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LABOUR MARKET AND HEALTH:

Theoretical, Empirical and Cognitive Aspects

By

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For my parents and my close friends who, in different ways, have sacrificed themselves for this thesis and gave me the opportunity to realize my own potentials.

Σὰ βγεῖς στὸν πηγαμὸ γιὰ τὴν Ἰθάκη,
νὰ εὐχῆσαι νὰ ᾖ μακρὸς ὁ δρόμος,
γεμάτος περιπέτειες, γεμάτος γνώσεις.

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As you set out for Ithaka,
hope the voyage is a long one,
full of adventure, full of discovery.

K.P. Kavafis

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Abstract

Health and safety at work, as the main subject of the study, is the key element in achieving sustained decent working conditions and a strong preventive safety culture. The purpose of this study is to present the current state of knowledge regarding the theory, empirical research, determinants and consequences of occupational health and safety. It first describes the main theoretical approaches, as well as the theoretical framework and empirical results of occupational health and safety issues. Moreover, it presents an overview of the legislation framework regarding OSH issues, and the current status of empirical research on the subject in European Union countries, highlighting cross country differences. In addition, there is an attempt to identify the knowledge gaps and methodological shortcomings of the existing literature in order to contribute towards future research in the OSH field, especially in Greece. The study also seeks to investigate potential causal relationships between specific OSH indicators – variables. Given the lack of attention in the literature to injury-related absenteeism, there is an attempt to fill this gap, investigating the effect of job satisfaction on injury-related absenteeism by using Greek and UK data. Furthermore, the study investigates the effect of labor earnings on workers' psychological well-being and distress, employing data from thirty three European countries and Turkey. An extensive literature review of numerous publications, reports and institutions' databases is conducted. In order to investigate the potential relationships between OSH variables, two econometric analyses are implemented, using econometric tools (such as OLS regression, Tobit model, Logistic regression, Order Logic regressions).

Moreover, the thesis argues that, although the labor markets of most industrialized countries have undergone several changes, there has been lack of attention concerning the occupational health and safety consequences of these changes. Moreover, given that there has been an increase in workplace hazards and occupational diseases, implying rising costs for social protection systems, EU countries have implemented several health and safety policies in order to improve working conditions. It is also suggested that empirical up to date research in Greece is rather inadequate, mainly because of the absence of econometric methods to evaluate the available data. Therefore, more

systematic research is needed on the determinants of injuries and on their effects on job participation and productivity. Although the legal framework is quite adequate, there is a need for both prevention strategies and enforcement of the existing safety regulations. The empirical results indicate that there is a negative relationship between injury-related absenteeism and job satisfaction. The study also provides some scope for policy recommendations towards reducing injury-related absenteeism. In addition, a positive, but rather weak, impact of individuals' labor earnings on their psychological well-being is revealed, while a negative impact on their psychological distress dimensions (such as depression, fatigue and insomnia) is observed. On the contrary, a positive effect of labor earnings on work-related stress is found. In general, the study provides some substantial insights regarding OSH issues, contributing to the body of knowledge in the research field

Keywords: occupational health and safety, work-related accidents, occupational diseases, injury-related absenteeism, job satisfaction, psychological well-being, psychological distress

Περίληψη

Η υγεία και η ασφάλεια στην εργασία, ως βασικό αντικείμενο μελέτης της διατριβής, αποτελεί ένα βασικό στοιχείο στην επίτευξη βελτιωμένων συνθηκών εργασίας και στη λήψη αποτελεσματικών μέτρων πρόληψης. Η παρούσα μελέτη σκοπό έχει να παρουσιάσει τόσο την θεωρητική όσο και την εμπειρική διάσταση, τους καθοριστικούς παράγοντες καθώς και τις συνέπειες που αφορούν την υγεία και την ασφάλεια στην εργασία. Σε πρώτο επίπεδο, περιγράφονται οι βασικές θεωρητικές προσεγγίσεις, το θεωρητικό πλαίσιο και τα εμπειρικά ευρήματα σχετικά με την εργασιακή υγεία και ασφάλεια. Επιπλέον, παρουσιάζεται ένα εκτενές νομοθετικό πλαίσιο καθώς και η εμπειρική έρευνα που έχει πραγματοποιηθεί στις χώρες της ευρωπαϊκής ένωσης για το θέμα της εργασιακής υγείας και ασφάλειας, επισημαίνοντας διαπολιτισμικές διαφορές. Επιπροσθέτως, γίνεται προσπάθεια να εντοπιστούν μεθοδολογικά κενά στην βιβλιογραφία, συνεισφέροντας έτσι στην μελλοντική έρευνα στον τομέα της υγείας και της ασφάλειας στην εργασία, ιδιαίτερα στην Ελλάδα. Από την άλλη, η μελέτη επιχειρεί να διερευνήσει πιθανές αιτιώδεις σχέσεις μεταξύ συγκεκριμένων δεικτών – μεταβλητών που σχετίζονται με την υγεία και την ασφάλεια στην εργασία. Επειδή εντοπίζεται ελλιπής βιβλιογραφική έρευνα σχετικά με τις απουσίες από την εργασία λόγω τραυματισμού, που αποτελούν συγκεκριμένη κατηγορία απουσιών, γίνεται προσπάθεια να καλυφθεί το συγκεκριμένο ερευνητικό κενό. Στην μελέτη αυτή, ελέγχεται η επίδραση της εργασιακής ικανοποίησης στις απουσίες από την εργασία λόγω τραυματισμού, χρησιμοποιώντας δεδομένα από την Ελλάδα και το Ηνωμένο Βασίλειο. Στη συνέχεια, διερευνάται η επίδραση των δεδουλευμένων απολαβών στην καλή ψυχολογική κατάσταση – ευημερία και την αρνητική ψυχολογική κατάσταση των εργαζομένων, χρησιμοποιώντας δεδομένα από τριάντα τρεις χώρες της Ευρώπης και από την Τουρκία. Διεξήχθη μία εκτενέστατη βιβλιογραφική ανασκόπηση, χρησιμοποιώντας έρευνες, δημοσιεύσεις, αναφορές και βάσεις δεδομένων από ιδρύματα σε εθνικό και διεθνές επίπεδο. Επιπλέον, για την διερεύνηση πιθανών σχέσεων μεταξύ μεταβλητών για την εργασιακή υγεία και ασφάλεια, πραγματοποιήθηκαν οικονομετρικές αναλύσεις με τη χρήση

οικονομετρικών εργαλείων (όπως OLS regression, Tobit model, Logistic regression, Order Logic regressions).

Από τα ευρήματα της βιβλιογραφικής ανασκόπησης προκύπτει ότι, παρόλο που οι αγορές εργασίας των περισσότερων εκβιομηχανισμένων χωρών υφίστανται πολλαπλές αλλαγές, υπάρχει ελλιπής βιβλιογραφική αναφοράς στις επιπτώσεις αυτών των αλλαγών στην εργασιακή υγεία και ασφάλεια. Επίσης, παρατηρείται αύξηση των επαγγελματικών ασθενειών καθώς και των κινδύνων στους χώρους εργασίας, επιφέροντας υψηλό κόστος στα συστήματα κοινωνικής προστασίας. Έτσι οι χώρες της ευρωπαϊκής ένωσης εφάρμοσαν πολιτικές υγείας και ασφάλειας ώστε να βελτιωθούν οι συνθήκες εργασίας. Από την άλλη, η μη χρήση σύγχρονων και έγκυρων οικονομετρικών μεθόδων, καθιστούν την εμπειρική έρευνα στην Ελλάδα ανεπαρκή. Για το λόγο αυτό, κρίνεται απαραίτητη μια πιο συστηματική ερευνητική προσέγγιση σχετικά με τους παράγοντες που προκαλούν τραυματισμό και τις επιπτώσεις του στην εργασία και την παραγωγικότητα. Παρόλο που το νομικό πλαίσιο είναι σχετικά επαρκές, υπάρχει ανάγκη για στρατηγικές πρόληψης και εφαρμογή των ήδη υπάρχοντων κανονισμών για την εργασιακή ασφάλεια. Τα αποτελέσματα από την εμπειρική έρευνα δείχνουν την ύπαρξη αρνητικής σχέσης μεταξύ απουσιών από την εργασία λόγω τραυματισμού και εργασιακής ικανοποίησης. Επιπλέον προτείνεται ένα σύνολο πολιτικών για την μείωση των απουσιών από την εργασία λόγω τραυματισμού. Εν κατακλείδι, παρατηρείται ότι η επίδραση των δεδουλευμένων απολαβών είναι θετική για την καλή ψυχολογική κατάσταση - ευημερία, ενώ είναι αρνητική για την αρνητική ψυχολογική κατάσταση (κατάθλιψη, κόπωση και αϋπνία). Αντιθέτως η σχέση μεταξύ δεδουλευμένων απολαβών και εργασιακού άγχους βρέθηκε θετική. Σύμφωνα με τα παραπάνω, η μελέτη παρέχει κάποια αξιόλογα επιπρόσθετα στοιχεία σχετικά με τα θέματα που αφορούν στην εργασιακή υγεία και ασφάλεια, συνεισφέροντας με τον τρόπο αυτό στο πεδίο της επιστημονικής γνώσης.

Λέξεις κλειδιά: υγεία και ασφάλεια στην εργασία, εργατικά ατυχήματα, επαγγελματικές ασθένειες, απουσίες από την εργασία λόγω τραυματισμού, εργασιακή ικανοποίηση, θετική ψυχολογική κατάσταση – ευημερία, αρνητική ψυχολογική κατάσταση

Chapter 1

General Introduction

1.1 A General Research Framework

The main subject of this study is the discipline of occupational health and safety (OSH). OSH is generally defined as the science of the anticipation, evaluation, recognition and control of hazards arising in or from the workplace that could impair the health and well-being of employees. Its main scope has evolved gradually and continuously in response to social, political, technological and economic changes. In particular, OSH aims to promote and maintain the highest degree of physical, psychological and social well-being of employees, to protect them from risks and prevent hazards. It is a key element in achieving sustained decent working conditions and strong preventive safety culture.

The promotion of OSH represents an important strategy, not only to ensure the physical and psychological health of employees, but also to contribute positively to productivity. Healthy employees are better motivated, satisfied and productive, contributing to equitable and sustainable socio-economic development. In order to ensure such durable results, coherent national policies are needed. Nevertheless, improving OSH is a dynamic process with long-term objectives, which requires the collaboration and participation of both employers and workers.

Given the above, the chapter sets the bases for a detailed overview of occupational health and safety issues, presenting the purpose and the significance of the study, as well as the empirical methodology that will be used.

1.2 The Purpose of the Study

The study aims to impress the current state of knowledge regarding the theory, empirical research, determinants and consequences of occupational health and safety. In particular, the study attempts to describe the main theoretical approaches to occupational health and safety, as well as the theoretical and empirical framework and the economic impact of occupational health and safety indicators. Furthermore, it seeks to exploit available measures of health and safety across European countries, highlighting cross country differences. In addition, it essays to present occupational health and safety legislation framework and empirical research and point out the possible knowledge gaps and methodological shortcomings.

The study also focuses on the potential correlation between particular OSH indicators – variables. It investigates the potential causal relationship between injury related absenteeism and job satisfaction, attempting to fill the gap in the literature to this particular type of absenteeism. In addition, it investigates the effect of labor earnings on employees' psychological well-being and distress aspects.

1.3 The Importance of the Study

As mentioned above this study disserts occupational health and safety issues. Work is central to individuals' health and well-being. It does not only provide the main source of individuals' revenue, it may also have a direct impact on individuals' quality of life. Furthermore, bad working conditions may lead to injuries and professional diseases, mental illnesses, harmful & unhealthy behaviors (smoking, alcohol, unhealthy eating) or long-term health consequences and hence sickness absence and increased labor turnover. In general, the issues of occupational safety and health exhibit important moral, legal, and financial aspects. All organisations have a duty of care to ensure that employees and any other individual who may be affected

by the work tasks assigned remain safe at all times. Moral obligations would involve the protection of employee's lives and health. Legal reasons for OSH practices relate to the preventative, compensative and penal effects of laws that protect worker's safety and health. OSH can also reduce employee injury and illness related costs, including medical care, sick leaves and disability benefit costs.

The study seeks to identify the knowledge gaps and methodological shortcomings of the existing literature in order to contribute towards future research in the OSH field. In addition, it attempts to fill the gap in the literature, investigating the effect of job satisfaction on injury-related absenteeism. It also attempts to discuss possible policy measures towards reducing injury-related absenteeism, since the economic and social costs of the phenomenon are quite substantial. Moreover, taking into account the research evidence that earnings and other socioeconomic predictors can influence mental health, the dissertation essays to examine the effect of labor earnings on workers' psychological well-being and distress. It is important to mention that psychological well-being strengthens workers' productivity, confidence and motivation, while aspects of psychological distress can lead to incapacity for work.

Concerning the above, workers' physical and psychological health and safety are not only the concerns of the employees and their families, but also of the employers. Finally, the workers' overall health affects the economy as a whole given that productivity and competitiveness also depend on achieving and sustaining high quality of working conditions. Hazards in the workplace create both human and economic costs.

1.4 Empirical Methodology

An extensive literature review of numerous publications, reports and institutions' databases will be conducted. Furthermore, two empirical studies will be implemented

in order to investigate possible causal relationships between OSH variables, using econometric tools.

