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HEALTH-RELATED RISK PERCEPTIONS AND WAGE COMPENSATION: EVIDENCE FROM TURKEY

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Abstract

In this paper, we estimate wage compensation of workers facing different risks adversely affecting their health and well-being based on individual evaluations of work environment by using the ad-hoc module of 2013 Household Labor Survey. Our results reveal that among various risk factors, only general risk of injury is compensated by a significant and positive premium. Informal workers and female wage earners do not receive additional payment working in risky environments. Allowing risk compensation to vary across wage dispersion, we find that positive compensations follow an inverse-u shape. We argue that in terms of unpleasant job attributes, the labor market in Turkey can be identified with labor segmentation rather compensating wage differentials.

Keywords: Work safety; Risk; Wage differentials; Working conditions; Health risk; Turkey.

JEL Classification: J28; J33; J81

SAĞLIKLA İLGİLİ RİSK ALGILAMALARI VE ÜCRET TELAFİSİ: TÜRKİYE'DEN BULGULAR

Öz

Bu çalışmada, 2013 Hanehalkı İşgücü Anketi özel modülünde yer alan sorular çerçevesinde işçilerin çalışma ortamları hakkında öznel değerlendirmelerini dikkate alarak, sağlıklarını olumsuz etkileyen farklı risklere karşı elde etmiş oldukları telafi edici ücretlerini tahmin ediyoruz. Sonuçlarımız, çeşitli risk faktörleri arasında yalnızca genel yaralanma riskinin pozitif ve istatistiki olarak anlamlı bir şekilde telafi edildiğini ortaya koymaktadır. Kayıt dışı çalışanlar ve ücretli kadın çalışanlar, sağlık açısından riskli ortamlarda çalışırken bu risklere karşı ek ödeme almamaktadır. Risk tazminatının ücret dağılımına göre değiştiğini dikkate alarak bir tahmin yaptığımızda, pozitif tazminatların ters-u şeklinde bir seyir izlediğini görüyoruz. Sonuç olarak, zor iş koşulları açısından, Türkiye'deki işgücü piyasasının telafi edici ücret farklılıkları yerine işgücü bölümlenmesi (segmentasyon) ile tanımlanabileceğini savunuyoruz.

Anahtar Kelimler: İş güvenliği, Ücret farklılıkları, Çalışma koşulları, Sağlık riski, Türkiye

JEL Sınıflandırması: J28; J33; J81

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1. Introduction

Turkey has a persistently poor record on work related accidents. Over the last two decades and more, the frequency of work-related fatalities has remained relatively high. According to recent ILO statistics, Turkey has the fourth highest fatality rate and ninth highest non-fatal occupational injury rate per 100,000 workers.[2] Although work-related fatal and non-fatal accidents remain persistently high in Turkey, the literature dealing with risk compensation is very limited. Mutlu and Altuntas (2019) provide evidence that, between 2013 and 2016, most work-related accidents occurred in the manufacturing sector. Within manufacturing, non-fatal accidents are more frequent in metal goods (except for machines), construction, textiles, coal mining and automotive manufacturing (Unsar and Sut 2009) while the highest fatality rates are in the construction sector. Polat (2014) compares positive compensation for fatal and non-fatal accidents risks based on industry averages in various countries between 2010 and 2011, showing that accident risk premia in Turkey are lower than in other countries. Using a two-step procedure, Akarçay and Polat (2019) estimate industry-level risk compensation using pooled cross-sections of the Household Labor Force Surveys (HLFS) for 2013-2017. They find no statistically significant premia at the two-digit industry level.

Several studies also discuss that job attributes and working conditions can better explain the prevalence of accident risks. For example, regulation of working hours has a strong impact on the frequency of work-related accidents as industry-level accident rates are strongly positively correlated with working hours (Akarçay and Polat, 2019). Ergör et al. (2003) find that long working hours can increase early day time accidents. Altunkaynak (2018), in contrast, reports no correlation between work hours and type of accidents. Celik et al. (2013) argue that less educated workers are more affected by accidents.

The difficulty in assessing how pay is related to job hazards is to identify the individual workplace risk each worker is facing. Firstly, it is not always possible to have matched data, identify firm specific factors or find a proxy for worker preferences (taste) due to data limitations. Another well documented issue is the measurement error related to aggregated accident risk probabilities (whether industry or occupation or a combination of both) (Viscusi 2004). Viscusi (1978) and Garen (1988) propose alternative ways to deal with self-

