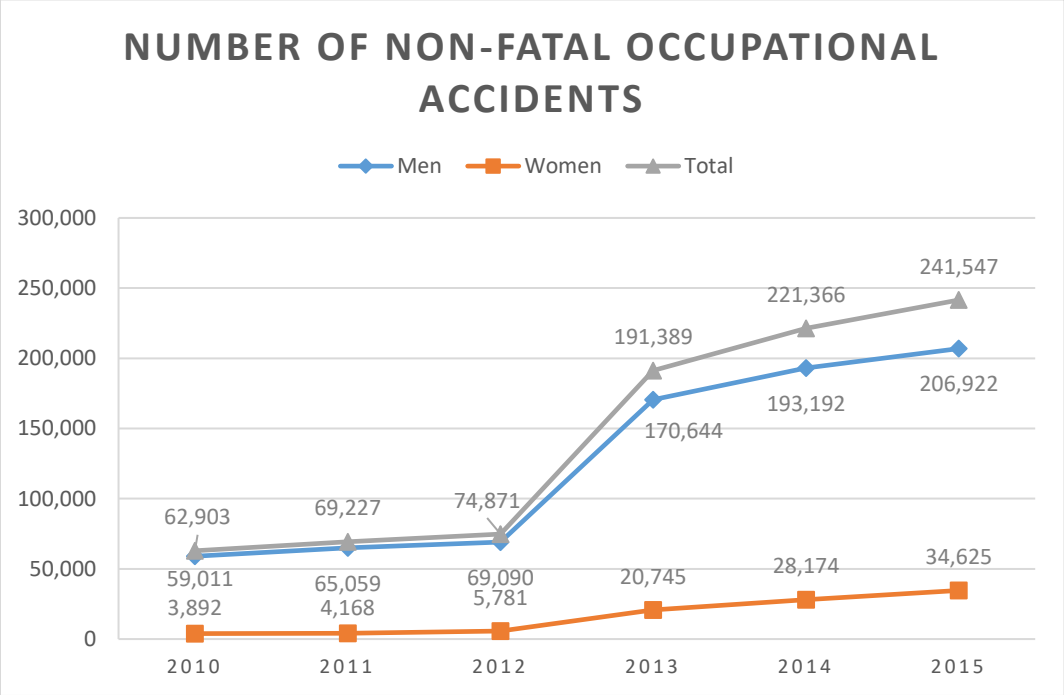

Figure 1.1 – Number of Non-Fatal Occupational Accidents Between 2010 and 2015

If we compare the number of non-fatal occupational accidents in Turkey and in European Union, in 2014 the average number of non-fatal occupational accidents was 107,171 in European Union, where it was 221,336 in Turkey. Besides Turkey is also above the average of European Union when it comes to fatal accidents. On average, European countries have reported 126 fatal occupational accidents, whereas Turkey has reported 1,621 fatal occupational accidents in the same year.

As there is a high level of risk heterogeneity across jobs and economic activities, it is necessary to check the industry-specific statistics. According to the data drawn from the Social Security Institution of Turkey (SGK), there are five different economic activity types which had proportionally bigger number of accidents and deaths. These are; mining, metal/machinery, construction, manufactory and transportation activities. All together, they generated %64,8 of non-fatal occupational accidents and %73,8 of fatal occupational accidents in 2015. Therefore, it is possible to say that these activity types carry high levels of accident risks. In figure 1.2, we can see the proportions of non-fatal accidents in these economic activity types between 2010 and 2015. Figure 1.2 also shows us that two economic activity types, mining and manufactory, are consistently generating higher proportions of non-fatal occupational accidents.