There are two data sets used in the study. The first one, concerning injury absenteeism – job satisfaction relationship, will be drawn from a European research survey (SOCIOLD). This three – year research project contains data from six EU countries and the participants were selected by the method of multistage sampling. The procedure had four stages of random and systematic sampling. The participants responded to a questionnaire of 40 minutes duration, comprising of 58 questions relating to issues such as physical and mental health status, past working experiences, incidence of diseases, sense of well-being, job satisfaction, absenteeism and socioeconomic and occupational background of the participants of the labour force. The surveys were conducted in the summer-autumn of 2004 through internet and face-to-face interviews. Owing to missing information on some variables for some participants and after necessary data processing, the final sample consists of 1001 individuals from Greece and UK. In addition, the methodological tools for analysing absence data will be the ordinary least-squares (OLS) regression and the Tobit model. Moreover, in order to enhance the statistical analysis, the effects of marginal changes will be estimated.

The data, concerning the impact of labor earnings on psychological well-being and distress, will be drawn from the 5th European Survey on Working Conditions. The research was conducted in the first half of 2010 (face to face interviews) and contains data from thirty three European countries and Turkey. The target sample size of 1000 interviews was set for most countries. The participants who were selected by the method of multi-stage stratified random sample, responded to a questionnaire of about 44 minutes duration, comprising of 89 questions relating to issues such as working

time duration and organisation, work organisation, learning and training, physical and psychosocial risk factors, health and safety, work-life balance, worker participation, earnings and financial security, as well as work and health.

The methodological tool for analysing psychological well-being data is the ordinary least-squares (OLS) regression. Concerning depression, fatigue and insomnia, logistic regression will be used, since the dependent variables are binary. In addition, an ordinal logistic regression will be employed regarding working stress as a dependent variable which has more than two categories. Moreover, because of the lack of interpretation of the coefficients in the Logit and Ordered Logit regressions, the marginal effects method will be utilized, estimating the partial effects on the predicted probabilities.

1.5 The Structure of the Study

After an overall discussion of the purpose and the importance of the study, as well as the description of the empirical methodology, we present the structure of the dissertation.

Chapter 2 attains a detailed overview of the theoretical framework regarding health and safety at work. The chapter presents the labor market framework, as well as the labor market indicators. Moreover, it discusses the labor market economics approach with respect to the occupational health and safety at workplace, also presenting the main points of the economic impact of occupational health and safety. It also describes the theoretical framework of occupational accidents, absenteeism and job satisfaction, as well as issues concerning occupational health and safety management and occupational health and safety systems.

The following chapter exhibits a detailed overview of health and safety at work in European Union. It presents work related health problems and occupational accidents

drawing information from EU institutions' databases and studies, as well as the trends, the potential patterns, the determinants and the financial impact of absenteeism across European countries. Subsequently, it presents data about a specific type of absenteeism, due to sickness. Furthermore, the chapter provides an overview regarding job satisfaction impact on health and safety at work, linking the contributions by country. It also describes the point of view of European Union workers concerning occupation health and safety issues and reviews health and safety policies recently implemented in each of the European countries.

Chapter 4 presents a detailed review of current state of health and safety at work in Greece. The chapter indicates the main points of the OSH legislation in Greece and presents an outline of the Greek health system. Moreover, it includes sections relating to main OHS indicators, Greek datasets and econometric techniques. It also presents the main research findings regarding work related accidents, occupational health problems, job satisfaction and absenteeism, concentrating also on potential shortcomings. In addition, it discusses the economic impact of OSH indicators, while it provides OSH policy implementation attributes.

Furthermore, chapter 5 attempts to examine the relationship between injury related absenteeism and job satisfaction employing data drawn from a recent European research project (SOCIOLD). The chapter presents an extensive literature survey concerning absenteeism and job satisfaction and also the nature of their relationship. It also describes the data and the empirical methodology, the research findings regarding the statistical significant relationship (if there is any) between injury absenteeism, job satisfaction and other determinants, and provides possible policy recommendations.

The following chapter attempts to examine the relationship between psychological well-being and labor earnings employing data drawn from the 5th European Survey on Working Conditions (2010). It presents an extensive literature survey concerning psychological well-being and aspects of psychological distress, and also the nature of the relationship between psychological well-being and labor income. It also describes the data and the empirical methodology as well as the research findings regarding the statistical relationship between psychological well-being, labor earnings and other determinants. Finally, an overall discussion and concluding comments will close the dissertation.

Chapter 2

OSH Theoretical Framework

2.1 Introduction

Occupational Health and Safety is defined by the International Occupational Hygiene Association (IOHA) as the science of anticipating, recognizing, evaluating and controlling health hazards at the workplace with the objective to protect employees' health and well-being and safeguard the community at large. The chapter presented below describes the main theoretical approaches to occupational health and safety. In particular, the chapter is focused, among other issues, to the theoretical framework and the empirical results of the occupational health and safety indicator effects.

Occupational safety is a major issue both for workers and management and it has academic and practical significance. The organizational approaches tend to produce a sufficient level of safety and focus on the optimal design of equipment. From a managerial perspective, the importance is given to management control and employee compliance, emphasizing rule enforcement and infractions punishment (Barling et al., 2003). Furthermore, employee health has long been a topic of interest for organizations. In recent years, health care costs have been rising at a rate nearly three times the rate of inflation. Direct medical costs represent only a portion of the costs that an organization faces when workers face an accident or a disease. Absenteeism, medical leave, turnover, productivity loss, job performance and the use of disability programs may account for more than 50% of the total costs regarding poor health.

Thus, a cooperative approach is needed, with both the employees and employers to join their forces to improve employee health (Robbins et al., 2012).

In order to attain a detailed overview of the theoretical framework regarding health and safety at work, the chapter is structured as follows: section 2.2 presents the labor market framework, as well as the labor market indicators. Section 2.3 discusses the labor market economics approach regarding occupational health and safety at workplace, while section 2.4 attempts to present the main points of the economic impact of occupational health and safety. The following three sections (2.5, 2.6, 2.7) present the theoretical framework of occupational accidents, absenteeism and job satisfaction, while section 2.8 presents issues concerning occupational health and safety management and occupational health and safety systems. A concluding section will close the chapter.

2.2 Labour market and Labour market indicators

A market is a place where buyers and sellers interact to determine how much of a commodity will be bought and sold, and for what price. In the labour market the 'buyers' are employers, the 'sellers' are people of working age (15 years and older) who want a job, and the price of labour is wages and other employment related costs (such as payroll tax, etc.). Labour markets are concerned with people and their skills and abilities relative to employer needs. Wages are important in attracting people to jobs, but other factors such as working conditions, job security and career prospects also count (Brooks & Williams, 1996).

In the past decades, the labor markets of most industrialized countries have undergone several changes. The three related sets of labor market changes are the growth of outsourcing – self-employment and home work, the growth of small business and labor shedding and finally the growth of temporary and part time labor.

However, there has been little attention of the occupational health and safety consequences of these changes, especially when combined with changes to work organization and work processes. Some of these changes to labor markets may have positive OHS effects for occupational health and safety, namely the shift in employment away from hazardous industries and the gains in knowledge, experience from an ageing workforce (Quinian, 1999).

Labour market activity can be measured by indicators such as labour force participation, employment, unemployment and vacancies. People of working age who are either working or actively looking for a job are counted as part of the labour force. Employment refers to the number of people in jobs, unemployment refers to the number of people looking for jobs, and vacancies are the number of jobs that employers cannot fill. If the number of people willing to work is the same as the number of workers employers want, then there will be no unemployment or vacancies. In reality, the chances of this occurring are quite remote. Unemployment occurs when there are insufficient jobs available for those seeking work. Vacancies appear when more jobs are available than there are people wanting them. Because jobs have a skill or ability component, vacancies can also appear even when there is unemployment due to skill mismatches between the jobs and the people seeking them. The main indicators of labour market performance are the participation rate and the unemployment rate. The participation rate is the percentage of working-age people who are participating in the labour force. Generally, it is likely that a relatively high proportion of working-age people want to work, apart from those who are undertaking some form of education, are looking after children or are retired. The labour market may not be performing as well as it could if the labour force participation rate fails due to people withdrawing from the labour force because they think they cannot find a

job. The unemployment rate is the percentage of the labour force whose are unemployed. A relatively low unemployment rate indicates that the labour market is performing well in matching jobs with workers. There is some debate among economists about what is a low unemployment rate. This is because there are submarkets within the labour market and some unemployment can arise because those looking for work do not have the skills or abilities to suit the jobs on offer (for all the above points see Sapsford & Tzannatos, 1993; Πετρινώτη, 1989).

Any labor market for a given occupation is based on the demand by firms for a certain set of skills that is the result of a profit maximization decision and the supply of those skills by individuals that is the result of a series of decisions (workforce enter, set of working hours). In both instances, the decisions made by firms as well as by individuals involve opportunity cost. The aggregation of demand and supply choices made by firms and individuals respectively, is reflected in total labor demand and supply in any given labor market. The intersection of labor demand and labor supply result in a market equilibrium wage rate for that occupation as well as an equilibrium quantity of workers hired and worker supply. Changes in any one or more forces on either the labor demand or labor supply side of a given labor market, will result in changes in incentives. This will accordingly move market equilibrium wage rates and equilibrium levels of employment to different levels (for all the above points see Sapsford & Tzannatos, 1993; Πετρινώτη, 1989; Borjas, 2005).

The neoclassical supply and demand model is a powerful tool that can be used to analyze employment and wage outcomes in the labour market. The neoclassical model includes behavioural assumptions about how buyers and sellers of labour respond to wage rates, prices and other factors, and assumes that the labour market is in equilibrium (the labour market clears where supply equals demand). The labour

supply curve depicts the amount of labour offered for sale at each wage rate, holding all other factors constant, while the labour demand curve depicts the amount of labour that firms (employers) are willing to hire at each wage rate, holding all other factors constant (HSE, 2006). In a competitive labour market, the intersection of the labour demand and supply curve determines the equilibrium wage rate and employment level. There are two important implications concerning the competitive labour market model. On the one hand, if there are no mobility costs, homogenous labour will be paid the same equilibrium wage rate in different sectors (industries or regions) of the economy. On the other hand, there is no involuntary unemployment, thus all individuals who want to work at the equilibrium wage will have a job. The individuals who are unwilling to work at the equilibrium wage but are willing to work at a wage higher than the equilibrium wage are voluntarily unemployed (Benjamin et al., 2002).

Neo-classical economists view the labour market as similar to other markets in that the forces of supply and demand jointly determine price and quantity. However, the labour market differs from other markets in several ways. The most important of these differences is the function of supply and demand in setting price and quantity. In markets for goods, if the price is high there is a tendency in the long run for more goods to be produced until the demand is satisfied. With labour, overall supply cannot effectively be manufactured because people have a limited amount of time in the day, and people are not manufactured (Boyer & Smith, 2001). The labour market may also be at a non-clearing market state. Whereas most markets have a point of equilibrium without excess surplus or demand, the labour market is expected to have a persistent level of unemployment. The households supply labor services. In standard microeconomics theory, people are assumed to be rational and seeking to maximize their utility function. In the neoclassical labour market model, their utility function is

determined by the choice between income and leisure. As the wage rate rises, the employee will substitute work hours for leisure hours, thus the employee will work more hours to take advantage of the higher wage rate. Economists also need to know the maximum quantity of hours an employer will demand at every wage rate. To understand the quantity of hours demanded per period of time, it is necessary to look at product production. That is, labour demand is a derived demand which is a function of the output levels in the goods market. A firm's labour demand is based on its marginal physical product of labour. This is defined as the additional output (or physical product) that results from an increase of one unit of labour (or from an infinitesimally small increase in labour) (Benjamin et al., 2002; Syverson, 2011).

In addition, there are other approaches to studying the labour market than the neo-classical model. One of them is the institutional approach which plays down economic forces and emphasizes the roles of institutions, custom and socio-political factors. Rather than abstract theoretical reasoning, this approach emphasizes descriptive realism. The Marxian radical approach focuses on class conflict between workers and capitalists, who appropriate and use the economic surplus to ensure their continued power. The existence of surplus value means exploitation of labor (Benjamin et al., 2002). The dual labour market approach views the labour market as being segmented into a primary market with good, high-paying, stable jobs and a secondary market with lousy, low wage, high turnover jobs (Reich et al., 1973; Cain, 2001). A typical example of a primary sector employer is a large manufacturing establishment, while small service firms such as fast food outlets typify the secondary sector (Bulow & Summers, 1986). In contrast to the working experience of manual workers, employees in clerical jobs enjoy better working conditions, good career prospects and job security. Research evidence clearly shows that educational

qualifications as well as the number of years spent in school play an important role for the future occupational position. In addition, sociologists have stressed that the biggest difference in the working experience of manual and non-manual workers is the opportunities offered for advancement. Moreover, unskilled workers are more heavily represented among the unemployed (Theodossiou, 1992).