[2] See for fatal accidents; https://www.ilo.org/shinyapps/bulkexplorer27/?lang=en&segment=indicator&id=INJ-FATL-SEX-MIG-RT-A and for non-fatal accidents; https://www.ilo.org/shinyapps/bulkexplorer52/?lang=en&segment=indicator&id=INJ-NFTL-ECO-RT-A, last accessed 4 August 2020

selection and the income effect while several country case studies have followed similar procedures to obtain more robust results (Gunderson and Hyatt 2001). Although matched employer-employee data, specific working conditions[3] or panel data could be considered more robust strategies to capture individual heterogeneity in assessing workers' evaluations of specific job hazards better than basic OLS estimations, for developing countries industry level aggregates are usually the most available data for evaluating how wage differentials compensate for work-related accident risks. In the present study, however, instead of using aggregate risk probabilities, we evaluate risk compensation using workers' individual assessments of the risk factors they perceive in their workplace. The Eurostat-module of 2013 HLFS provides workers' subjective evaluations of their working conditions and their past work experiences related to health problems. We first run a hedonistic wage regression to identify which unpleasant job attributes reported in the 2013 module are compensated for. Then, using quantile regressions, we capture the variation of compensation along the wage distribution.

Individual risk assessment of workers partly remedies for some of the well-known measurement issues related to workers' preferences. Using individual level data for Italy, Cioni and Savioli (2016) finds a strong correlation between workplace safety and poor job attributes. Furthermore, the type of contract does not explain the likelihood of workplace accidents and illnesses. Similarly, using the 1999 module for Italy and Spain, Hernanz and Toharia (2006) conclude that the type of contract has no significant relationship to workplace accidents and illness.[4]

The structure of our paper is as follows. We first introduce the 2013 HLFS module and present our identification strategy to estimate compensation for job attributes. We then discuss the results of the model and identify further implications regarding labor market segmentation which can characterized by high wage "good" jobs versus low wage "bad" jobs. By analyzing unconditional hourly wage dispersion, we argue that some unpleasant job attributes are specifically concentrated in the lower half of the hourly wage distribution. We therefore use quantile regression estimates to refine our inference based on OLS results and the unconditional hourly wage distribution. In the last section, we draw some conclusions.

[3] For an example see European Working Conditions Survey (EWCS), https://www.eurofound.europa.eu/surveys/european-working-conditions-surveys-ewcs

[4] Unfortunately, we lack micro-data for Turkey for the same module for previous rounds (1999 and 2007) to compare our results.

Data

Before introducing the data and the model, we need to outline the 2013 ad hoc module. As discussed in the introduction, Turkey has a poor record of work-related accidents and illnesses. However, when we compare Turkey's data from the 2013 module with those of EU countries, we observe that reported accidents at work and the incidence of risk factors are significantly lower than EU averages. This is quite counter-intuitive given that working conditions and accidents at work figures provided by the ILO are considerably higher in Turkey than in EU countries. Table 1 and 2 illustrate the discrepancy between the administrative figures and the survey results. In terms of work-related health problems, Turkey can be grouped with other developing countries like Brazil, Mexico and Egypt.

To avoid structural differences, we can compare individual sector averages (Table 2columns c and e). The gap between reported cases is still significant, which may be due to several factors. One possibility is that there is some mismeasurement in the national module. For example, Turkey is one of the few exceptions where the questionnaire has not been piloted to identify inconsistencies or ambiguities. Turkey is also among the ten countries where the "cannot say" answer category was omitted, which biases the responses.[5] Another reason, though less likely, could be that workers have become inured to poor working conditions. Finally, but closely related, workers in Turkey may be unaware of job hazards and necessary safety requirements. Thus, they may well underestimate some risk factors due to weak regulatory enforcement and inspections. In any case, because we do not know the direction of individual mismeasurement, we have to rely on an econometric evaluation despite.

We use the 2013 HLFS data and its ad hoc (Eurostat) module, which is devoted to accidents at work and other work-related health problems. TurkStat does not provide all the standard information in the full sample of HLFS (detailed questions on labor market status) but a very limited set of variables on request. The 2013 module covers 12,820 wage earners with positive wages working in both the public and private sectors. We restrict the data to the private sector since Turkey's public sector uses different criteria for risk compensation. We further limited age to 21-59 years. These steps reduced the number of observations to 8,753 workers, yielding a module sample of around 13% of the full HLFS sample under similar restrictions.[6] Specific factor weights provided by TurkStat are used in all the informative tables.

[5] See the final statistical report on the quality assessment and statistical analysis of the 2013 Labour Force Survey ad hoc module.

[6] We provide a short summary in Table 7 (see appendix) for HLFS for comparison.

For Turkey, data limitations only allow estimation of wage compensation with aggregated variables (industry level) used as proxies for working conditions (Polat 2014; Akarçay and Polat 2019). However, using broad industry aggregation averages out individual preferences and firm heterogeneity, which biases the estimations (Viscusi 2004; Leigh 1995). Black and Kniesner (2003) discuss in detail the difficulties and biases of using hedonic wage equations to assess risk premia. In standard hedonic wage regression settings, average incidence rates do not accurately reflect the workers' ability and individual risk assessments. Moreover, there are certain specific sectors where firm heterogeneity matters for accidents and health related problems. More specifically, firms size greatly varies across sectors in Turkey, with certain sectors dominated by small and medium enterprises. As Fabiano, Currò, and Pastorino (2004) shows for Italy, accident rates vary with firm size. Thus, we need to acknowledge the type of risk factors in order to better assess the compensation scheme.