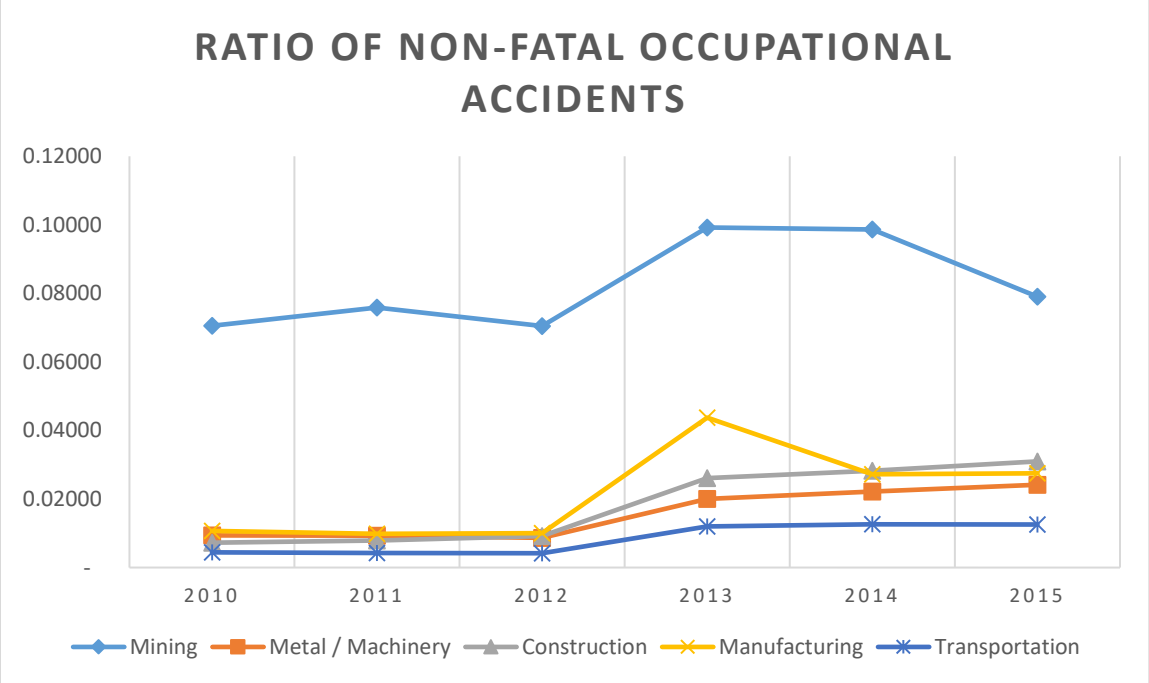

Figure 1.2 – Ratio of Non-Fatal Occupational Accidents Between 2010 and 2015

In addition to this, it can be also observed that there is a big differentiation in the number of occupational accidents between men and women throughout the years. A few opinions are available to explain this phenomenon. Firstly, it can be caused by the low level of participation of women in the labor force. It is around 65% for men, but only around 27% for women. However, participation rates are solely not enough. One must consider the occupational segregation in Turkish labor market to analyze this issue better. The highly risky economic activities, which are mentioned above, are dominated by men. When we check the economic activity types which are more balanced in terms of participation rates and which are less risky, we can see that the accident rates of men and women converge.

2. Literature Review

Most of the empirical studies in the topic of compensating wage differentials has based its approach on Rosen (1974) that firms and workers exchange wage-job risk bundles in an implicit market. However, this approach could not provide a solid ground other than triggering the empirical tests of compensating wage differentials, since the results were often of small order of magnitude, insignificant or wrong-signed. (Bonhomme and Jolivet, 2009)

Early studies have been only able to provide limited evidence for compensating differentials. Smith (1973), in an early study, finds that work-related death risk is reflected in wage rates, but there was not any evidence for compensating differentials related to non-

fatal injury. (Smith, 1973) Similarly, Thaler and Rosen (1975) show that occupation-specific mortality rates do provide a wage premium for workers in most hazardous occupations. Brown, despite being able to use a longitudinal dataset, can't avoid an uncomfortable number of exceptions from the theory. (Brown, 1980). Smith (1973) suggests that *"Tests of the theory of compensating wage differentials are inconclusive with respect to every job characteristic except the risk of death."*

In order to better understand the insignificant or wrong-signed results that many authors have obtained, it is necessary to discuss the methodology used for predicting the magnitude of compensating wage differentials. The literature, fundamentally, has tried to find the effects of the personal characteristics of workers and the non-wage characteristics of jobs on wages based on cross-sectional data sets. However, this approach has been criticized for several reasons by many authors. The most important critique is that unobserved characteristics of workers, such as intelligence and motivation, can bias the estimations, because they can differentiate wages according to different levels of productivity they cause. Hwang, Reed and Hubbard (1992) prove that unobserved characteristics can bias the estimates, so that the true compensating wage differentials can be underestimated by 50%. As a primary solution, in many studies researchers have tried to reduce the bias of unobserved characteristics by using longitudinal data sets for fixed effects models or using a wage change equation instead of simple hedonic wage equations. (Brown, 1980) (Duncan and Holmlund, 1983) However, using these models were not enough to provide significant results, since there exist other biases for the estimation. Another important bias, measurement errors, can originate from the surveys. The survey questions can be vague, so that the workers may provide answers subjectively and in addition workers may not

possess the right information about the amount of risk that they face or they value the risk subjectively. This bias can be also reduced through a wage change equation by using changes in working conditions. (Duncan and Holmlund, 1983) Furthermore, another bias is caused by the heterogeneity of individual preferences as workers may have different tastes about certain job characteristics, so that not all of job characteristics can be identified as desirable or undesirable. (Cahuc and Zylleberg, 2014) This bias has incited many studies to focus on the effects of death or injury risks of jobs, since these two characteristics of job can be evaluated more globally. Accordingly, in the literature we find many studies proving that death or injury risk provides a positive wage premium. (Thaler and Rose, 1975) (Brown, 1980) Another issue of estimating compensating wage differentials is the endogeneity of job riskiness. Viscusi (1978) adds up to the literature by arguing that there is an income effect on job preferences. The individuals with higher non-wage wealth, higher human capital and higher earnings potential would choose less riskier jobs. (Viscusi, 1978) (Biddle and Zarkin, 1988) (Garen, 1988) In order to overcome this issue, researchers use quantile regressions and find that compensating wage differentials increase along the wage distribution. (Evans and Schaur, 2010) (Kiesner et al., 2010) (Polat, 2014) Some researchers consider self-selection as another bias for estimation of the wage compensations and their results prove that self-selection influences the wage premium individuals receive. Goeddeeris (1988) finds that public-interest lawyers receive smaller premiums than their counterparts described as private lawyers. In another study, Kostiuk (1990) finds evidence self-selection for the preference of shift work. Rao et al. (2002) studies an unusual case in the literature by the set-up of a natural experiment. They set two

different group of sex workers and observes that condom usage reduces their earnings by 66% to 79%.