2.3 OSH and Labor market

Labour market economics involves analyzing the determinants of the various dimensions of labour supply and demand, which interact to determine wages, employment and unemployment. There are many dimensions to labour supply, including demographics, immigration and emigration policies, the labour force participation decision, the hours of work decision (including overtime), education and training (human capital decisions), and the disincentive effects of income maintenance and unemployment insurance policies (Cahuc & Zylberberg, 2004; Kaufman & Hotchkiss, 2006). In addition, the supply of labour to a particular occupation is influenced by a range of monetary considerations such as the real wage rate on offer in the industry itself, overtime, substitute occupations and barriers to entry and non-monetary considerations such as improvements in the occupational mobility of labour, non-monetary characteristics of specific jobs (the level of risk associated with different jobs, the requirement to work anti-social hours, the non-pecuniary benefits, job security, opportunities for promotion) and the net migration of labour. Labour demand focuses on how firms vary their demand for labour in response to changes in the wage rate and other costs, including fringe benefits, legislatively imposed costs, and the quasi-fixed costs associated with hiring and training workers. Since labour demand is a derived demand (derived from the demand for the firm's output), it is also influenced by factors such as free trade, global

competition and technological change (Fleischer & Kniesner, 1980; Benjamin et al., 2002). Labour market outcomes are also influenced by the type of market structure (the degree of competition), union collective bargaining and various government laws (such as minimum wage laws). Labour market economics also studies various wage structures including occupational, industrial and regional wage differentials, union/non-union wage differentials, and male/female wage differentials (the issue of sex discrimination in the labour market) (Oaxaca, 1973; Benjamin et al., 2002).

Health is considered as an important factor in individual's supply decision. Thus, the impact of health on labor supply has been under extensive investigation, in particularly considering labor force participation and retirement. In addition, labor market participation may have a direct impact on health. For instance, boredom or lack of activity may lead to health deterioration (Stern, 1989). On the other hand, stress and work pressure or bad working conditions lead to health deterioration. These arguments suggest that labor force status could also affect health. Cai (2009) confirms the finding in the literature that health has a positive and significant effect on labor force participation and also suggests that treating health as an exogenous variable could lead to an underestimation of this effect.

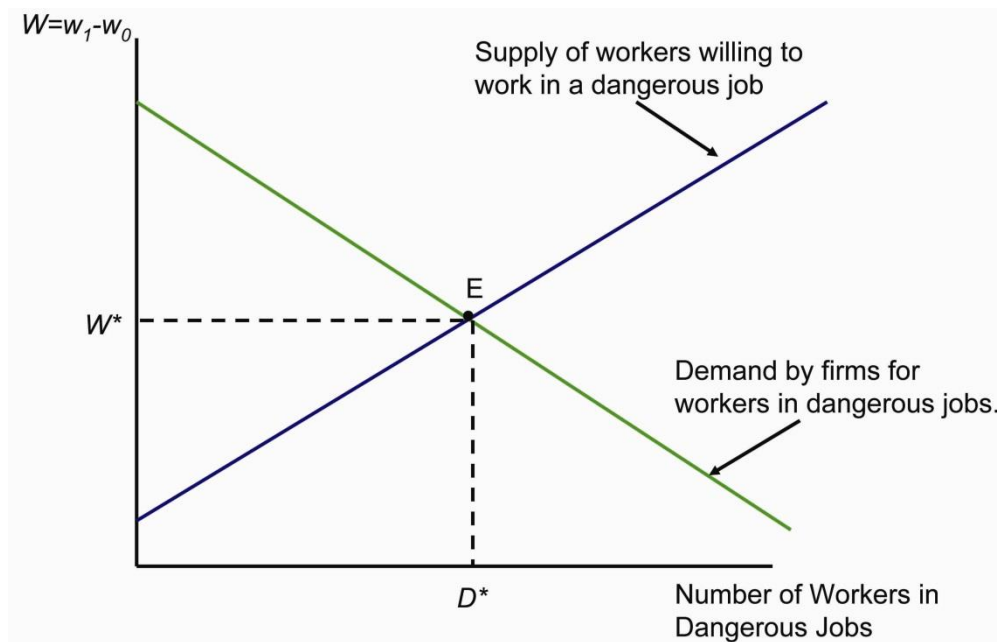
There is growing international evidence that some of the work arrangement changes have detrimental effects on occupational health, safety and well-being, as well as on the positive benefits of employee participation in OHS. Several studies found that improvement in sickness absence was greatest where enterprises had adopted a participatory approach, trade union representatives were active and management fails to consult over OHS (Johnstone et al., 2005).

A widely accepted theory concerning workplace health and safety, is the theory of compensating wage differentials. It attempts to explain differences in workers' wages

by taking into account the non-wage advantages and disadvantages associated with different employment categories. It is the price employers are required to pay if employees are to take on job tasks where there is an increased risk of injury or death. The theory predicts that market forces will ensure the payment of wage premiums by firms which are characterized by risky job tasks and inferior working conditions (Drakopoulos & Theodossiou, forthcoming; Pouliakias & Theodossiou, 2013). On the other hand, there are a number of crucial assumptions of the theory that are problematic, such as the labor mobility. In addition, workers might not be informed about workplace risks thus underestimating job risks. Moreover, the research evidence is not consistent with the assumption that individuals are always rational decision makers, even under risky and uncertain conditions (Drakopoulos & Theodossiou, forthcoming).

Economists have typically analyzed the safety decisions of both employees and firms. Firms have different costs in producing safety. They may have a risky work environment because it is less expensive to pay higher wages than to make the environment safe. But with a risky environment, the firm has to pay more to attract workers (wage differentials). If the wage differential is smaller than the cost of providing safety the firm will pay the higher wage and operate in risky conditions. If the wage differential is bigger than the cost of safety then the firm will invest in safety and pay lower wage to the worker. Thus, higher wage differential means that fewer firms would operate in risky working conditions, since it becomes more profitable for firms to make jobs safer than to pay the higher wage (Borjas, 2003, 2005; Pouliakias & Theodossiou, 2011).

Figure 2.1: Demand & supply of dangerous jobs



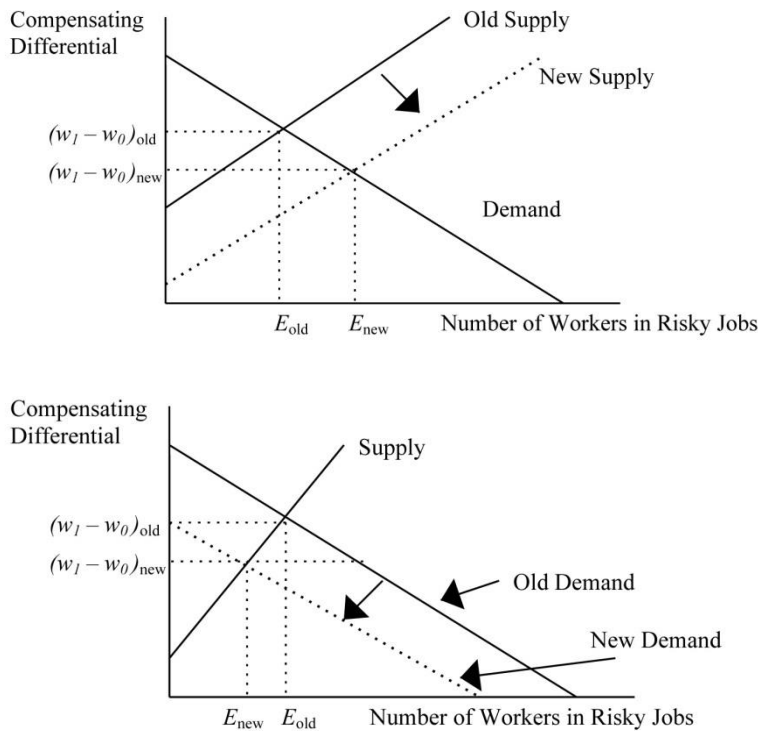
When the demand for the risky job is high (the labor supply to risky job) compared to the supply of it (demand for the labor), the price goes up (the wage goes down).

The supply curve slopes up because as the wage gap between the risky job and the safe job increases, more and more workers are willing to work in the risky job. The demand curve slopes down because fewer firms will offer risky working conditions if risky firms have to offer high wages to attract workers. The market compensation differential equates supply and demand, and gives the “bribe” required to attract the last worker hired by risky firms.

Safety engineering advances make it cheaper for firms to offer safe jobs, and hence reduce the gain from switching from a safe environment to a risky one (or reduce the cost of switching from a risky environment to a safe one). This will decrease the demand curve for risky jobs and reduce the compensating wage differential. Thus, the equilibrium number of workers in risky jobs goes down. The tendency of employees to consistently evaluate the likelihood of having an occupational accident as being less likely than the actual risk they face, may make them more willing to take these risks. This increases the supply of workers to risky jobs and reduces the compensating

differential. Thus the equilibrium number of workers in risky jobs goes up. If employment in risky jobs went down then it is likely due to technology; if employment in risky jobs went up it is likely due to preferences (Borjas, 2005).

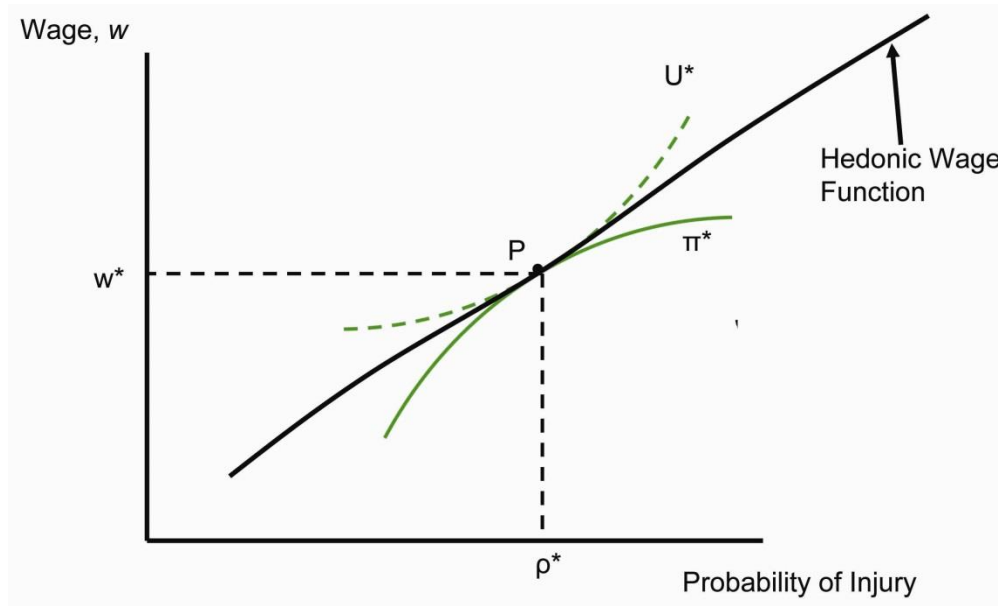
Figure 2.2: Labour Market for Risky jobs



Good job characteristics are associated with low wage rates. Bad job characteristics are associated with high wage rates. Evidence is not clear on the link between amenities (such as job security, predictability of layoffs, work schedules, working hours) and wage differentials, except the risk of death. The observed relationship between wages and job characteristics is called a hedonic wage function. The Hedonic wage function shows the market price for an attribute. Studies report a positive relationship between wages and work hazards. The statistical value of life is the amount that workers are jointly willing to pay to reduce the likelihood that one of them will suffer a fatal injury in a given year on the job. Evidence is uncertain, since

there is variation in estimates of the correlation between wages and the probability of injury (Borjas, 2003, 2005).

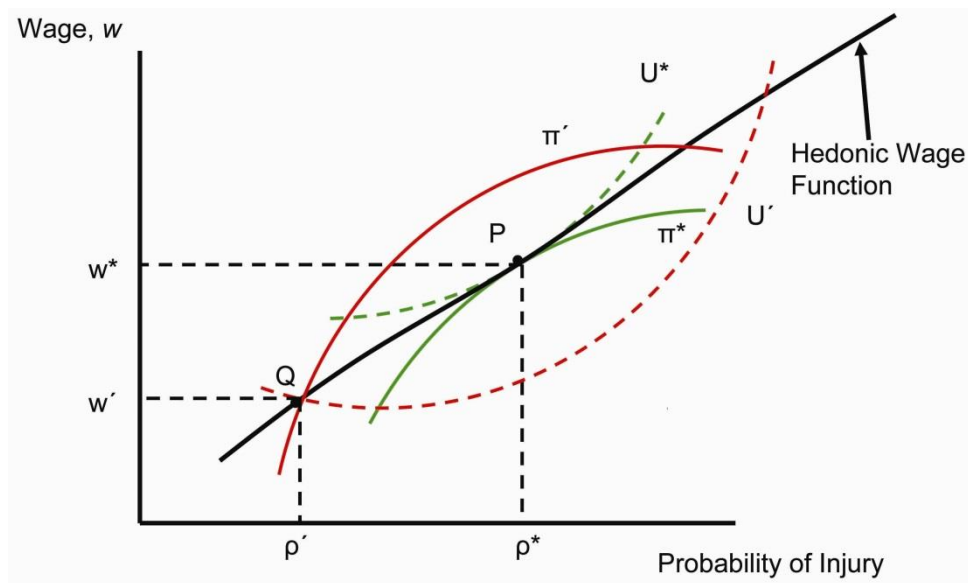
Figure 2.3: Prior to OSHA regulation



Initial equilibrium at P with wage w^ and probability of injury p^* .*

To protect the safety and health of the labor force, OSHA sets regulations that are aimed at reducing risks in the work environment. OSHA is authorized to inspect employers for potential violations and to assess civil penalties if violations are found. OSHA may also seek criminal penalties in limited circumstances if an employee has a fatal accident. An employer will make safety and health improvements until the cost of these precautions is higher than the cost of paying additional wages, workers' compensation premiums, and other related costs. If, however, such financial incentives fail, employers will underinvest in safety and health improvements. Regulators can address this shortfall by ordering employers to undertake safety and health precautions improvements up to the point where the costs of such improvements exceed their benefits (Shapiro, 1999).