Another issue that needs to addressed is the asymmetric information inherent in the wage contract in terms of job hazards. The employer supposedly has superior knowledge of the risks related to each task in the workplace. Nevertheless, from the workers' perspective, the hazards specific to each task might not be predictable unless necessary safety measures are adopted or unless s/he is an experienced worker in that firm or sector. This asymmetric information problem has not been sufficiently discussed in the literature. In the basic hedonic wage regression, the accident incidence ratio is plugged into the equation as if it is common knowledge or easily observable by all workers. We argue, however, that acknowledging the workers' individual perceptions of their working conditions can partly solve this asymmetric information problem inherent in the standard hedonistic wage regression.

Methodology

Individual assessment of workers is also valuable in relation to informal wage contracts since official statistics generally report accident incidences only for formal workers under social security protection (in many countries as in Turkey, the administrative data source for work accidents is the social security institution itself). The HLFS module has the advantage of providing information on the type of contract the worker has. In developing countries, where informal jobs are quite frequent, injury and accident figures are officially under-counted and do not accurately reflect risks that workers face. Note that informality is not a binary choice at the firm level. Rather, the degree of informality may vary across firms through different practices. For example, firms partly comply with formal employment requirements yet choose to hire some workers informally. In Turkey, this bias is quite

significant as the share of informal workers is around for 33.5% of total employment and 15% of wage earners. Thus, when analyzing developing countries, excluding workers with informal contracts could underestimate the widespread economic consequences related to safety issues.

Risk premium is estimated by adding a risk preference factor to the hedonic wage equation. We adopt a similar strategy by plugging the risk factors reported by workers into the following wage regression:

$$ln(w_i) = \alpha + \sum \beta X_i + \sum \delta H_i + \sum \gamma q_i + \varepsilon_i \quad (1)$$

In equation 1, w_i denotes the log hourly wages. *X* is a set of individual characteristics which include gender, years of schooling, age and its square, tenure and its square, regular working hours, marital status, firm size (6 categories), administrative worker dummy. *H* indicates the industry (18) and occupation (9) fixed effects. γ denotes the risk premium associated with specific physical and mental risk factors reported by the worker q . ε is the error term. Table 3 provides a brief description of variables used in all models.

Work-related risk factors are grouped into two broad categories, namely physical health and mental well-being. The six risk factors adversely affecting physical health are difficult work postures or work movements; Handling of heavy loads; exposure to excessive noise or strong vibration; exposure to chemicals, dust, fumes, smoke or gases; visual fatigue (strong visual concentration); exposure to general risk of injury. The three mental-wellbeing factors are severe time pressure or overload of work; exposure to threats or physical violence; harassment or bullying. Because the survey design allows workers to report multiple risk factors for their current job, risk factors are not mutually exclusive. Table 4, which presents the correlations between risk factors, indicates that risk factors are not strongly correlated. The closest association of around 55% is between exposure to excessive noise or strong vibration and exposure to chemicals, dust, fumes, smoke or gases. Generally, these factors more correlated with other physical risk factors. Although we also have information for injury and health problems at work, integrating these variables into the wage equation might be misleading since they are related to the workers' past experience and might not reflect compensation/ or bargaining for the current job. The incidence figures give information on the profile and frequency of health problems.

Results

The standard model assumes that the workers' aptitude and preference for dirty jobs may be correlated, which could undermine the true estimation of compensating differentials (Rosen 1986). Here, an instrumental variable approach could help solve this endogeneity issue. Viscusi (1978) uses wealth as an instrument for safety demand while Garen (1988) uses an identification strategy for self-selection and integrates the non-wage income effect. Lack of information usually makes this solution inapplicable since finding a good instrument is not always possible and the selection equation does not go beyond the usual sector and occupation fixed effects. Another possibility is that unpleasant job attributes could indicate low qualifications and thus reflect job sorting in the labor market. In this case, it would again be difficult to avoid endogeneity bias. We elaborate on this point later.

Our results are only consistent for the exposure to a general risk of injury, which is the most frequently reported factor. Except for female workers and informal workers, compensation coefficients are positive and significant. Workers with formal contracts have a slightly higher premium than the two other samples. Controlling for industry and occupation fixed effect lowers the premium for each sample.[7] In other words, apart from the sector and occupational heterogeneity, risky jobs still pay around 2% more than safe jobs. Therefore, we can infer that workers are well informed about the job's specific requirements and that wages are negotiated beforehand in relation to unpleasant and poor working conditions.