3. Data:

The data set, which is used for this study, is drawn from the fifth and sixth waves of the European Working Conditions Survey (EWCS), conducted in 2010 and 2015, respectively. The EWCS is conducted by the Foundation for the Improvement of Living and Working Conditions, a European Union (EU) body created in 1975. Each wave of the EWCS represents a new cross section survey of individual workers within Europe asking detailed information about the nature of their jobs and working environment. Some groups are underrepresented or overrepresented in the survey. In order to overcome this issue, EWCS provides useful weights from which a combination of design, post-stratification and supra-national weights are applied in this study, so that the result can represent the whole population. However, application of weights doesn't change the results very much. This survey is very valuable as it collects wide range of information about working conditions throughout the years across many countries. It is especially important to be able to control the heterogeneities in the literature of compensating wage differentials. As the data is very wide, there is the possibility of using various variables to control for heterogeneity. In table 3.1 and 3.2, various heterogeneities on country level are shown and in table 3.3 various heterogeneities on industry level are shown.

Table 3.1 – Heterogeneities Across Countries (1)

Country	Mean Wage	Female Ratio	Mean Age	Mean Tenure	Risk Perception	Informed About Risk	Risk Compensated	Hours Compensated
Belgium	12.305	47.43%	41.179	12.722	23.08%	82.79%	6.96%	29.49%
Bulgaria	1.745	53.56%	43.677	10.149	31.14%	92.88%	7.81%	16.41%
Czech Republic	4.394	52.57%	42.669	10.050	15.84%	92.06%	14.93%	47.49%
Denmark	18.151	48.43%	42.973	10.876	17.91%	89.81%	7.15%	37.47%
Germany	10.757	48.33%	42.906	11.511	18.79%	88.64%	8.15%	7.12%
Greece	5.928	41.73%	41.578	13.155	32.64%	86.99%	8.08%	18.89%
Spain	8.571	49.22%	41.333	11.811	35.00%	86.99%	5.78%	22.69%
France	11.661	53.70%	40.932	11.750	26.95%	77.43%	10.68%	10.19%
Ireland	15.367	47.89%	41.496	12.386	18.71%	94.17%	2.39%	33.31%
Italy	10.392	49.40%	43.921	14.117	14.72%	81.50%	9.67%	1.15%
Latvia	2.803	60.50%	43.822	9.873	40.96%	91.37%	5.51%	20.32%
Lithuania	6.355	60.26%	43.953	10.179	27.47%	87.85%	3.58%	20.13%
Hungary	2.625	51.80%	43.505	10.685	24.07%	92.26%	4.74%	27.08%
Netherlands	14.168	48.56%	44.032	12.740	17.26%	83.37%	3.03%	33.10%
Austria	11.470	54.65%	41.879	12.203	23.26%	86.36%	15.16%	41.54%
Poland	3.386	52.90%	41.295	11.614	25.52%	91.79%	9.92%	40.67%
Portugal	5.012	54.79%	43.674	13.531	18.48%	85.47%	3.89%	15.54%
Romania	1.851	46.30%	42.105	10.941	26.74%	90.58%	8.81%	23.26%
Slovakia	3.591	54.15%	43.421	10.508	25.30%	93.41%	12.29%	38.93%
Finland	14.129	54.29%	43.835	13.689	26.88%	88.47%	7.01%	40.54%
Sweden	15.343	51.45%	45.605	13.129	41.80%	87.64%	3.20%	43.54%
United Kingdom	14.652	49.25%	42.348	10.074	18.39%	93.90%	2.18%	36.97%
Croatia	3.738	50.00%	40.968	12.821	30.41%	87.12%	8.58%	28.25%
Turkey	3.533	26.22%	36.250	11.228	23.05%	68.17%	11.33%	29.04%
Norway	19.722	52.67%	42.963	12.227	17.61%	90.82%	15.45%	51.04%

Table 3.2 – Heterogeneities Across Countries (2)