Figure 2.4: After to OSHA regulation



New equilibrium given by Q involves lower risk of injury ρ' and lower wage w' .

A worker maximizes utility by choosing the job at point P , which pays a wage of w^* and offers a probability of injury of ρ^* . The government prohibits firms from offering a probability of injury higher than ρ' , shifting both the worker and the firm to point Q . As a result, the worker gets a lower wage and receives less utility (from U^* to U'), and the firm earns lower profits (from π^* to π') (Hintermann et al., 2010; Borjas, 2003, 2005). The labor market “marries” workers who dislike risk with firms that find it easy to provide a safe environment and workers who do not mind risk as much with firms that find it difficult to provide a safe environment (Borjas, 2005).

2.4 OSH economic impact

Occupational injury and illness are matters of health, but they are also matters of economics, since they stem from work, and work is an economic activity. The role of OSH and its financial costs and benefits is an important aspect of economic analysis, but above all, economics is a social science and its perspective is that of society as a whole, including workers, their families and their communities as well as enterprises. There are three general purposes that economics can serve for OSH. First, identifying

and measuring the economic costs of occupational injury and disease, can motivate the public to take these problems more seriously. Second, understanding the connections between the way firms and markets function and types of OSH problems that arise, is crucial for the success of public policy. Finally, as important as the protection of worker health and well-being is, it is not the only objective of modern society. Economic analysis can help show when safeguarding working conditions is complementary to other social goals, and it can illuminate the trade-offs when it is not. The majority of accidents are attributable to the conditions of work and not the performance. The most important cost of occupational injuries and diseases are non-economic. Economics can also help identify groups at risk, shedding light on the specifically economic OHS costs. According to epidemiological analysis, risk is a function of exposure to hazardous conditions, while according to social science approaches, is the result of social position, pressures and incentives. The most dangerous jobs are those lowest in the economic hierarchy, for instance informal and precarious employment, work in small and medium enterprises (for all the above points see Dorman, 2000).

Economic theory establishes that labor markets create several incentives for employers to reduce occupational safety and health risks. Economic studies confirm the existence of one such incentive: the demand by workers for additional compensation, for exposure to safety risks. Employers that fail to reduce workplace hazards can expect to pay increased labor costs because workers will demand additional compensation for enduring occupational safety and health risks. Assuming that workers are informed about job risks, they will seek compensation equal to the expected cost of an injury or illness not covered by workers' compensation. In addition, the employer may have to pay for the cost of recruitment and training of

additional workers to replace those persons who are injured or killed and other related costs. To avoid these expenses, an employer will make safety and health improvements until the cost of additional precautions is more than paying wage premiums and other related costs.

Viscusi (1978) found that workers in risky jobs receive higher wages after controlling for education, experience, and other market characteristics. An employer will determine whether to prevent workplace accidents or illnesses by comparing the cost of prevention with the cost of not taking such action. A firm will invest in safety and health precautions until the cost is more than the cost of paying higher wages, workers' compensation, and other accident and illness costs. Empirical data support the conclusion that workers' compensation provides a significant incentive to make safety and health improvements. However, research evidence is equivocal concerning whether workers' compensation induces employers to take safety precautions (Shapiro, 1999). In addition, research in cognitive psychology suggests that employees tend to not evaluate appropriate information about the assumed risk and consistently underestimate the level, nature and severity of risk associated with accidents, since perceptions of risk are influenced by pre-existing experience (Drakopoulos & Theodossiou, forthcoming).

OSH in European Union

The economic impact, and more specifically the estimating of the costs and benefits of occupational safety and health, has become an important issue in most Member States of the European Union and the attention paid to it is still increasing. Different financial incentives and instruments are used in occupational safety and health policy in Member States. Cost-benefit analysis (CBA) is considered to be the best known tool at the moment (Dorman, 2000; MacCarthy, 1982). However, other

incentives such as the use of subsidies and financial sanctions are also important. In some Member States the assessment of the economic impact is one of the standard pieces of information used in political decision making. However, the way economic assessments influence decision-making varies from one Member State to another (Kankaanpaa et al., 2008). Although cost-benefit analysis (CBA) is seen as an important part of the decision-making process on new measures in most Member States, the impression is that ethical considerations are still predominant. Cost-benefit analysis is carried out after implementation of an OSH measure in only a few Member States. The way assessments are performed varies from one country to another and may also vary according to the nature of the measure. Estimating the benefits proves particularly difficult. The evidence from Member States indicates that there are many problems involved in estimating the benefits, including a lack of reliable data, difficulties in isolating relevant factors, and the fact that benefits often become apparent only after some time (MacCarthy, 1982; Kankaanpaa et al., 2008). Some Member States have estimated the cost of work-related illness as a percentage of Gross National Product. The methods of estimating the costs of work related illness as a percentage of GNP vary too greatly to permit strict comparison between Member States. Nonetheless, it is believed that the range of indications of the costs of work-related risks gives an approximation of the real costs involved (Dorman, 2000).

For individual enterprises it is more important to know if specific investment in OSH measures will lower their costs. In most Member States instruments exist, or are being developed, which provide support to enterprises in evaluating the costs and benefits of measures. Small and medium-sized enterprises often lack the financial and personnel resources to apply these methods appropriately. Subsidies that promote the development, sale or purchase of safe and healthy products, production methods,

work organisation, machines etc. exist in a majority of Member States. However, only in a few Member States are the effects of measures undertaken as a consequence of subsidy evaluated (Cagno et al., 2013). Regarding the future of subsidy arrangements, there seem to be a number of different trends in Europe. In some Member States subsidy funds are under pressure; while in others new measures are being taken. The Member States have well-developed systems for the imposition of financial penalties and administrative fines on individual enterprises. Nonetheless, they seem to be applied in a rather moderate way. Compliance with the legislation is the main objective of enforcement. Some Member States indicate that the level of financial sanctions is too low to function as a deterrent and that they have therefore taken initiatives to increase them (HSE, 2005). Furthermore, there seems to be an increasing interest among administrations in using administrative fines themselves instead of, or in addition to, bringing offenders to court. In a small majority of the European Member States financial incentives form part of mandatory social insurance schemes for occupational diseases and accidents. Smaller firms are especially affected by the fact that financial incentives in premium policy are usually more related to sector-wide experience of claims than to assessment of the effectiveness of the individual organisation's safety and health arrangements (ILO, 2008; Cagno et al., 2013).

A rather new and different approach to promoting occupational safety and health in enterprises involves public organisations – in their capacity as private entities – selecting contractors or suppliers of products, goods and services on the basis of their performance regarding safety and health at work. Many Member States recognise the need to exchange information about estimating the cost and benefits of measures. Many Member States stress the importance of a methodology to assess the impact of EU directives (European Agency for Safety and Health at Work, 2003).

Occupational health and safety regulation bodies impose a penalty on firms which is positively related to the unsafe working conditions. Higher expected penalties will increase enterprises' investment in work quality inputs, while workers safety will be reduced. Very severe penalties may induce a negative effect for productivity, whereas low and moderate expected penalties increase health and safety (Viscusi, 1978).

2.5 Occupational Accidents

The probability of occupational accidents is attributed to a social, economic and cultural context, particularly to the internal dispositional employees' characteristics and the external causal factors such as the working environment characteristics (Gyekye & Salminen, 2006; Demde et al., 2004).

Many researchers attempt to understand accidents by introducing accident causation theories (models), in order to provide tools for better occupational accident prevention programs. Heinrich, in 1959, developed the domino theory which posits that accidents result from a sequence of five factors: ancestry and social environment, fault of person, unsafe act / mechanical or physical hazard, accident and injury. The factors can be visualized as a series of dominoes standing on edge. When one falls, the linkage required for a chain reaction is completed. The domino theory also consists of ten statements, the axioms of industrial safety (Abdelhamid et al., 2000). The main disadvantages of this theory are that there can be just one cause for a given accident and that any interruption could stop the sequence of events (Katsakiori et al., 2008).

Another approach is based on human error theories which are best captured in behavior and human factor models. The human factors theory attributes accidents to a causal chain of which human error plays a significant role. It consists of three factors that lead to human errors: overload, incorrect response and inappropriate activities.

Behavioral theory assumes that there are permanent personal characteristics which can lead to an accident. There are seven fundamental principles: intervention, identification of internal factors, motivation to behave in the desired manner, focus on the positive consequences of appropriate behavior, application of the scientific method, integration of information, planned interventions (Abdelhamid et al., 2000; Geller, 2005).

Furthermore, the causal attribution theory attempts to understand how people explain causality. Occupational accidents have mostly been attributed to two fundamental causes: internal causal factors (personal) and external causal factors (contextual) (DeJoy, 1994; Gyekye, 2010). According to Goncalves et al. (2008), occupational accident experience has a positive correlation with external causal attributions and unsafe behavior. Thus, greater occupational accident experience and higher external attributions related to organizations' fault for accidents, are associated with higher unsafe behavior. Accident experience may change employees' behavior, at least during a certain period after the accident.

Different approaches to the causal attribution of industrial accidents also exist. Most of the studies regarding accident process have been based on one of three basic approaches: the ergonomic approach which focuses on work environment and equipment design, the environmental approach which focuses on potential hazards at work and the behavioral approach which focuses on changing workers' unsafe behavior (Gyekye et al., 2012).

Scholz & Gray (1990) applied a process-oriented model of risk assessment based on the behavioural theory of the firm, which affects the firm's decisions that are relevant to risk of occupational injuries. The behavioural theory of the firm provides a framework for considering decision processes within the firm and includes four major

concepts. The concepts refer to goal adaptation and attention rules in a changing environment, solving particular problems, addressing multiple goals sequentially and short run feedback reaction. According to the findings, Occupational Safety and Health Administration enforcement has a significant impact on injuries as well as on lost workdays. Although the results suggested that a 10% increase in enforcement activities will reduce injuries by about 1% for large, inspected firms, a richer compliance model might help improve the effectiveness and efficiency of enforcement strategies.

Although safety research has focused on human errors as prime causes of occupational accidents, recent studies have illuminated the importance of work climates and management practices as contributors to workplace inadequacy (Gyekye et al., 2012; Katsakiori et al., 2008). Cox et al. (1998) proposed a three-factor model of safety climate: safety management and personal actions and quality of safety training. In addition, Cheyne et al. (1998) suggested a five-factor model of safety climate which consists of communication, individual responsibility, safety standards and goals and personal involvements. A change in occupational injury rate could affect firms by reducing medical care costs, labor costs and productivity losses associated with workers turnover, as well as workers' compensation disability costs (Zaloshnja et al., 2006). Gyekye et al. (2012) developed a theoretical model of the combined effect of individual factors, such as employees' educational levels and organizational role, and organizational factors, such as organizational citizenship behaviours, organizational support, job satisfaction and perception of workplace safety, as determinants of industrial accidents. The results indicated strong interrelationship between safety and supportive perception and citizenship behaviour. Moreover, safety climate was found to have a strong impact on accident frequency.

Ensuring a supportive work climate by increasing workers' job satisfaction levels and implementing fairness perception measures, may have multiple benefits for organizations and the nation. Such supportive interventions would induce lower accident frequencies, less absenteeism, lower turnover and higher productivity.

According to the theory of compensating wage differentials, the existence of market forces ensures the payment of wage premiums by firms which are characterized by inferior working conditions, a high incidence of workplace accidents and diseases (Adnett & Dawson, 1998). Wei (2007) investigated the existence of compensating wage differentials for occupational diseases, highlighting the fact that workers face a far greater risk of occupational disease rather than fatal and non-fatal injury. It has been pointed out that the social class distribution of work related accidents and diseases is often skewed, with job risk affecting lower educated and lower income individuals to a greater extent. Psychological evidence also highlighted that individuals at the lower rungs of the education and income distribution are more likely to underestimate the probability of an occupational accident or disease. Moreover, the social costs of work related injuries and diseases have largely been overlooked in the economic discourse. Finally, market forces are likely to be much weaker in manual occupations such as construction and manufacturing, in which job risk is most prevalent.

An alternative theory suggests that occupational accidents are linked to the social relations to work. This sociological explanation implies that accidents are produced at three interrelated levels of social relations of work: rewards, command and organization. The rewards level induces accidents through factors such as financial incentives, long working hours, symbolic recompense while organizational level social relations produce the majority of occupational accidents due to monotony and

boredom associated with the performance of routine work. Furthermore, according to command level, an absence of workgroup integration implies increase of accidents, while the individual – member level causes accidents through accident proneness, individual carelessness and differentiated cognitive capacities (Dwyer & Raftery, 1991).

The incidence of occupational accidents is associated with a number of factors, such as company size, age and outsourcing of labor, demographic factors, such as low family income and several job characteristics, such as job satisfaction (Pouliakias & Theodossiou, 2013). Shannon et al. (1997) suggested empowerment of the workforce, encouragement of long term relations and systematic evaluation of safety hazards are associated with lower injury rates. Fenn & Ashby (2004) proposed that larger firms may be more safety conscious than small firms which may lack in safe technology and OSH programs. In addition, correlation has been found between injury rates and type of contracts. The higher rate of occupational accidents observed in the case of temporary workers. In addition, research shows that job dissatisfaction may act as a mediating factor that increases the occupational accidents (Theodossiou & Pouliakias, 2010).