As an unspecified category, general risk of injury must be treated differently than other risk factors because it implies more than work-related health problems. In fact, this category makes the distinction more apparent between work-related health issues and probable accident risks that might lead to injury. Therefore, general risk of injury can be interpreted as a close proxy for dangerous or unsafe jobs rather than dirty or unpleasant jobs. The positive but insignificant coefficients for female workers can be interpreted in relation to their safety preferences. However, although this argument seems valid, the share of female workers who consider their jobs as risky (around 7%) is not negligible compared to male workers (around 25%).[8] The lack of compensation for general injury risk in informal jobs is particularly important for developing countries. A majority of studies on compensating wage differentials rely on official statistics that only include insured workers. Excluding

[7] It is possible that sector pay reflects productivity differences arising from technology or capital intensity.

[8] The insignificant result for the female sample could be explained by gender discrimination, which deserves further investigation.

informal wage earners may over-estimate the premium of fatal and non-fatal accident risks used to calculate Value of Statistical Life (VSL).

Our results reveal that specific risk factors are compensated for in certain group of workers. For female workers, difficult work postures or work movements have a significant wage differential when fixed effects are controlled for (columns 3 and 4 in Table 5).[9] Yet, the same risk factor has a significant negative effect for the male sample, which is difficult to interpret. One explanation is that non-wage income (unobservable in our model) affects job sorting through reservation level and/or ability sorting ranks "good" jobs over "bad" ones. We think that this argument is less likely because endowment differences are not huge at the lower end of the wage distribution. We argue that a similar argument holds for the negative sign of handling heavy loads for formal workers (columns 7 and 8 in Table 5). Exposure to excessive noise or strong vibration only has significant and positive coefficient for informal sector wage earners. The OLS results show that wage earners who are exposed to chemicals, dust, fumes, smoke or gases receive no extra payment. It is worth noting that these risk factors can lead to serious work-related health problems and occupational diseases related to chemical exposure that are common to certain sub-sectors in Turkey (Akgun et al. 2005, 2006; Anlar et al. 2017; Elci et al. 2003). While visual fatigue related to long eye concentration receives compensation, it loses statistical significance once fixed effects are controlled for. Thus, a combination of industry and occupation dummies capture the variation.

Among the risk factors adversely affecting mental well-being, there is no positive pay premium except for severe time pressure for female wage earners. However, its significance disappears when we control for fixed effects. Harassment and bullying have consistently negative and significant impacts on hourly wages. Unexpectedly, this impact is also quite large, especially for women, for whom it more than doubles in the fixed-effect model. One explanation could be that workers' perceptions mirror the observed wage penalty or discrimination, probably as ''harassment or bullying". As we will see in the next section, workers reporting harassment and bullying as an adverse effect on mental well-being are located towards the higher end of the wage distribution, which might also indicate a glass-ceiling effect among highly skilled workers. Thus, it is possible that there is reverse causation and that our identification is not accurate.

[9] Upper extremity musculoskeletal complaints are common among female workers (De Zwart, Frings-Dresen, and Kilbom 2000).

Discussion

Assuming that workers are compensated according to unpleasant job characteristics, it follows that the unconditional wage distribution reflects these pay differences. Compensating wage differentials are endogenous to unconditional wage distribution. Workers facing hard working conditions should be ranked above other workers with similar endowments due to the risk premium. We should keep in mind that the compensation gap is not symmetric or uniform across the wage distribution for all workers. Assuming that safety is a normal good, it follows that wealthier wage earners must be compensated with higher premia. Thus, the gap between workers having similar endowments must increase along the wage dispersion. To illustrate our argument, Figure 1 plots average perceived risk factors across hourly wage deciles.[10] Job requirements like difficult work posture and handling heavy loads are segmented in the lower half of the distribution while compensation for these unpleasant conditions is very limited if non-existent. This lower half of the hourly wage dispersion is characteristic of Turkey's labor market. These workers earn around the minimum wage or less (Bakis and Polat 2015). The prevalence of risk factors gradually declines towards higher deciles. Thus, "bad" jobs can be identified by skill sorting or by low-wage workers. Evidently, this type of labor market segmentation suggests that labor regulations and inspections do not work efficiently to differentiate compensation.

The humped shaped distribution of risk factors (Figure 1 panel B) like general risk of injury, exposure to chemicals, dust, fumes, smoke or gases, and excessive noise or vibration also needs further explanation. On the one hand, positive compensation (except for bad posture, heavy loads and visual fatigue) shifts the order of workers towards the higher deciles above the median wage (Figure 1 A). On the other hand, the reduction of compensation towards the higher end of distribution implies that the income effect is operative and higher wages improve safety and eliminate workplace risk factors. The frequency of visual fatigue is higher for white-collar workers and increases with hourly wages. Mental risk factors like physical threat or violence, and bullying or mobbing are only significant at higher wage deciles (Figure 1 B), though the incidence rate remains less than 5%. Heavy workload is reported slightly more around the median decile before flattening for higher deciles.