Country	Mean Daily Workhour	Mean Overhour	Mean Commuting Hour	Involve Organisation	Colleague Support	Strong Work Well-Done
Belgium	6.032	2.245	1.140	51.12%	71.79%	86.26%
Bulgaria	6.961	2.653	1.076	41.45%	78.58%	89.00%
Czech Republic	6.669	2.795	1.070	42.16%	68.99%	79.08%
Denmark	5.902	2.476	1.162	61.47%	82.64%	90.77%
Germany	5.880	1.810	1.137	34.17%	66.84%	85.75%
Greece	7.317	4.169	1.082	54.69%	77.00%	75.33%
Spain	6.229	2.192	1.070	52.94%	83.14%	81.97%
France	5.879	2.286	1.050	53.59%	67.99%	84.99%
Ireland	6.018	3.212	1.117	59.38%	85.68%	82.34%
Italy	5.954	1.477	1.020	49.53%	47.93%	86.32%
Latvia	6.513	2.792	1.176	40.00%	73.38%	79.56%
Lithuania	6.453	2.453	1.063	33.30%	74.83%	68.90%
Hungary	6.664	2.439	1.111	43.46%	78.66%	75.85%
Netherlands	5.349	2.325	1.200	63.96%	74.41%	90.11%
Austria	5.998	2.498	1.009	47.14%	74.36%	91.35%
Poland	6.706	2.815	0.993	38.13%	58.71%	79.41%
Portugal	6.536	2.062	1.007	41.36%	75.83%	86.89%
Romania	7.101	3.910	1.071	52.41%	75.66%	84.94%
Slovakia	6.919	2.942	1.088	30.93%	65.55%	72.75%
Finland	6.140	2.567	1.119	51.26%	83.87%	75.40%
Sweden	6.332	2.738	1.183	52.08%	70.49%	81.72%
United Kingdom	5.806	3.315	1.162	51.06%	81.60%	74.35%
Croatia	6.840	2.228	1.043	43.16%	77.47%	83.03%
Turkey	8.460	5.445	1.081	42.75%	66.59%	64.38%
Norway	5.799	2.256	1.082	59.89%	87.43%	88.20%

Table 3.3 – Heterogeneities Across Industries

NACE.1	Mean Wage	Female Ratio	Mean Age	Mean Tenure	Risk Perception	Informed About Risk	Risk Compensated	Hours Compensated
Agriculture, hunting and forestry	5.411	32.66%	47.519	18.894	32.67%	75.79%	7.40%	26.61%
Fishing	7.071	37.41%	43.494	10.371	28.08%	76.32%	8.12%	31.27%
Mining and quarrying	12.548	28.41%	43.311	14.081	37.09%	91.92%	23.80%	41.67%
Manufacturing	8.220	37.14%	41.814	11.999	28.71%	88.56%	10.11%	38.75%
Electricity, as and water supply	10.312	23.17%	43.152	14.030	28.18%	94.10%	14.57%	39.27%
Construction	9.564	9.67%	41.675	11.128	40.87%	88.66%	13.65%	43.27%
Wholesale and retail trade	7.668	53.24%	39.803	9.684	17.12%	84.80%	4.31%	31.96%
Hotels and restaurants	7.723	54.04%	36.989	7.771	19.52%	83.33%	3.45%	35.61%
Transport, storage and communication	10.500	31.82%	42.601	11.812	28.57%	87.87%	10.45%	38.55%
Financial Intermediation	13.943	52.93%	41.580	12.305	12.13%	89.12%	2.91%	24.93%
Real estate activities	11.506	46.17%	40.971	9.775	18.16%	85.55%	6.31%	27.08%
Public administration and defence	10.582	46.80%	43.963	14.370	26.00%	89.26%	12.11%	27.05%
Education	11.502	71.58%	43.892	13.560	16.93%	88.97%	2.75%	22.52%
Health and Social Work	11.356	81.62%	43.679	12.070	30.76%	91.22%	9.47%	35.22%
Other Service Activities	9.370	59.97%	41.850	9.957	20.51%	84.69%	6.62%	28.33%
Activities of households	8.647	82.64%	47.844	7.808	16.52%	65.72%	2.08%	17.28%
Activities of extraterritorial organisation	19.296	51.43%	44.157	12.070	26.47%	88.57%	3.13%	15.63%

NACE.1	Mean Daily Workhour	Mean Overhour	Mean Commuting Hour	Involve Organisation	Colleague Support	Strong Work Well-Done
Agriculture, hunting and forestry	9.495	5.218	0.822	53.88%	64.83%	80.42%
Fishing	8.926	3.162	0.988	46.33%	68.26%	74.16%
Mining and quarrying	8.973	3.201	1.154	48.56%	80.69%	82.94%
Manufacturing	8.800	2.361	1.125	41.48%	71.25%	79.11%
Electricity, as and water supply	8.751	2.441	1.184	49.33%	79.15%	84.53%
Construction	9.052	3.098	1.154	46.45%	76.05%	84.23%
Wholesale and retail trade	8.602	2.789	1.061	46.15%	71.94%	77.97%
Hotels and restaurants	8.746	4.644	1.058	46.25%	77.17%	76.13%
Transport, storage and communication	8.764	3.401	1.128	43.84%	71.14%	79.97%
Financial Intermediation	8.312	1.997	1.236	50.00%	72.37%	83.38%
Real estate activities	8.243	2.687	1.127	51.32%	69.84%	82.08%
Public administration and defence	8.174	1.949	1.182	48.29%	76.68%	81.33%
Education	7.144	1.398	1.129	57.57%	76.98%	86.35%
Health and Social Work	7.552	2.364	1.110	50.90%	79.55%	87.17%
Other Service Activities	7.610	2.364	1.059	49.34%	70.95%	83.35%
Activities of households	5.649	1.580	0.849	44.58%	35.34%	82.31%
Activities of extraterritorial organisation	8.131	2.490	1.333	69.70%	78.79%	88.57%