Kirschenbaum et al. (2000) suggested that workers' accident proneness is affected by specific aspects of working environment, subcontracted and higher paid employees are more likely to get repeat injury while large family household improves stress feelings and lessens the likelihood of accident proneness. A Wisconsin study of the determinants of accidents concludes that 45% of all occupational accidents resulted from worker actions, 30% were caused by transitory hazards and 25% were due to identifiable physical characteristics of the workplace (Viscusi, 1979).

In the case of fatal occupational accidents, there has been a decrease over recent years, although the non-fatal occupational accidents have risen. Fatal work related diseases have also increased (Hamalainen et al., 2009; Oh & Shin, 2003). More than 2.3 million people die every year because of fatal occupational accidents and diseases (International Labor Office, 2003). In addition, non-fatal occupational injuries sometimes cause health problems such as long time hospitalization, work disability, morbidity (McCurdy et al. 1991). International Labor Office (2003) estimated that the total costs of occupational accidents and occupational diseases are 4% of the gross national product.

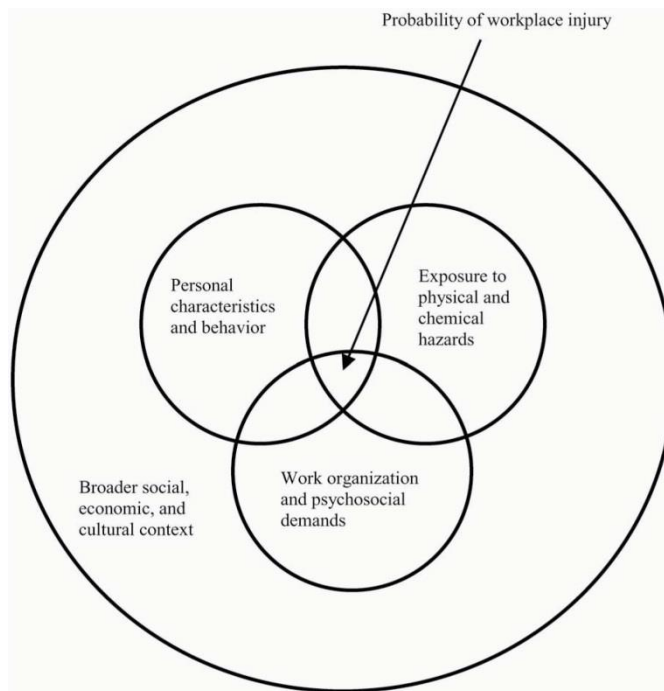
Oh & Shin (2003), proposed human capital, education and work experience as the crucial determinants of non-fatal occupational injuries. Workers of high education and more work experienced, encounter less injury rate than their counterpart (Robinson, 1984; Keyserling, 1983). More experienced workers have access to safer jobs and reduce the risky situations or hazardous conditions because of their higher skills, competent work performance, and control of work process. In addition, working environment, psychological factors such as job strain and emotional distress, personal conditions such as smoking, illicit drugs, alcohol, obesity, lack of sleeping, anxiety, clinical depression can influence the work injury rate (Kristensen, 1991). Kraus (1985) argued that workers in professional and technical occupations experience less occupational injury than workers in production and transportation jobs, but more than those in clerical jobs. The riskiest jobs include metal making, construction, machine operating, quarrying and agriculture. Most accidents occur while lifting or carrying, followed by slips, trips or falls.

Additional research has indicated the association between long hours and shift work and the increase risk of accidents. Minor injuries are also associated with work

stress, anxiety, age, frequent risk taking outside work, symptoms, low income, job type, time on the job, sleep problems, self-employment, negative job characteristics and cognitive failures, such as distractibility, poor selective attention and mental errors. Furthermore, research evidence has shown that workers in their first few months with a new employer, have the highest rate of injury (Simpson et al., 2005). Although the literature indicates that the effect of race on non-fatal occupational injuries is inconsistent (Oh & Shin, 2003; Strong & Zimmerman, 2005), race is an important predictor of fatal injuries at work, since black employees experience a higher rate of fatal accidents than white employees (Robinson, 1984; Leigh, 1983). In addition, race/ethnicity was proposed as a significant predictor of the number of workers' absent days due to injury (Strong & Zimmerman, 2005).

Many authorities suggested that occupational injuries and diseases result from a complex interplay of multiple risk factors such as the exposure to physical and chemical hazards, the performance of unsafe practices, psychosocial factors, work organization and culture, biological and personal characteristics, environmental and social conditions (figure1). The incidence of occupational injuries and diseases is also related to several demographic and job factors such as low family income, living in a rural area, working in high hazard occupation, job satisfaction, exposure to hazardous job activities, lifting or carrying weight, kneeling, crouching, reaching (Dembe et al., 2010).

Figure 2.5: Multiple risk factors for workplace injuries and illnesses



Source: Dembe et al., 2010

Recent works have pointed out additional factors that were associated with risk of occupational injuries. Those factors could be organizational involvement, physical work environment, general health and safe behaviour, external aspects or circumstances related to injured individual, psychosocial stressors, stress symptoms and poor safety behaviour, inadequate training (Blanch et al., 2009; Fabiano et al., 2008). Garcia et al. (2004) also argue that healthy environment and healthy behaviours are important determinants in occupational health. Specific training programmes are devoted to increasing workers' knowledge of job hazards and promoting safer work behaviours. Employees' behaviour, though, are influenced by other factors, besides proper training, which should be evaluated in order to develop integral programmes for workplace hazards control.

There is growing evidence that new job environment can have a negative impact on safety. Downsizing was linked to reduced safety outcomes where lean production industries have higher injury rates. In addition, precarious and migrant employees are

more vulnerable to work related accidents (Koukoulaki, 2009). Literature findings indicate the negative impact that changes in the job environment may have on occupational health and safety. These changes could be the disruption of human biological rhythms, the increase of employees fatigue due to changes in patterns of working hours and years, job insecurity and occupational stress, unsafe work practices related to workload and time pressure, which could lead to an increase in occupational accidents. Some of the difficulties in conducting risk assessment and implementing preventive measures in the changing work environment could be lack of time and methodological tools, lack of training and unsafe work practises, linguistic problems, continuous alteration of workplaces, tasks and working hours, underreporting of occupational accidents and diseases (Papadopoulos et al., 2009).

Clarke's study (2006) highlighted the role of employee's response to safety as the greatest influence on safety behaviour, rather than manager's concern for safety. It has also been found that employee's safety attitudes such as concern of safety, conflict between production and safety and work environment perceptions such as work pressure and work clarity, were associated with unsafe behaviours but only the latter was associated with occupational accidents.

The employers and employees should co-operate in order to handle their daily risk situations and qualify a constructive dialogue about working conditions. Effective communication regarding health and safety issues has been highlighted as an important factor in the success of safety interventions. Nevertheless, it is not possible to eliminate all risks of accidents, but it is possible to learn how to handle risk situations to prevent risks from leading to accidents (Jorgensen et al., 2011; Clarke, 2006). Failure to prevent industrial accidents and occupational diseases can result in significant costs at the personal, domestic and corporate levels as well as to the

society. These costs could be personal costs (such as damage to or loss of part of the body, physical and mental suffering, loss of income, medical expenses, loss of life): domestic costs (such as reduced family income, possible legal fees, psychological effects on family members) : corporate / business costs (such as lost time as a result of work stoppage as an industrial action or to conduct investigations, the recruitment and training of a suitable replacement, damage to equipment, tools and property, loss of product or material, disruption of flow of production and consequent inability to meet deadline/ demands, legal fees and compensation, cost of training the replacement, weakened morale in workplace, continuation of overhead costs per injured worker): and social costs (such as strain on facilities and personnel of national health services, loss of skills and services of the injured person, use of resources of the legal system) (Kirschenbaum et al., 2000; Zaloshnja et al., 2006).

2.6 Absenteeism and labor supply and demand

Economists have tended to analyze absenteeism within the framework of the static neoclassical labor supply model, giving emphasis on factors representing the employment contract. The comparative statics of absence behavior in the simple model that Brown & Sessions (1996) suggested are relatively straightforward. An increase or a decrease in the wage rate produces an income effect which increases or decreases the tendency to be absent if leisure is a normal good. The same applies to unearned income which acts as a pure income effect. In addition, an increase in contractual hours will increase the tendency to be absent due to the diminishing marginal utility of leisure (Brown & Sessions, 1996).

According to Reza (1975), there are two types of labor costs borne by the firm. There are the employment costs per individual which are independent of the number of hours that each employee works and include paid vacations and holidays, insurance

plans and the user cost of labor which captures the hiring wage and the expected effect of the economic conditions at the time of hiring on future wages. The sum of these costs depends on the number of workers on the payroll and not in attendance. In addition, the employer incurs wage payments which are directly related to the total working hours by all employees in attendance. An increase in absenteeism decreases the optimum levels of individuals on the payroll, capital services and individuals in attendance, while the optimal number of working hours per worker in attendance rises. Reza also analyses a decrease in the real wage showing that a worker will wish to supply fewer hours. In order to achieve it the individual can increase the amount of absence as well the absence rate, increasing further the number of working hours by the rest co-workers who are in attendance. Assuming that individuals of the work force are homogenous, they would have an incentive to reduce attendance. Strikes as collective action and absenteeism as individual level action have been distinguished as symptoms of contractual dissatisfaction.

Absenteeism can occur for either valid (accidents, illnesses) or invalid (shirking) reasons (Brown & Sessions, 1996). The causes of absenteeism are multifaceted and are influenced by individual health status, social insurance system, work environment, biological factors, attitudes, commitment to work, macroeconomic conditions and psychosocial determinants. Moreover, demographic factors, health and several job characteristics have been identified as important determinants of absenteeism. Absence rates decrease with rising earnings and increase with tenure, while absenteeism tends to be low during probationary periods, for instance when employees want to impress their employers. It has been found to be negatively related to fixed term – temporary contracts and positively related to unionization (Theodossiou & Pouliakas, 2010). The highest absence rates mostly have been found in the public

sector, larger size firms and secondary sector occupations (hard manual work, using hazardous materials) (Michie & Williams, 2003).

Relevant studies found that when a worker contracts for more than his/her desired hours, he/she would be absent from work in order to consume more leisure. Dissatisfaction with job contracts is related to absence. Employees who prefer to work more hours for more pay would be absent less often than those who prefer to work fewer hours for less pay. Job satisfaction, increasing income from other sources are also related to absence. The possibility of working at home, being married, job rotation and outsourcing reduces absenteeism, while working in large firms, using other technologies, centralization, flexible working hours and sickness benefits, are associated with higher absenteeism (Dionne & Dostie, 2007; Frick & Malo, 2008).

Dunn and Youngblood (1986) studied the conditions under which an individual will be absent when contractual hours exceed desired hours. The results revealed a significant positive relationship between absence and the difference between a worker's marginal rate of substitution and the wage rate. Allen (1981) analyses a sample of workers with self-reported measures of absent days. His findings suggested that wages and paid sick leave are inversely related to absenteeism. Winkler's findings are in accordance with Allen's findings, analysing the impact of sick leave policy on schoolteachers' absenteeism. Scott and Markham (1983) re-tested Allen's hypothesis and found no statistical significant relationship between the average hourly pay rates and the average absence rates.

A common finding in many of the labour supply based studies has been that females exhibit higher absence rates than males. This is because women play a larger role in domestic duties and tend to assume responsibility for the children within a

household. For instance, Leigh (1991) found a significant positive effect between absence and an interactive variable between sex and young dependants.

Some researchers have attempted to take into account labour demand considerations. Allen (1981) treated absenteeism as a non-pecuniary characteristic of the compensation package but as an agreeable job attribute, suggesting an inverse relationship between wage rates and absence. Such considerations suggest that the flexibility into employment contracts may enable the firms to exert some control over the absence level. Hence, overtime systems have been suggested as a way to counteract absenteeism. For instance, Leslie (1982) suggested that high overtime working should imply low rates of absenteeism. On the other hand, Chaudhury and Ng (1992) suggested that overtime may be associated with increased absence since it may lead to less working flexibility and more working hours. Leigh's findings (1991) implied that individuals with inflexible working hours are more prone to absence than those with flexible hours. In addition, absence could be increased by the income effect associated with overtime. The findings in the economic literature regarding the impact of overtime on absence behaviour are inconsistent. Kenyon and Dawkins (1989) indicated that an increase in overtime per employee reduces absence.

Additional studies included the factors of part time and full time works, white and blue collar jobs. For instance, Chaudhury and Ng (1992) found that firms with more part time employees exhibit a lower level of absence, which is consistent with the findings of Drago and Wooden (1992), while Kenyon and Dawkins (1989) found that white collar workers are less prone to absence.

Most of the above mentioned studies use absenteeism in general, without distinguishing any particular types of absenteeism. However, more specialist studies support the distinction between voluntary and involuntary absenteeism. Involuntary

absenteeism can be influenced by organizational, personal and attitudinal variables (Driver and Watson, 1989). Most absence research has concentrated on two main themes: the association of personal characteristics with absence and the association of job satisfaction with absence. Job satisfaction and personal characteristics (such as age and family size), have been found to be related to absenteeism in some studies, but not related in others. As was mentioned earlier, according to Steers and Rhodes (1978), the inconsistency of job satisfaction-absenteeism findings may be explained by other variables which moderate the relationship. Scott and Mabe (1984) identified gender as one such moderator. Gender has become a significant employment factor due to the changing nature of the labor force in many countries. Traditionally, it has been assumed that men and women participate in the workforce for different reasons. In the past, men provided the primary source of family income while most women were unpaid homemakers. In more recent years, the increase in the number of single parent households, the feminist movement, civil rights legislation, and inflation have all had an effect on changing the make-up of the workforce and on the nature of the relationship between women and their jobs (for a discussion, see Schultz, 1990). Not only are more women working, but they are also holding more diverse jobs, some of which were previously held only by men (Scott and McClellan, 1990). According to Clegg (1983), females tend to be more frequently absent than males, most of the time for unexcused reasons (Fitzgibbons & Moch, 1980). This gap may be due to differences in the social roles females and males play as well as to differential socialization (Romme, 1990). Lau et al. (2003) support these findings and also report that women are generally more absent than men due to domestic and general health issues (for all the above points see Drakopoulos & Grimani, 2013).