We extend our discussion further by using quantile regressions to trace the reaction of the wage distribution to different risk factors to investigate whether compensation differs along the hourly wage distribution. The quantile estimation approach was proposed by

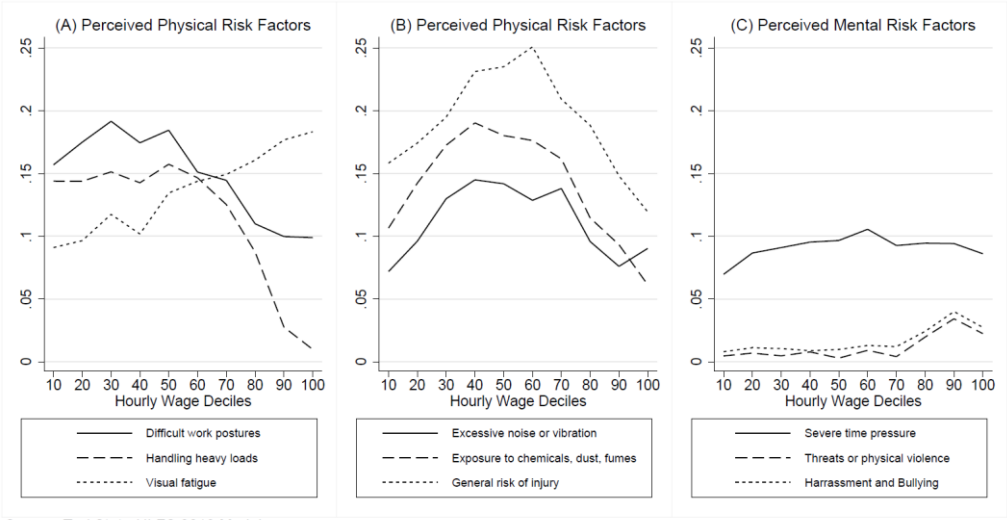
[10] Note that the sample of the module is representative when specific weights are used. A comparison of the full sample of HLFS and the module can be found in Appendix Table 7.

Evans and Schaur (2010) and Kniesner, Viscusi, and Ziliak (2010) to deal with income heterogeneity in the Garen (1988) sense. Polat (2014) also used a similar identification strategy for Turkey, finding an inverse-U relation between risk premium and wage dispersion using aggregate, sector level data. However, individual assessments offer better insights to match the position of the wage-earner and the perceived risk factor at current risk. Personal evaluation available in the 2013 HLFS ad hoc module allows empirically overcoming the difficulty in tracing specific risk factors along the wage distribution. Table 6 displays the quantile regressions for wage earners in the full, male and formal sector sample.[11] For job attributes like difficult work postures or work movements, and movement of heavy loads, the negative and significant results remain as in the OLS estimation, which needs further explanation. Nevertheless, for all three samples, the compensation scheme for general risk of injury has a humped shape, validating our raw observations across wage deciles. It is worth noting that we do not observe all the non-wage component of risk compensation. It is possible that higher wage decile could receive non-wage (other than bonuses, like housing or in-kind contributions) compensation for general risk of injury.[12] For male wage earners, positive compensation only appears at higher wage segments for exposure to excessive noise or strong vibration. In the full sample, jobs imposing severe time pressure or overload of work pay relatively higher wage premia in the upper half of the distribution. Lastly, the wage penalty related to harassment or bullying increases as we move up the hourly wage distribution / towards the higher end of the hourly wage distribution.

[11] We do not provide estimation results for female and informal sector workers due space limitations, results are available upon request.

[12] We thank the anonymous referee for pointing out this issue.

Figure 1: Wage distribution and share of persons reporting risk factors adversely affecting physical health and mental well-being



Source: TurkStat - HLFS 2013 Module

Conclusion

In this paper, we investigated whether risk factors as perceived by individual workers yield compensating differentials. Our results showed that only general risk of injury has positive wage compensation compared to other types of risks. When sub-groups are considered, our findings suggest no statistical significance of general risk of injury for either female workers or informal workers. We also found that certain job attributes like difficult work postures or movement of heavy loads are associated with lower wage returns, which implies labor segmentation (“good” jobs versus “bad” jobs) rather than labor market formation based on compensating wage differentials. The relationship between hourly wage order and job attributes suggests that wage compensation increases along the distribution with "bad" jobs concentrated in the lower half. Quantile estimates give support for the income effect and show that the size of compensation for general injury risk follows an inverse-U pattern along the wage distribution. Our study could be improved by addressing the endogeneity issue stemming from job sorting. In order to better understand compensating differentials, the current survey module in Turkey should provide more information on the composition of household and non-wage components of income.