4. Estimation Strategy:

The estimation begins with a simple wage equation to obtain a base model which has a set of individual covariates including gender, education, age, age squared, tenure and its square as independent variables, and wage as the dependent variable. $ln(w_{ijt})$ denotes the log real hourly wage expressed in 2015 prices of individual i in country j in a given year t. In the second stage, the model is augmented with a set of variables, denoted with R_{ijt}; such as risk perception, being informed about risk, risk compensation, and hour compensation to measure the effect of risk. Furthermore, in the third model another set of variables which describe the organizational aspects of working conditions, denoted with O_{ijt}, such as involvement in work organization, colleague support and feeling of strong work well-done, are added and third model becomes the full model. To obtain the final model, as EWCS provides a wide set of variables, the variable C_{ijt} is added and it is used to control for the year, country, occupation and industry fixed effects. The equations of the four models, which are briefly described above, can be shown as:

$$ln(w_{ijt}) = \alpha + \beta_1 X_{ijt} + \varepsilon_{ijt} \quad (1)$$

$$ln(w_{ijt}) = \alpha + \beta_1 X_{ijt} + \beta_2 R_{ijt} + \varepsilon_{ijt} \quad (2)$$

$$ln(w_{ijt}) = \alpha + \beta_1 X_{ijt} + \beta_2 R_{ijt} + \beta_3 O_{ijt} + \varepsilon_{ijt} \quad (3)$$

$$ln(w_{ijt}) = \alpha + \beta_1 X_{ijt} + \beta_2 R_{ijt} + \beta_3 O_{ijt} + \beta_4 C_{ijt} + \varepsilon_{ijt} \quad (4)$$

The data set accommodates a great amount of heterogeneities especially in terms of wage, risk perception and working conditions. A three-stage estimation strategy will be used in order to show the cross-national differences more clearly. Firstly, the estimation will be done for a pool of all countries. In the second stage, the model will be estimated only for Turkey. In the third and final stage, the models will be separately estimated for two different country groups. The grouping of the countries is made according to their GDP per capita level in 2015, which is drawn from the data of the World Bank. The list of two country groups can be found in Table 4.1. The line is drawn from 20,000 $ GDP per capita. From now on, the countries above the line will be addressed as developed countries and the countries below the line as less developed countries. By estimating separately, we will be able to see the heterogeneities of countries properly.

Table 4.1 – Ranking of Countries According to the GDP per Capita Rates in 2015

Developed Countries	
Country	**GDP - 2015**
Norway	74481.819
Ireland	61093.691
Denmark	53014.644
Sweden	50585.258
Netherlands	44290.869
United Kingdom	43929.691
Austria	43636.754
Finland	42403.467
Germany	41178.457
Belgium	40454.170
France	36352.480
Italy	29993.076
Spain	25684.724

Less Developed Countries	
Country	**GDP - 2015**
Portugal	19222.935
Greece	18006.970
Czech Republic	17556.924
Slovakia	16089.016
Lithuania	14251.780
Latvia	13654.849
Poland	12558.871
Hungary	12365.626
Croatia	11592.910
Turkey	9125.688
Romania	8980.657
Bulgaria	6993.477

As it is mentioned before in the literature review part, there are several empirical challenges to estimate the compensating wage differentials. Several authors have mentioned that unobserved characteristics, job heterogeneity and endogeneity of job riskiness can bias the estimations of compensating wage differentials. Thanks to the wide set of variables that EWCS provides, there is the chance to decrease the effect of unobserved characteristics and job heterogeneity. The organizational aspects of work, such as involvement in work organization, colleague support and feeling of work well-done, can change the wage levels in function of a change in the productivity, but they are used for limiting the bias of unobserved characteristics of wage until a certain level and see their effect on wages. Unfortunately, the possibility to control for the risk endogeneity of jobs does not exist as EWCS does not provide an information about the non-wage wealth of the individuals.

5. Results

5.1. Results of All Countries

The results from the estimation for all countries pooled are shown in Table 5.1. The results for the individual characteristics are as expected: Higher education, age and tenure cause a higher wage, while being female decreases the wage by almost 16%. It can be easily said that there exists a gender wage gap overall in European countries.

The parameter of interest of the model, risk perception, receives a negative and significant result in the model three, which is an unexpected result. The expected result was a positive risk premium on wages, however results show that there is a negative one by 15%. However, when the model is controlled for the fixed effects, risk perception becomes insignificant while remaining negative. A similar result is obtained for being informed about risk, but it becomes positive when controlled for fixed effects, although it is an insignificant result. When it comes to the variable of risk compensation, we see a controversial result: it is significant and positive, wages increase 7% on average when they are compensated for risk. In addition to that, we also observe a 2% increase on average when the workers are compensated for hour. This fits to the coefficient of over hour work which is significant and positive. Working hours receives a negative and significant coefficient, which tells us that the workers, who work for longer hours, are receiving a smaller hourly wage than their counterparts. This finding shows us that those who work longer hours are generally paid lowly and possibly are in industries which do not require high qualifications. We also see that longer commuting hours increase the wages %2 on average.