The relevant literature provides some insights concerning the relationship of demographic and socioeconomic characteristics, and the absence rate. More specifically, research on the relationship between age and absenteeism is equivocal. Age has been shown to be negatively related to absence frequency (Lau et al., 2003). This implies that absenteeism is higher amongst younger employees. This relationship can be explained by the fact that older workers usually take up higher responsibility at work, and they will not ask for a sick leave as a result of minor illness. Rhodes (1983) suggested that the relation between age and absenteeism may depend on factors such as the type of absence measures used, whether the job is physically demanding, and the worker's gender. Thus, employee absenteeism might depend on this type of factors and not necessarily on their age (Hackett, 1990).

Furthermore, a number of researchers have found education to be negatively related to absence rate. Hence, years of education are inversely related to absenteeism. The rationale here is that higher educated employees have more autonomy at work and more involvement in their jobs and thus are less absence prone (Muchinsky, 1977; Alen, 1981; Leigh 1991, Chaudhury & Ng, 1992; Zatzick & Iverson, 2011). Moreover, the proportion of employees on fixed – term/temporary contracts that face a greater risk of job loss, is negatively associated with absenteeism, while flexible working time arrangements are found to be related with lower employee absence (Pouliakas & Theodossiou, 2011). Individuals with inflexible working hours are more prone to absence than those with flexible hours and part time jobs (Brown & Sessions, 1996). Böckerman & Ilmakunnas (2008) suggest that absences are more frequent in manufacturing than in other sectors. Finally, Drago & Wooden (1992) supported that absenteeism is higher among females, singles, blue collar workers and low educated

employees (for a review of the empirical literature on absenteeism, see Harrison & Martocchio, 1998).

Sickness absence is a complex phenomenon, which can be the result of various causes, such as musculoskeletal or psychosocial complaints (depression, work family conflicts) and its occurrence can be influenced by a range of factors, such as demographics, health, mental health, job, personal and organizational factors. Predictors of sick leave could be unmarried status, psychosomatic complaints, using medication, burnout, psychological problems, low job control, low decision authority, low level of job autonomy, low job complexity and unfairness to work. One in every three workers is absent from work due to psychosocial health problems (Duijts et al., 2007). Other key factors associated with sickness absence that have been considered are the long work hours, the work overload and time pressure, job demands, lack of control, lack of participation in decision making, poor social support, unclear management and job role (Michie & Williams, 2003). Furthermore, several studies have confirmed the negative relationship between absences and unemployment (Askildsen et al., 2005).

Pouliakas & Theodoropoulos (2009) suggested that various forms of incentive pay, such as profit sharing, share ownership, cash bonuses, affect absence rates. Incentives that are associated to the evaluation of individuals' positive attributes are found to be related to lower absenteeism. Although some types of performance related pay are associated with lower absence rates, this does not imply that all firms should employ incentive pays as an absence control. Whether this is a suitable compensation strategy, depends on the production technology of firms. Furthermore, Bockerman et al. (2012) suggest that the impact of innovative work practices on sickness absence may differ

between employee groups and absence measures such as long terms absence, accidents at work.

For example, on a typical working day around 7% of employees in Norway are absent from work due to sickness. It has been found that each workers absence behavior is affected by the characteristics of colleagues. Furthermore, physicians' absence certification practices also have a significant impact on patients absent behavior (Markussen et al., 2011). There are also individual costs of absences due to risk of losing the job, if the absence is related to shirking, or due to the direct loss of worker's income when absent (Askildsen et al., 2005).

According to Bokerman & Illmakunnas (2008), dissatisfaction is related to sickness absence, implying that the improvement of working conditions is intended to decrease absenteeism. Coles et al. (2007) showed that the nature of the firm production technology play a significant role to absenteeism. In addition, it has been investigated the relationship between international sickness absence rates and institutional characteristics of labor markets, controlling age, health and unemployment. It was confirmed that absenteeism is significantly and positive related to the strictness of employment protection.

2.7 Job Satisfaction

Job satisfaction which is commonly conceptualized as a positive emotional state resulting from an assessment of an individuals' job experience, relates to many personal and work related outcomes, such as health, life satisfaction, intentions to stay and contextual performance (Locke, 1969; Brown & Lent, 2005; Gyekye, 2005). The correlations are relatively small considering that the outcomes are complex and influenced by a number of factors such as physical, chemical, socio-psychological and

biological. Moreover the distribution of job satisfaction is negatively skewed which means that people tend to be satisfied with their job (Brown & Lent, 2005).

Some argue that Maslow's hierarchy of needs theory laid the foundation for job satisfaction theory. In order to enhance workers motivation and commitment, managers should take into account five specific needs, such as physiological, safety, social and self-esteem needs and self-actualization, as well as the new technology and the training that provide opportunities for meeting those needs. This model served as a good basis from which early researchers could develop job satisfaction theories (Benson & Dundis, 2003).

There are three general theoretical approaches that have been used to explain the level of an employee's job satisfaction: the cognitive judgment approach (including discrepancy theory and equity theory), the social influence approach (including social information processing theory) and the dispositional approach (Weiss & Cropanzano, 1996; Murray et al., 2006). According to cognitive judgment approach which has dominated the theoretical landscape, job satisfaction depends on an evaluation of the difference between an individual's expectations and what the individual actually receives. It is assumed that job satisfaction can be measured either by various aspects such as pay and promotion or by worker's self-reported satisfaction. In the general structure the work environment consists of concrete or abstract features which are perceived and compared to some standards held by job incumbents. The degree of match between perceptions and standards could be assumed as individual's level of job satisfaction (Weiss & Cropanzano, 1996). Thibaut & Kelley's theory (1967) proposed that people evaluate their current role based on comparisons with their past experience and observations of others in similar roles. A comparison level is developed as a standard, a baseline indicator of what the individual feels that

deserves. The social information processing theory, on the other hand, suggests that social context influences job attitude formation. Other's evaluations of the job influence our own evaluations, especially when the job is complex or work events are ambiguous (Brown & Lent, 2005). The SIP is considered as the source of input for an individual's perception and standards. The basic idea is that the social environment has both direct and indirect influences on overall attitudes and the perceptions and standards respectively. Job satisfaction is caused primarily by cues from the social environment. Lastly, according to dispositional approach, job satisfaction is a result of individual tendencies to naturally feel good or bad. The basic idea is that to some degree, an individual's job satisfaction reflects the general tendency, which is independent of the specific nature of the job, to feel good or bad about all aspects of life (Weiss & Cropanzano, 1996). This approach also implied that job satisfaction tends to be stable over time and across careers and jobs. Judge et al. (1998), in the context of the dispositional theory, argued that there are four core evaluations of the self that determine an individual's disposition towards higher job satisfaction: high self-esteem, high self-efficacy, internal locus of control and low levels of neuroticism.

Job satisfaction has also been found to have a positive correlation to employee involvement. The Job characteristics approach, as a basic research tool employed to study employee involvement, implies that aspects of the work environment impact work outcomes such as job satisfaction (Zatzick & Iverson, 2011). According to Hackman & Oldman (1976), there are five core job dimensions: skill variety, task identity, task significance, autonomy and feedback. Those dimensions influence three critical psychological states: experienced meaningfulness of work, experienced responsibility for work outcomes, and knowledge of results of work activities. The skill variety, task identity, task significance influence the degree of which a person

experiences a job as meaningful. Autonomy and feedback influence the degree of which a person feels personally responsible for work that is produced. There is a moderate relation between job characteristics and job satisfaction. A number of other characteristics of the work environment, generally called workplace and work role stressors, such as high level of noise, lack of privacy, extreme temperature (poor physical conditions), role ambiguity, role overload, role conflict, underutilization skills and lack of career development, have been shown to influence the level of job satisfaction. According to job stress models, job stressors lead to strains such as boredom, dissatisfaction, poor physical and psychological health (Barling et al., 2003; Brown & Lent, 2005; Fairbrother & Warn, 2003).

The Herzberg Two Factor Theory has contended that motivating factors (e.g. achievement in work, recognition, promotion opportunities) related to the job itself can cause job satisfaction but not job dissatisfaction, while hygiene factors (e.g. pay, company policies, supervisory practices, and other working conditions) unrelated to occupation can cause job dissatisfaction but not satisfaction (Locke, 1969). Nevertheless, the model has been criticised in that it does not specify how motivating and hygiene factors are to be measured (Hackman & Oldham, 1976). Moreover, an integrated model acknowledges both the top-down and bottom-up approaches (Brief, 1998). The model integrates research on the situational and dispositional influences on job satisfaction with some of the ideas about how person – environment fit predicts job satisfaction.

Lawler and Porter (1967) developed a theoretical model, based on the expectancy theory, concluding that an individual's motivation is affected by the attractiveness and fairness of the reward which is categorized as intrinsic (e.g. sense of achievement) and extrinsic (e.g. bonus, commission and pay increases). They stated that job

satisfaction and indirectly, work performance, are a positive function of the reward, and that extrinsic and intrinsic rewards are additive in this effect. Christen et al. (2006) also provide a model which included job related factors, role perceptions, job performance and firm performance. In their study, found a significant, positive effect of job performance on job satisfaction, implying that actions to increase job performance can also increase job satisfaction.

On the other hand, Locke & Latham (1990), leaders in goal-setting theory and research, suggested success as a factor that creates job satisfaction, assuming that high expectations for success in work provide achievements and success in performing tasks. The high-performance cycle explains how high goals lead to high performance, which in turn leads to rewards, such as recognition and promotion. Subsequently, rewards result in high satisfaction as well as high self-efficacy.

It has traditionally been studied in sociology and psychology, but has been shown to provide useful information about economic life (Freeman, 1978; Borjas, 1979; Clark & Oswald, 1996). As an economic variable, job satisfaction contains useful information for predicting and underestimating behavior but also lead to complexities due to the dependency on psychological states (Bonsang & Van Soest, 2010). Freeman (1978) suggested that job satisfaction is a major determinant of labor market mobility. The industrial psychology literature relates job satisfaction to mental health and absenteeism, implying that affects a broader range of phenomena (Clegg, 1983). An empirical analysis shows that inferior working conditions, such as dangerous job, physically tiring, noise, heat, are associated with reduced employee motivation and lower job satisfaction which lead to a higher incidence of workplace illness, injury or absenteeism (Pouliakas & Theodossiou, 2009) and thus lower productivity (Clark, 1996). Job satisfaction as a context related phenomenon which is influenced by a

variety of contextual factors such as safety climate, was found to be associated with safety perception. Workers who expressed higher levels of job satisfaction also had positive perspectives on safety climate, while dissatisfied workers had negative perspectives (Gyekye, 2005).

In addition, job satisfaction may have an indirect influence on workers' health through physical and psychosocial employment conditions, such as workplace safety, quality of air, responsibility, work stress, job security, equally harassment (Stansfeld, et al., 1997; Fischer & Sousa-Poza, 2009). Furthermore, a strong relationship between job satisfaction and mental (burnout, anxiety, depression) and physical health has been found (Faragher et al., 2005). It also can be confirmed that job dissatisfaction can be hazardous to a worker's mental health and wellbeing concerning the employee level. At the aggregate level, job satisfaction affects workers' productivity and retirement decisions and ultimately, a society's economic prosperity (Fischer & Sousa-Poza, 2009; Faragher et al., 2005).

Another consistent finding in the job satisfaction literature is the large and significant effect of job loss on job satisfaction. The perceived risk of job loss may affect employees' job satisfaction, but dissatisfied employees may also face an increased risk of losing their job. Theodossiou & Vasileio (2007), taking into account the endogenous nature of the relationship between job satisfaction and the risk of job loss, found that the perceived risk of job loss has a strong and significant determinant effect on job satisfaction. In addition, high risk of job loss should also have detrimental effects on the productivity of employees.

Recent theorizing on job satisfaction describes it as a multifaceted construct and a function of worker personality traits and workplace factors. Implicit in these definitions, is the importance of both internal and external factors as determinants of

job satisfaction. Relevant research has demonstrated the importance of job satisfaction in organizations, especially in terms of efficiency, productivity, employee relations and absenteeism (Dormann & Zapf, 2001; Gyekye & Salminen, 2006; Jones et al, 2009; Gyekye et al., 2012).

Flanagan et al. (1974) were the first to explore the economic implications of job satisfaction. Their theoretical framework suggested that as an economy grows, there will be an increase in workers' demands for both pecuniary and non-pecuniary rewards. If any combination of these rewards is not deemed to be satisfactory, it will lead to lower productivity and higher levels of strikes, quits and absenteeism. However, Flanagan et al. were unable to find any supporting empirical evidence for their theoretical suggestions. Since then, the literature on job satisfaction determinants has increased enormously (for the seminal paper, see Freeman, 1978, and for more recent studies, Bender & Sloane, 1998; Hamermesh, 2001). The nature of the problem has also been examined in the applied psychology literature (e.g. Clegg, 1983; Spector, 2000).