Tables

Table 1: Occupational Injuries for selected countries

	Non-fatal occupational injuries per 100'000 workers Manufacturing Sector	Fatal occupational injuries per 100'000 workers Manufacturing Sector
Brazil *(1)*	2645.9	8.5
Germany *(2)*	2473.6	1.0
Egypt *(3)*	1478.7	8.4
France *(2)*	2601.1	2.5
United Kingdom *(2)*	1125.4	0.9
Italy *(2)*	1603.1	2.3
Mexico *(4)*	2732.3	5.3
Poland *(2)*	874.7	2.5
Romania *(3)*	123.5	2.9
United States *(5)*	900.0	2.6
Turkey *(3)*	3054.5	6.1

Source: International Labour Organization. (2020). ILOSTAT database. Available from https://ilostat.ilo.org/data/
(1) 2012, (2) 2015, (3) 2016, (4) 2017, (5) 2018

Table 2: EU countries, accidents at work and other work-related health problems (EuroStat 2013 HLS module)

	Persons reporting an accident at work	Exposure to risk factors that can adversely affect mental well-being		Exposure to risk factors that can adversely affect physical health	
	Total	Total	Services* (NACE 2, K to U)	Total	Industry** (NACE 2, B to E)
	(a)	(b)	(c)	(d)	(e)
European Union - 27 countries	2.9	28.9	32.2	54.0	59.4
Euro area - 19 countries	3.3	31.8	34.4	55.7	59.0
Turkey	*2.3*	*7.9*	*9.6*	*35.9*	*43.8*

Source: EuroStat, https://ec.europa.eu/eurostat/cache/metadata/en/hsw_apex_esms.htm
*Financial and insurance activities, real estate activities, professional, scientific and technical activities, administrative and support service activities, public administration and defense; compulsory social security, education, human health and social work activities, arts, entertainment and recreation, other service activities, activities of households as employers; undifferentiated goods- and services-producing activities of households for own use, activities of extraterritorial organizations and bodies.
**Industry (except construction)

Table 3: Descriptive Summary of HLFS ad hoc Module, 2013

	Mean	Std. Dev.
Hourly wage	5.481	4.799
Female	0.260	0.439
Age	35.616	9.108
Tenure years	4.417	5.387
Years of schooling	8.682	3.933
Having Social Security	0.813	0.390
Administrative worker	0.058	0.235
Regular W.Hours	52.258	12.487
Married	0.699	0.459
Firm size <=10	0.381	0.486
Firm size 10−24	0.124	0.329
Firm size 25−49	0.174	0.379
Firm size 50−249	0.217	0.413
Firm size 250−499	0.050	0.219
Firm size +500	0.053	0.225
Risk factors adversely affecting physical health		
Difficult work postures or work movements	0.161	0.367
Handling of heavy loads	0.144	0.351
Exposure to excessive noise or strong vibration	0.121	0.326
Exposure to chemicals, dust, fumes, smoke or gases	0.159	0.366
Visual fatigue (strong visual concentration)	0.128	0.334
Exposure to a general risk of injury	0.208	0.406
Risk factors adversely affecting mental well-being		
Severe time pressure or overload of work	0.092	0.290
Exposure to threats or physical violence	0.006	0.075
Harassment or bullying	0.010	0.099

Source: Turkstat Household Labor Force Survey, 2013, integrated safety and health at work module. Sample restrictions: Private wage earners within the age interval 21-59 years-old. We do not report industry (eighteen categories) and occupation (nine categories) due to space limitation.

Table 4: Correlation of risk factors adversely affecting physical health and mental well-being

Risk Factors		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Difficult work postures or work movements	(1)	1.00								
Handling of heavy loads	(2)	0.38	1.00							
Exposure to excessive noise or strong vibration	(3)	0.34	0.35	1.00						
Exposure to chemicals, dust, fumes, smoke or gases	(4)	0.33	0.42	0.56	1.00					
Visual fatigue (strong visual concentration)	(5)	0.29	0.15	0.30	0.31	1.00				
Exposure to a general risk of injury	(6)	0.31	0.42	0.44	0.48	0.23	1.00			
Severe time pressure or overload of work	(7)	0.24	0.24	0.22	0.24	0.24	0.27	1.00		
Exposure to threats or physical violence	(8)	0.06	0.04	0.07	0.07	0.08	0.08	0.15	1.00	
Harassment or bullying	(9)	0.07	0.04	0.10	0.08	0.10	0.10	0.21	0.37	1.00

All pairwise correlations are significant at level $p<0.01$.

Source: Turkstat Household Labor Force Survey, 2013, integrated safety and health at work module.