Furthermore, when the results of organizational aspects of work are evaluated, only work organization involvement brings a positive wage premium of almost 4%, while colleague support and feeling of work well-done did not give significant results. This might be possibly explained by the increase in the productivity that is caused by taking more responsibilities with involving in the work organization. (Herzberg, 1966)

Table 5.1 – Estimation Results for All Countries Pooled

All Countries	1	2	3	4
Lower Secondary Education	0.422***	0.390***	0.258***	0.112***
	(0.035)	(0.034)	(0.030)	(0.021)
Upper Secondary Education	0.412***	0.378***	0.260***	0.168***
	(0.032)	(0.032)	(0.028)	(0.020)
Post-secondary Non-tertiary Education	0.534***	0.516***	0.358***	0.215***
	(0.040)	(0.039)	(0.035)	(0.023)
First Stage of Tertiary Education	0.943***	0.918***	0.740***	0.335***
	(0.032)	(0.032)	(0.028)	(0.022)
Second Stage Tertiary Education	1.219***	1.200***	1.051***	0.492***
	(0.058)	(0.058)	(0.056)	(0.037)
Gender	-0.144***	-0.135***	-0.267***	-0.165***
	(0.013)	(0.013)	(0.012)	(0.007)
Age	0.008*	0.011**	0.034***	0.033***
	(0.004)	(0.004)	(0.004)	(0.003)
Age Squared	-0.000	-0.000	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
Tenure	0.016***	0.016***	0.013***	0.005***
	(0.002)	(0.002)	(0.002)	(0.001)
Tenure Squared	-0.000**	-0.000**	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Risk		-0.203***	-0.153***	-0.010
		(0.015)	(0.014)	(0.008)
Informed About Risk		-0.089***	-0.092***	0.013
		(0.018)	(0.017)	(0.010)
Risk Compensation		0.004	0.027	0.073***
		(0.021)	(0.020)	(0.010)
Hour Compensation		0.232***	0.210***	0.028***
		(0.013)	(0.012)	(0.007)
Working Hours			-0.007***	-0.004***
			(0.000)	(0.000)
Overhours			0.016***	0.004***
			(0.002)	(0.001)
Commuting Hours			0.060***	0.025***
			(0.011)	(0.006)
Work Organisation Involvement			0.188***	0.039***
			(0.012)	(0.007)
Colleague Support			0.047***	0.003
			(0.014)	(0.007)
Feeling of Work Well Done			0.018	-0.004
			(0.015)	(0.009)
Observations	20,574	20,574	20,574	20,574
R-squared	0.141	0.167	0.288	0.808

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1
4th estimation is controlled for workplace size, year, country, occupation and industry fixed effects.

5.2. Results of Turkey

The estimation of individual characteristics give similar results for Turkey as well. Higher education, age and tenure give positive wage premiums, while being female decreases the wages by %8. We can say that according to these results, gender wage gap in Turkey is smaller than the one in Europe.

The results are also similar with the previous ones for risk perception in Turkey. When uncontrolled, risk perception causes a decrease of 10% on average. However, when controlled for the fixed effects the coefficient becomes bigger and insignificant. There is a difference with the pooled results when it comes to being informed about the risk. Turkish workers received 6% more wage on average for being informed about risk. However, having risk and hour compensations do not yield in significant results for Turkey. Consistently with the pooled results, longer working hours cause a decrease and over hours cause an increase in wages but in a bigger amount compared to the pooled results. In addition, Turkish workers received a 7% wage premium on average for having one more hour of commuting to work. This is a bigger wage premium when compared to the pooled results and it might have several explanations such as Turkish workers accept more easily further work offers or it can be caused by the inequality of works across regions, cities or districts which gives an incentive to workers to commute more for work.

Furthermore, it is observed that being involved in work organization yields a bigger wage premium of %11, which is bigger than the premium of %4 for average European

Table 5.2 – Estimation Results for Turkey

Turkey	1	2	3	4
Lower Secondary Education	0.123*	0.119*	0.152***	0.111**
	(0.063)	(0.064)	(0.056)	(0.053)
Upper Secondary Education	0.340***	0.310***	0.254***	0.155***
	(0.056)	(0.057)	(0.047)	(0.046)
First Stage of Tertiary Education	0.835***	0.794***	0.529***	0.341***
	(0.059)	(0.060)	(0.058)	(0.062)
Gender	-0.062	-0.074*	-0.108***	-0.081**
	(0.045)	(0.044)	(0.036)	(0.034)
Age	0.036*	0.036*	0.044**	0.035**
	(0.020)	(0.020)	(0.020)	(0.018)
Age Squared	-0.000	-0.000	-0.001**	-0.000*
	(0.000)	(0.000)	(0.000)	(0.000)
Tenure	0.023**	0.025**	0.017**	0.013*
	(0.010)	(0.010)	(0.008)	(0.008)
Tenure Squared	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Risk		-0.141***	-0.105**	-0.043
		(0.048)	(0.043)	(0.037)
Informed About Risk		0.084*	0.086**	0.067*
		(0.044)	(0.038)	(0.036)
Risk Compensation		0.027	0.042	0.025
		(0.063)	(0.046)	(0.044)
Hour Compensation		0.016	0.014	0.015
		(0.049)	(0.040)	(0.036)
Working Hours			-0.006***	-0.006***
			(0.000)	(0.000)
Overhours			0.006**	0.007***
			(0.002)	(0.002)
Commuting Hours			0.039	0.072**
			(0.034)	(0.034)
Work Organisation Involvement			0.131***	0.115***
			(0.036)	(0.035)
Colleague Support			-0.015	-0.035
			(0.035)	(0.033)
Feeling of Work Well Done			-0.096***	-0.112***
			(0.035)	(0.031)
Observations	913	913	913	913
R-squared	0.333	0.349	0.548	0.640