Several studies also have attempted to investigate the relationship between individual job satisfaction and the income of other workers in the household (Clark, 1996; Clark & Oswald, 1996; Sloane & Williams, 2000). The standard well-being function implies that the income of other household members should affect the individual's job satisfaction positively. Higher income from other household members, imply higher family income and therefore lower financial pressure on the individual to work. Nevertheless, household variables may not work in this simple manner especially if the relative or comparison income effect is taken into consideration: higher income of other household members may reduce an individual's job satisfaction. Clark, (1996) has found evidence of a strong negative correlation

between an individual's job satisfaction and the income of other workers in the household, especially that of the spouse.

Moreover, job dissatisfaction seems to be linked to the external causal factors responsible for accident occurrence. Gyekye & Salminen (2006) explore the influence of job satisfaction on causal attributions for occupational injuries. It was noted that employees who experienced higher levels of job dissatisfaction, attributed accident causality more to job environmental factors than to their personal characteristics. In addition, the results of Barling et al. (2003) supported a significant effect of job satisfaction on occupational injuries. Empirical research on occupational accidents has demonstrated that accident causality is attributed to internal (dispositional characteristics of the worker) and external causal factors (characteristics of the work environment). Models of occupational accident process have included variables such as employees' social work environment, organizational climate, behaviour at work and personality variables as contributory factors (Dormann & Zapf, 2001, Hardy et al., 2003; for all the above points see Drakopoulos & Grimani, 2013).

2.8 Occupational Health and Safety Management

The research literature on occupational health and safety has been enriched either by the contribution of psychology and sociology, following a theoretical base, or by industrial relations and management studies, following a more pragmatic route. There have been a number of psychological studies that have identified work as a major cause of physical and psychological diseases. According to social psychological theories, attitudes and behavior are causally related, while until 1990s there was the belief that by changing attitudes, safety can be improved. Early psychological studies tended to focus on the individual and their failure to take responsibility for health and safety rather than on the social group or work environment. The last twenty years,

studies have focused both on individual and working environment, with an emphasis on causation and intervention (Zanko & Dawson, 2012). For instance, Iverson and Erwin (1997) suggested that occupational injuries can be attributed to the characteristics of both the work environment and the individual. On the other hand, Wallace et al. (2006) suggested that human behavior and unsafe behaviors are symptoms and not direct causes, while Zacharatos et al. (2005) stressed the importance of organizational factors in ensuring safety at work. A number of studies illustrate the dynamic between individual behavior and the context under which decisions are made. For instance, poor safety climate increases accident levels, hence organizations should focus on changing work environment (e.g. safety culture or climate development) in a way to motivate employees to participate in safety activities rather on punishing those who fail to comply with the safety procedures. (Katz-Navon et al., 2005; Vogus et al. 2010).

Other studies, within the field of industrial relations, focus on the social causes of illness and injuries, on patterns of work and forms of work organization. For instance, trade union involvement and employee representation improves health and safety at work. Although the number of accidents in unionized workplaces is higher than in non-unionized, this is probably due to more robust accident reporting systems (see Zanko & Dawson, 2012). Nonetheless, Eaton and Nocerino (2000) implied that committees are not enough by themselves to improve health and safety, but also require the workers and employers involvement and commitment.

In addition, culture, climate and local work practices are all seen to contribute to the development of a healthy and safe environment that supports the well-being of workers. Safety culture involves actions that focus safety relevant assumptions and cultural practices that reduce injury. This implies enabling, enacting and elaborating.

In particular, to enable is to direct attention to safety and create contexts where individuals feel safe to speak up and act in ways that improve safety. However, it is inadequate to produce a safety culture by itself. To enact a safety culture requires to highlight threats to safety and to distinguish resources to reduce those threats. Moreover, to elaborate a safety culture is to evolve, expand and enlarge an initial set of safer practices, as well as to use feedback to modify enabling practices and enacting processes. Safety culture also implies an ongoing struggle to detect and correct misidentifications, misspecifications and misunderstandings that threaten safety. These processes, mentioned above, establish a safety infrastructure, incorporate triggers for improvement and provide direction for efficiency and safety balance (Vogus et al., 2010).

Safety culture differs from the related concept of safety climate which refers to the shared perceptions of existing safety policies, procedures and practices. Safety climate, which is considered as a key organizational variable for understanding an organization's safety performance, is a multidimensional construct that encompasses individual perceptions of a wide range of safety aspects in a work environment. Safety procedures as the first dimension of safety climate refer to worker's perceptions of the level of detail in a firm's safety procedures. A second dimension of safety climate refers to how workers perceive the amount of information they receive through routine circulation of safety information and training. The third dimension refers to workers' perception of their supervisor' safety related activities and methods, while fourth dimension is the degree of priority assigned to safety within an organizational unit, comprehending worker expectations and behaviors regarding workplace balance and safety (Katz-Navon, 2005).

Additional studies suggested that perceived unfairness is associated with well-being and various indicators of health such as psychological conditions, unhealthy behaviors, physical health and absences. It is an important job stressor that can lead to adverse psychological reactions in the work environment. Employees' reactions to stress can be quite severe to both the organization and the individual, resulting in poorer chronic psychological well-being. Perceived unfairness is often the result of an imbalance between the effort workers put toward to their work and the rewards they receive. Thus, inadequate rewards for demanding work, perceived as unfair and by workers, may result in negative psychological conditions such as decreased levels of self-esteem, a sense of hopelessness, depression, anger, anxiety, fatigue, exhaustion, as well as unhealthy behaviors such as smoking, sedentary lifestyle, poor diet, alcohol consumption. Psychological conditions and states can have a substantial influence on physical health through various mechanisms, causing employees to react more negatively to problems and to exhibit less motivation for recovery and increasing the length of hospital stays. Research has found that employees report more physical health complaints when they experience mistreatment, adverse organizational changes, lack of support and general unfairness in the workplace. On the other hand, fairness provides workers with a sense of predictability in and control over their work environment and the rewards they receive. Employees who perceive fairness can trust the organization decisions without worrying about whether the decisions were arrived at through fair and just procedures. Research has found perceived fairness to be associated with mental health problems reduction and job control, which is a relatively strong predictor of employee well-being (see Robbins et al., 2012).

Leaders, managers and supervisors believe that making workers happier and healthier increases their effort, contributions and productivity. They attempted to

contribute to workers well-being by work redesign, changing the task dimension of organizational contexts, by incentive compensation, changing the reward dimension of organizational contexts, by team building and safety practices, changing the social and physical dimension of organization contexts (Grant et al., 2007). Another important aspect that has been taken into account was the organizational sustainability. There is a need for sustainability practices adaptation (for instance, to provide health insurance, to pay adequate wages and to avoid environmental pollution) that encompasses both human and environmental sustainability (Pfeffer, 2010).

Over the past 20 years, the concept of the occupational health and safety management systems, which are defined as a set of interrelated or interacting elements to establish OHS policy and objectives and to achieve those objectives (ILO, 2001), has become common. The occupational health and safety management systems are either mandatory, namely arise from government legislation and are enforced through inspections and fines, or voluntary, namely arise through private enterprise, professional organizations etc. There is a body of research showing that a more developed OHSMS is correlated with a lower injury rate. Its success depends on the nature of intervention, workplace and external environment characteristics (Robson et al., 2007).

It has been much debated as to whether OHSMSs have a positive effect on health and safety or not. Proponents almost take it for granted that an OHSMS will automatically lead to better health and safety performance. Critics, on the other hand, have used harsh words to describe them. Other issues are their usefulness and cost for SMEs (Hasle & Zwetsloot, 2011). As deleterious effects of OHSMSs have been indicated the weakening of external regulatory approaches and the false sense of

security derived from the presence of a formal OHSMS (Robson et al., 2007). There are no easy linear solutions and no quick fixes. OHSMSs have strengths, weaknesses, as well as complexities. The functioning of OHSMSs implies dynamic complexities, uncertainties and ambiguities. Such systems can be understood as a tool for management, but using the tool does not imply anything about management ambitions or health and safety objectives (Robson et al., 2007; Hasle & Zwetsloot, 2011).

2.9 Conclusions

The chapter discussed to the theoretical framework of occupational health and safety. In particular, the chapter was focused, among other issues, to the theoretical framework and the empirical results of the occupational health and safety indicator effects.

The main approaches to studying the labor market were the institutional approach, the Marxian radical approach, the dual labor market approach and the neoclassical model, which is considered as a powerful tool that can be used to analyze employment and wage outcomes in the labor market. Although the labor markets of most industrialized countries have undergone several changes, there has been lack of attention concerning the occupational health and safety consequences of these changes. OSHA has set regulations that are aimed at reducing risks in the work environment and protecting the safety and health of the labor force. The economic impact of OSH has become an important issue in Member States of the European Union where different financial incentives and instruments such as cost benefit analysis have been used. In addition, many Member States recognize the need to exchange information about estimating the cost and benefits of measures.

Referring to occupational accidents as OSH indicator, the chapter presented the main accident causation theories. Most of them focused on work environment,

potential hazards at work, changing workers' unsafe behavior, the social relations to work, compensating wage differentials and other demographic and psychosocial factors and job characteristics. Moreover, absenteeism, as an additional indicator of OSH, has many multifaceted causes that are influenced by several biological, psychosocial and demographic factors. On the other hand, sickness absence has been considered as a complex phenomenon, which can be influenced by a range of factors, such as demographics, health, mental health, job, personal and organizational characteristics. Lastly, job satisfaction is influenced mainly by physical, chemical, socio-psychological and biological factors. Several theories and models have been developed to explain the level of employees' job satisfaction. According to the research mentioned above, workplace, work role stressors, motivating factors, success, income, perceived risk of job loss, safety perception were some of the main characteristics which influence job satisfaction.

The research literature on OSH has been enriched by psychology, sociology, industrial relations and management studies, following a more theoretical or pragmatic base. Current studies suggested the attribution of both the work environment and the individual characteristics to occupational accident, emphasizing the contribution of safety culture and climate to the development of a healthy and safe environment that supports workers' well-being. Additional studies have also considered the organizational sustainability and the perceived unfairness, which is associated with well-being and various health indicators. Moreover, over the past 20 years, the concept of the occupational health and safety management systems have become common, since they are correlated with a lower injury rate. Its success depends on the nature of interventions, workplace and environment characteristics.

However, it has been much debated as to whether OHSMSs have a positive effect on health and safety or not.

The next chapter will review the current state of knowledge and issues related to the socio-economic impact of occupational health and safety at work in the European Union. In particular, it concentrates on studies investigating available health and safety at work indicators, such as occupational accidents, work related health problems, absenteeism and job satisfaction. It also compares their effects across EU countries. The aim is to exploit available measures of health at work which are comparable across different Member States to investigate cross country differences, offering some essential insights.

Chapter 3

Health and Safety at Work in the EU

3.1 Introduction

The previous chapter discussed to the theoretical framework of occupational health and safety. In particular, the chapter was focused, among other issues, to the theoretical framework and the empirical results of the occupational health and safety indicator effects. This chapter concentrates on studies investigating available health and safety at work indicators, such as occupational accidents, work related health problems, absenteeism and job satisfaction. It also compares their effects across EU countries. The aim is to exploit available measures of health at work which are comparable across different Member States to investigate cross country differences, offering some essential insights.

In brief, the World Health Organization and the World Bank attribute about 3% of lost life years due to work factor. Moreover, social insurance expenditure on OSH (for instance, sick pay, disability allowance, occupational injuries, incapacity benefits) accounts for approximately 2-3% of GDP in most advanced Western economies. International Labor Organization estimates also show that occupational diseases and accidents account for economic losses as higher as 4% of worldwide GDP. Around 4 million accidents at work, resulting in more than 3 absent days, occurred in the EU 15 in 2005. This corresponds to an incidence rate of 3100 nonfatal and 3.5 fatal accidents per 100.000 workers. In the last decade, this rate has decreased significantly. In addition, for each worker in EU 15, an average of 1.3 working days per year is lost

due to an occupational accident and 2.1 days are lost due to other work – related health problems (Theodossiou & Pouliakas, 2010; Kreis & Bodeker, 2004). Every day more than 960.000 workers in the world report an occupational injury, while 1.020 and 5.330 people die due to occupational accidents and due to work – related diseases respectively (Hamalainen et al., 2009). Some calculations suggest that the estimated direct and indirect costs of occupational injuries and diseases in the US are approximately \$170 billion annually, while in EU countries the estimated cost of occupational diseases is approximately 25 billion € annually (1.233 million € in Germany, 29.3 million € in Austria, 334 million € in Belgium, 67 million € in Denmark, 1.068 million € in Italy, 36.7 million € in Portuguese, 46,52 million € in Switzerland). All of the above figures neglect other major non quantifiable costs, such as the insurance costs, the indirect costs that companies incur the prematurely retired and the impact on families (Theodossiou & Pouliakas, 2010).

In order to attain a detailed overview of health and safety at work in European Union, the chapter is structured as follows: section 3.2, which is divided into subsections, includes the research findings referring to OSH indicators across EU countries. Subsection 3.2.1 presents work related health problems and occupational accidents drawing information from EU institutions' databases and studies. The following subsection (3.2.2) presents the trends, the potential patterns, the determinants and the financial impact of absenteeism across European countries. Subsequently, subsection 3.2.3 presents data about a specific type of absenteeism, due to sickness. Furthermore, subsection 3.2.4 provides an overview regarding job satisfaction impact on health and safety at work, linking the contributions by country. The final subsection 3.2.5 presents the point of view of European Union workers concerning occupation health and safety issues. Finally, section 3.3 reviews health

and safety policies recently implemented in each of the European countries. A concluding section will close the chapter.