Table 5: Risk Factors and Compensation - Hedonic wage regressions

	Full Sample		Female Wage Earners		Male Wage Earners		Formal Contracts		Informal Contracts	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Risk factors adversely affecting physical health										
Difficult work postures or work movements	-0.025	-0.011	0.040	0.061*	-0.043**	-0.032*	-0.022	-0.009	-0.030	-0.019
	(0.013)	(0.012)	(0.027)	(0.025)	(0.015)	(0.013)	(0.013)	(0.012)	(0.034)	(0.034)
Handling of heavy loads	-0.031*	-0.019	-0.046	-0.039	-0.036*	-0.018	-0.045***	-0.027*	0.043	0.021
	(0.013)	(0.012)	(0.036)	(0.035)	(0.014)	(0.013)	(0.013)	(0.012)	(0.036)	(0.038)
Exposure to excessive noise or strong vibration	0.003	0.009	-0.069	-0.033	0.016	0.018	-0.016	-0.010	0.102*	0.098*
	(0.016)	(0.015)	(0.036)	(0.036)	(0.017)	(0.016)	(0.016)	(0.015)	(0.044)	(0.045)
Exposure to chemicals, dust, fumes, smoke or gases	0.003	0.020	-0.024	0.015	0.005	0.015	-0.001	0.013	0.037	0.061
	(0.014)	(0.013)	(0.033)	(0.033)	(0.015)	(0.014)	(0.014)	(0.013)	(0.041)	(0.043)
Visual fatigue (strong visual concentration)	0.042**	0.008	-0.013	-0.007	0.053**	0.015	0.054***	0.018	-0.098	-0.080
	(0.016)	(0.014)	(0.034)	(0.030)	(0.017)	(0.016)	(0.015)	(0.014)	(0.052)	(0.052)
Exposure to a general risk of injury	0.041***	0.028*	0.021	0.025	0.043**	0.027*	0.056***	0.038***	-0.001	-0.021
	(0.012)	(0.011)	(0.031)	(0.030)	(0.013)	(0.012)	(0.012)	(0.011)	(0.037)	(0.039)
Risk factors adversely affecting mental well-being										
Severe time pressure or overload of work	0.024	0.017	0.085*	0.050	0.003	0.006	0.011	0.006	0.082	0.076
	(0.016)	(0.015)	(0.034)	(0.033)	(0.017)	(0.016)	(0.016)	(0.015)	(0.049)	(0.050)
Exposure to threats or physical violence	0.069	0.044	0.015	-0.060	0.089	0.067	0.077	0.051	-0.148	-0.107
	(0.070)	(0.062)	(0.105)	(0.099)	(0.080)	(0.072)	(0.074)	(0.065)	(0.220)	(0.209)
Harassment or bullying	-0.156***	-0.116**	-0.205*	-0.207*	-0.136***	-0.077*	-0.151***	-0.105**	-0.101	-0.118
	(0.034)	(0.036)	(0.097)	(0.098)	(0.036)	(0.036)	(0.034)	(0.035)	(0.138)	(0.150)
Constant	0.920***	1.193***	0.671***	0.834***	1.018***	1.257***	1.206***	1.463***	1.117***	1.203***
	(0.083)	(0.083)	(0.152)	(0.150)	(0.098)	(0.099)	(0.083)	(0.080)	(0.201)	(0.222)
Occupation Controls (9 cat.)	no	yes	no	yes	no	yes	no	yes	no	yes
Industry Controls (18 cat.)	no	yes	no	yes	no	yes	no	yes	no	yes
Observations	8,753	8,753	2,276	2,276	6,477	6,477	7,114	7,114	1,639	1,639
R-squared	0.467	0.539	0.537	0.601	0.451	0.529	0.488	0.578	0.236	0.266

Robust standard errors in parentheses, *** p<0.001, ** p<0.01, * p<0.05

Source: Turkstat Household Labor Force Survey, 2013, integrated safety and health at work module.

We control for gender, years of schooling, age and its square, current job tenure and its square, social security coverage, administrative tasks, firm size (6 category), regular working hours, marital status. Detailed regression results are upon request.