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1
4th estimation is controlled for workplace size, year, country, occupation and industry fixed effects.

worker. Colleague support is neither a significant determinant of wage in Turkey. But, feeling of work well-done is a significant result for the average Turkish worker. A positive result could be expected for work well-done, since it will be beneficial for higher levels of productivity, but we obtained a negative result of 11%.

5.3. The Comparison of Results of Developed Countries and Less Developed Countries

As it is explained before, the countries in the sample are grouped in two according to their GDP per capitas, and the countries with higher GDP per capita are called as developed countries and while the rest as less developed countries. In this stage, a comparison of the results in Table 5.3 and Table 5.4 from estimations separately are done for two groups of countries.

Firstly, the results of the individual characteristics are as expected for both country groups. However, there are some level differences. The most important one is that the gender wage gap is wider in less developed countries: being female yields 19% decrease on average in less developed countries, while it causes a 13% decrease in developed ones. Differences of age and tenure premiums are very small, however it must be noticed that age gives a bigger wage premium in developed countries compared to the less developed ones, as 3,7% opposed to 2,4%. Controversially, less developed countries give a higher wage premium to tenure than the developed countries. These results might show us employers' different valuations of individual characteristics.

When it comes to the parameter of interest of our model, interesting results are obtained. The results for developed countries fit the previous findings of the pooled estimation. However, a different result is obtained for the less developed countries: when controlled for fixed effects, a negative result is received which is significant at 10% confidence level. This result tells us that a worker who has a risky work receives %2 less wage on average than the workers with the same characteristics, but with non-risky jobs. Furthermore, being informed about risk does not yield in significant results for both groups. However, both groups receive significant results for risk and hour compensation. On the one hand workers in less developed countries receive almost %2 more wage if they are compensated for risk, on the other hand they receive almost %2 less wage if they are compensated for hours. In both groups, significant results are obtained for working hours, but it decreases wages more in less developed countries. Workers in developed countries gets an increase in wages for working over hours, and it is a bigger increase than the one in the pooled results. In addition, it can be observed that workers in less developed countries receive a higher wage premium than the workers in developed countries for commuting hours. This finding must be explained with the case of Turkey.

Looking at the organizational aspects of work, in both countries workers who are involved in work organization have higher earnings than their counterparts. But, it should be noticed that involvement has higher returns in less developed countries. Furthermore, both countries receive insignificant results for colleague support and feeling of work well-done. But only the developed countries' coefficients result in positive signs which were expected.

Table 5.3 – Estimation Results for Developed Countries

Developed Countries	1	2	3	4
Lower Secondary Education	0.165***	0.156***	0.143***	0.069**
	(0.038)	(0.038)	(0.037)	(0.033)
Upper Secondary Education	0.286***	0.275***	0.268***	0.147***
	(0.037)	(0.036)	(0.036)	(0.032)
Post-secondary Non-tertiary Education	0.331***	0.320***	0.303***	0.176***
	(0.040)	(0.040)	(0.039)	(0.034)
First Stage of Tertiary Education	0.555***	0.548***	0.533***	0.277***
	(0.037)	(0.036)	(0.036)	(0.033)
Second Stage Tertiary Education	0.728***	0.723***	0.726***	0.447***
	(0.049)	(0.048)	(0.048)	(0.046)
Gender	-0.109***	-0.103***	-0.159***	-0.135***
	(0.008)	(0.008)	(0.009)	(0.008)
Age	0.024***	0.024***	0.035***	0.037***
	(0.003)	(0.003)	(0.003)	(0.003)
Age Squared	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
Tenure	0.002	0.001	0.001	0.004***
	(0.002)	(0.002)	(0.002)	(0.001)
Tenure Squared	0.000	0.000	0.000*	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Risk		-0.072***	-0.058***	-0.004
		(0.010)	(0.009)	(0.009)
Informed About Risk		0.055***	0.052***	0.010
		(0.013)	(0.012)	(0.011)
Risk Compensation		0.056***	0.056***	0.065***
		(0.013)	(0.013)	(0.011)
Hour Compensation		0.043***	0.047***	0.021***
		(0.009)	(0.009)	(0.008)
Working Hours			-0.003***	-0.003***
			(0.000)	(0.000)
Overhours			0.010***	0.006***
			(0.001)	(0.001)
Commuting Hours			0.045***	0.022***
			(0.007)	(0.006)
Work Organisation Involvement			0.072***	0.032***
			(0.008)	(0.007)
Colleague Support			0.047***	0.006
			(0.009)	(0.008)
Feeling of Work Well Done			-0.001	0.004
			(0.011)	(0.011)
Observations	13,710	13,710	13,710	13,710
R-squared	0.194	0.204	0.262	0.459

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

4th estimation is controlled for workplace size, year, country, occupation and industry fixed effects.