Table 6: Risk Factors and Compensation - Quantile wage regressions

	Full Sample					Male Wage Earners					Formal Contracts				
	q10	q25	q50	q75	q90	q10	q25	q50	q75	q90	q10	q25	q50	q75	q90
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Risk factors adversely affecting physical health															
Difficult work postures or work movements	-0.002	-0.006	-0.014	-0.021	-0.013	-0.015**	-0.027***	-0.035***	-0.042***	-0.025	0.002	-0.010*	-0.016*	-0.008	-0.010
	(0.009)	(0.005)	(0.009)	(0.014)	(0.020)	(0.007)	(0.007)	(0.010)	(0.016)	(0.018)	(0.007)	(0.006)	(0.009)	(0.013)	(0.019)
Movement of heavy loads	0.003	-0.010	-0.026**	-0.020	-0.032	0.002	-0.004	-0.023*	-0.019	-0.034*	-0.011	-0.013**	-0.027***	-0.024	-0.034
	(0.010)	(0.008)	(0.010)	(0.017)	(0.024)	(0.007)	(0.007)	(0.012)	(0.017)	(0.020)	(0.009)	(0.006)	(0.009)	(0.015)	(0.022)
Exposure to excessive noise or strong vibration	-0.012	-0.015*	0.013	0.023	0.027	-0.003	-0.008	0.019	0.034*	0.059**	-0.023**	-0.007	0.005	0.010	0.004
	(0.012)	(0.009)	(0.011)	(0.015)	(0.021)	(0.011)	(0.008)	(0.014)	(0.018)	(0.026)	(0.010)	(0.007)	(0.011)	(0.015)	(0.028)
Exposure to chemicals, dust, fumes, smoke or gases	0.009	0.013	0.006	0.008	-0.010	-0.010	0.015*	0.012	0.012	-0.015	0.003	0.006	0.011	0.009	0.021
	(0.011)	(0.009)	(0.009)	(0.017)	(0.021)	(0.010)	(0.008)	(0.011)	(0.019)	(0.018)	(0.010)	(0.008)	(0.009)	(0.017)	(0.023)
Visual fatigue (strong visual concentration)	0.001	0.001	0.013	0.005	0.019	0.009	0.004	0.022*	0.017	-0.013	0.007	-0.004	0.018*	-0.003	0.008
	(0.008)	(0.008)	(0.010)	(0.016)	(0.023)	(0.008)	(0.009)	(0.013)	(0.017)	(0.020)	(0.007)	(0.010)	(0.011)	(0.015)	(0.025)
Exposure to a general risk of injury	0.024***	0.032***	0.031***	0.030**	-0.005	0.021***	0.034***	0.031***	0.025*	0.020	0.024***	0.035***	0.026***	0.040***	0.019
	(0.008)	(0.008)	(0.008)	(0.014)	(0.020)	(0.007)	(0.006)	(0.011)	(0.014)	(0.017)	(0.007)	(0.006)	(0.009)	(0.014)	(0.020)
Risk factors adversely affecting mental well-being															
Severe time pressure or overload of work	0.008	0.012	0.026*	0.026*	0.060*	-0.002	0.002	0.017	0.014	0.014	0.011	0.009	0.021	0.014	0.014
	(0.010)	(0.008)	(0.015)	(0.015)	(0.031)	(0.010)	(0.006)	(0.014)	(0.017)	(0.027)	(0.009)	(0.007)	(0.013)	(0.015)	(0.031)
Exposure to threats or physical violence	-0.049	0.001	0.022	0.003	0.126	-0.067***	-0.046	0.046***	0.052	0.080	-0.012	-0.033	0.006	-0.025	0.150
	(0.050)	(0.061)	(0.033)	(0.035)	(0.252)	(0.025)	(0.077)	(0.014)	(0.049)	(0.191)	(0.012)	(0.030)	(0.061)	(0.038)	(0.275)
Harassment or bullying	-0.014	-0.056***	-0.074***	-0.111***	-0.154**	0.044**	-0.012	-0.037	-0.114***	-0.178***	-0.009	-0.021	-0.058***	-0.100***	-0.121*
	(0.018)	(0.016)	(0.021)	(0.018)	(0.060)	(0.019)	(0.021)	(0.038)	(0.035)	(0.053)	(0.016)	(0.016)	(0.021)	(0.035)	(0.070)
Constant	1.071***	1.337***	1.483***	1.678***	1.698***	1.219***	1.405***	1.478***	1.633***	1.771***	1.777***	1.802***	1.646***	1.606***	1.713***
	(0.078)	(0.044)	(0.056)	(0.085)	(0.125)	(0.074)	(0.042)	(0.081)	(0.103)	(0.147)	(0.062)	(0.035)	(0.058)	(0.092)	(0.151)
Observations	8,753	8,753	8,753	8,753	8,753	6,477	6,477	6,477	6,477	6,477	7,114	7,114	7,114	7,114	7,114
R-squared	0.447	0.447	0.447	0.447	0.447	0.447	0.447	0.447	0.447	0.447	0.447	0.447	0.447	0.447	0.447

Robust standard errors in parentheses, *** p<0.001, ** p<0.01, * p<0.05

Source: Turkstat Household Labor Force Survey, 2013, integrated safety and health at work module. We control for gender, years of schooling, age and its square, current job tenure and its square, social security coverage, administrative tasks, firm size (6 category), regular working hours, marital status, industry dummies (18) and occupation dummies (9). Detailed regression results are upon request.

Appendix

Table 7: Comparison of characteristics of the module and full sample of HLFS

	Module		HLFS	
	Mean	Std. Dev.	Mean	Std. Dev.
Hourly Wage	5.481	4.799	5.577	5.330
Female	0.260	0.439	0.254	0.435
Age	35.616	9.108	35.470	9.133
Tenure years	4.417	5.387	4.292	5.366
Years of schooling	8.682	3.933	8.683	3.949
Having Social Security	0.813	0.390	0.808	0.393
Admistrative Worker	0.058	0.235	0.063	0.243
Regular W.Hours	52.258	12.487	52.477	12.632
No. Observations	8,753		67,164	

Source: Turkstat Household Labor Force Survey, 2013, integrated safety and health at work module.

Sample restrictions: Private wage earners within the age interval 21-59 years-old.

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