Table 5.4 – Estimation Results for Less Developed Countries

Less Developed Countries	1	2	3	4
Lower Secondary Education	-0.035	-0.045	-0.089***	0.108***
	(0.036)	(0.035)	(0.032)	(0.025)
Upper Secondary Education	-0.076**	-0.095***	-0.150***	0.136***
	(0.030)	(0.030)	(0.027)	(0.024)
Post-secondary Non-tertiary Education	-0.082**	-0.086**	-0.152***	0.210***
	(0.041)	(0.041)	(0.039)	(0.033)
First Stage of Tertiary Education	0.482***	0.456***	0.340***	0.366***
	(0.032)	(0.033)	(0.031)	(0.030)
Second Stage Tertiary Education	0.524***	0.479***	0.371***	0.477***
	(0.125)	(0.124)	(0.107)	(0.086)
Gender	-0.219***	-0.220***	-0.265***	-0.193***
	(0.017)	(0.017)	(0.017)	(0.014)
Age	0.016**	0.017***	0.021***	0.024***
	(0.006)	(0.006)	(0.006)	(0.004)
Age Squared	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
Tenure	0.017***	0.017***	0.016***	0.007***
	(0.003)	(0.003)	(0.003)	(0.002)
Tenure Squared	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Risk		-0.143***	-0.123***	-0.023*
		(0.019)	(0.018)	(0.013)
Informed About Risk		-0.002	-0.019	0.021
		(0.027)	(0.025)	(0.018)
Risk Compensation		0.094***	0.109***	0.084***
		(0.027)	(0.025)	(0.019)
Hour Compensation		0.067***	0.080***	0.041***
		(0.019)	(0.018)	(0.014)
Working Hours			-0.004***	-0.005***
			(0.000)	(0.000)
Overhours			-0.000	0.002
			(0.002)	(0.001)
Commuting Hours			-0.020	0.037***
			(0.016)	(0.011)
Work Organisation Involvement			0.044**	0.046***
			(0.018)	(0.013)
Colleague Support			0.023	-0.000
			(0.018)	(0.013)
Feeling of Work Well Done			-0.110***	-0.024
			(0.020)	(0.015)
Observations	6,864	6,864	6,864	6,864
R-squared	0.174	0.187	0.255	0.641

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1
4th estimation is controlled for workplace size, year, country, occupation and industry fixed effects.

6. Conclusion

The literature of compensating wage differentials focused on the effects of risk, as significant results could not be found for other non-wage characteristics of work. In that direction, measuring the effect of risk on wages has been the primary objective of this study.

The wage premium of risk is tried to be measured by using the cross-section data set of EWCS, which has never been used before in this objective. EWCS publishes information about the individuals' income only since 2010. Since then there has not been any other study that tried to measure the effect of compensating wage differentials using the EWCS data set. In that sense, this study can be considered as a decent contribution to this literature.

The estimation of the parameter of interest of the model, risk perception, did not give expected results. Only the less developed countries estimation ended up having a significant coefficient of risk perception, however its sign is negative. From this result, we can presume that European countries are segmented in function of compensating the working conditions. However, further studies are necessary to prove this idea. As there is an obvious divergence on several economic issues across the European countries, segregation by risk compensation might be a phenomenon in Europe as well. It must be mentioned once again that the measurement of risk perception is quite problematic, as it is a very subjective matter.

Nevertheless, other variables about risk yielded in some significant results. It can be observed that Turkish workers receive a positive wage premium for being informed about

risk, but they do not think that their wage is compensated for risk, as we can see that risk compensation receives a negative coefficient for the estimation of Turkey. In addition to that, being involved in work organization increases wages much more in Turkey than other countries in the sample. This interesting result might be explained by a sort of segregation of workers in work organization involvement: Those who already earn more involve more in work organization, while those who earn less get demotivated and do not take any responsibility.

Pooled results are quite confusing as well. Risk perception did not bring a significant wage premium, but workers think that their wages are compensated for risk have higher wages than their counterparts. This result brings us again to the difficulty of measuring the risk perception. It is safe to assume that a big part of workers in European countries are not perceiving the risk correctly.

As it is explained from the very beginning, the estimation of compensating wage differentials carry several empirical challenges which are hard to overcome. In this study, several control variables are used to reduce the effect of unobserved characteristics and job heterogeneities to a limit. However, only way to overcome entirely these biases is the usage of longitudinal data sets, which are most of the time not available. Another bias, which probably effected our results, is the endogeneity of job riskiness. It is necessary to have a variable representing the non-wage wealth of the individuals, such as household income, to purify the estimation of the risk premiums. Therefore, better designed surveys are necessary to measure the effects of compensating wage differentials.

7. References

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