3.2 Research findings

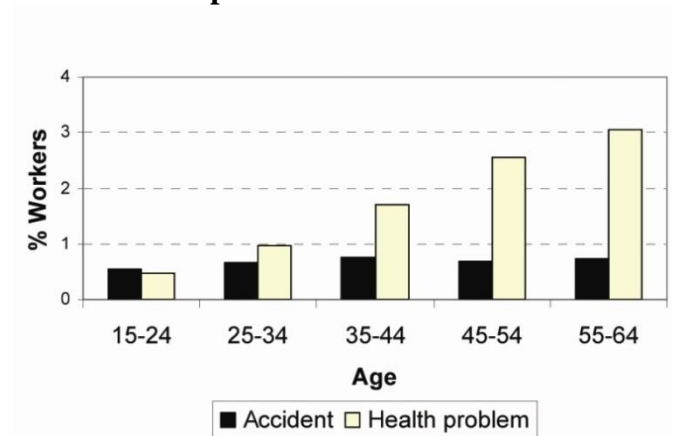
3.2.1 Work – related health problems and occupational accidents

In this section we discuss statistics from institutions' databases and empirical findings concerning fatal and nonfatal accidents, work related physical and mental health problems from European countries. According to the results from the Labor Force Survey 2007 (Eurostat, 2009), regarding accidents at work and work – related health problems, 3.2% of workers experienced an occupational accident resulting in injury during the past 12 months, which corresponds to almost 7 million workers. Among them, 73% reported work days and 22% reported time off that lasted at least one month. Hence, due to an accident at work, 0.7% of all workers in the EU-27 took sick leave for at least one month. Most employees reported one accident, but 0.4% had two or more accidents. Accidents occur most often in the youngest age groups and are more likely among men, skilled manual workers, and those who are working in Construction, Manufacturing, Agriculture.

Generally, high-skill qualifications are characterized by high safety standards and the specific job tasks imply that workers are not exposed frequently to physical, chemical or biological agents. Thus, reducing exposures to OSH hazards has a limited negative effect on the probability of workplace accident. On the other hand, the exposure to OSH hazards may be essential to finalize specific tasks for low-skill workers employed especially in the Manufacturing, Construction and Electricity, Gas and Water Supply sectors. Consequently, a marginal increase in the safety expenditure for reducing exposures to dangerous agents has a stronger effect on the probability of a workplace accident for low-skill individuals, as compared to the

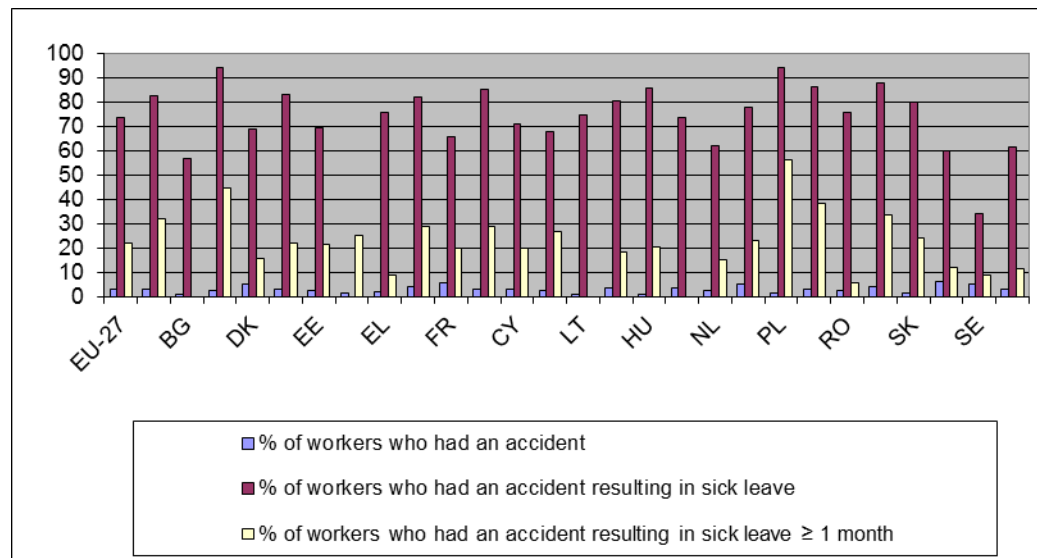
effect for high-skill individuals (Mazzolini, 2010). Furthermore, work – related characteristics that increase the likelihood of an occupational accident, are the shift work and atypical working hours. The incidence of occupational accidents is related to several demographic and other factors, such as age, low family income, job dissatisfaction, greater employee stress, lack of experience, firm size. It has been proposed that larger firms may be more safety conscious due to the greater degree of intensive monitoring by regulations and safety inspectors that they face (Theodossiou & Pouliakas, 2010).

Figure 3.1: Employees off ≥ 1 month due to occupational accidents and work – related health problems



Source: Eurostat, 2009

Graph 3.1: Occupational Accidents and resulting sick leave



Source: Eurostat, 2009; own calculations

It seems that economic recessions can affect work injuries as well. The majority of the relevant literature supports the evidence of a negative relationship between country unemployment rates and work injuries for the OECD countries (Boone and van Ours, 2002), for instance, U.K. (Davies *et al.*, 2009; Steele, 1974), Finland, France and Sweden (Saloniemi and Oksanen, 1998; Ussif, 2004), the US (Catalano, 1979; Sasaki, 2009; Ussif, 2004), Canada, and Japan (Sasaki, 2009). A possible explanation of the effect of country unemployment rates on fatal and nonfatal work injuries is that during recessions less people are employed and therefore it is expected that work injuries will tend to decrease. In addition, during recessions the slowdown of production reduces the number of job shifts and work intensity and will decrease the proportion of newly hired and less experienced workers in the workforce due to the declining rate of job creation (Economou and Theodossiou, 2010). In addition, it seems that high unemployment exerts a stronger effect on non-fatal work injuries in comparison to work related fatal injuries. Findings from the same research suggest that at the initial stages of the economic downturn, work accidents and absenteeism

tend to decrease. This result may be attributed to the slowdown of production and the work intensity, the reduction of job shifts and the reduction of newly hired and less experienced workers in the workforce (Economou and Theodossiou, 2010). However, at later stages of the recession, employers tend to cut down the firm costs therefore reducing costs associated with workplace health and safety, such as the expenditure on training and safety equipment. At the same time, employees might be more willing to undertake far riskier job tasks in a world of scarce employment opportunities in comparison to periods of economic boom. Hence, the permanent effect of unemployment on work accidents becomes positive. Furthermore, research in cognitive psychology, and recent advances in economic psychology, suggest that individuals consistently underestimate risks associated with accidents (Drakopoulos & Theodossiou, 2011).

The relevant literature indicates that in industries with strong unionisation presence, work injuries should be lower in comparison to the non-unionized sector. Unions contribute to the improvement of working conditions, obtain higher compensation benefits for workers who suffered work-related health problems, and in general, represent effectively the workers' interests regarding health and safety at the workplace. However, empirical results partly contradict conventional wisdom since a number of studies provide evidence that increased unionisation is associated with higher workplace injuries. A possible explanation is that unionization can simultaneously be affected by workplace injuries, hence, workers participate in union activity in order to protect themselves from the hazardous job conditions. Increased membership improves the ability of the unions to be effective in achieving improvements on occupational health and safety and hence the improvement of

working conditions. This finding has important implications for the design of OHS and industrial relations policies (Economou & Theodossiou, 2011).

Although the total number of fatal and nonfatal occupational accidents and diseases has increased over 10 years around the world, for EU countries there seems to be a downward trend in both estimates. Especially when considering the figures for new member countries of the EU, the drop is quite substantial. This is due to the stricter legislation relating to occupational health and safety. However this decrease might be also due to the way in which fatal accidents are calculated (Hamalainen et al., 2009). Still the economic, social and emotional costs are considered to be significant for the European Union (E.U.) member countries. In particular, it seems that the annual net economic costs of fatal and non-fatal work injuries are about 1%-3% of national GNP at the country level (European Agency for Safety and Health at Work, 2001). According to International Labor Organization (ILO, 2008) estimates, the global number of occupational fatal and nonfatal accidents and diseases does not seem to have changed significantly during the past decade. This is driven by the globalization process and by rapid industrialization of relatively poor countries that are not capable of maintaining effective OHS systems (Hamalainen et al., 2009).

The mean values for non-fatal work injuries per country for the whole time period examined for each country indicate an extremely high mean value of work injuries is observed for Luxembourg, followed by Spain and Slovenia. On the contrary, the lowest mean values of work injuries are observed for Romania, Latvia, Denmark and Lithuania. The majority of accidents are observed for the manufacturing, followed by electricity, gas, water supply, construction, transport, storage and communication, where a large proportion of individuals work in unskilled/semi-skilled blue collar positions. Moreover, the lowest number of work-related injuries is observed for

sectors with white collar, skilled positions such as professional, scientific and technical jobs and arts, entertainment and recreation (European Union Labor Force Survey, 2009; Theodossiou & Pouliakas, 2010).

Luxembourg is the country ranked first regarding the number of fatal work related accidents, followed by Lithuania. Surprisingly, Lithuania experiences one of the lowest rates in non-fatal work injuries. On the contrary, the lowest mean values of work injuries are observed for the United Kingdom and the Netherlands. In line with the findings presented above regarding non-fatal work injuries, the two sectors where the vast majority of incidents of fatal work accidents are electricity, gas, water supply, construction, transport, storage and communication and manufacturing. As expected, the lowest number of fatal work-related injuries is observed for education, health and social work. Still, workplace injuries remain at high levels in European countries and importance should be given to the improvement of workplace safety, especially in sectors where the majority of employees are working in blue collar job tasks, such as manufacturing and construction. Absenteeism rates are also found to be high, mainly in Scandinavian countries. As shown by previous research studies demographic characteristics (age, gender) and occupational characteristics appear to be important determinants of work-place injuries (Economou & Hydraulis, 2011; Pouliakas et al., 2010). Hours of work are also found to be important determinants of work accidents (Kirkcaldy, 1997; Krause *et al.* 2001). It is expected that employees on full-time employment are more prone to a work injury than part-time employees.

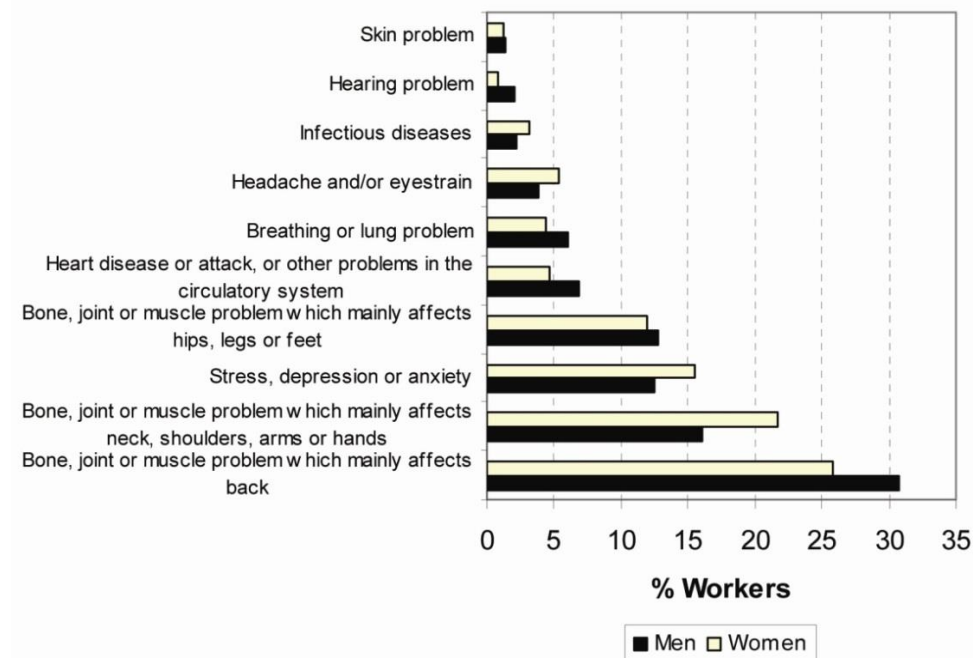
Generally, fatal and non-fatal work injuries in European Union countries do not follow a consistent pattern, but they seem to be related to the national institutional and legislative frameworks about OSH, as well as on the relevant investments and provisions undertaken by both employers and employees. However, the incidence of

work injuries among the different sectors of the economy, verifies the previous empirical findings that sectors with low-paid blue-collar positions are those exhibiting the highest work injury rates. In the above findings, it is evident that the sectors of “electricity, gas, water supply, construction, transport, storage and communication” as well as “manufacturing” are those more prone to work accidents. While it is also known that job characteristics are significant determinants of work risk, more information at the firm- and individual- level is required in order to better disentangle the causal relationships and assess the effects on Occupational Health and Safety. It is important for future research to identify the exact causes of the decreasing rates of accidents experienced in recent years, so that appropriate prevention strategies for old and new risks can be designed. It is, for instance, not yet clear whether OSH legislation has a significant effect on lowering the incidence of workplace accidents (Economou & Hydraulis, 2011; Pouliakas et al., 2010).

With regard to work related health problems, 8.6% of workers in the EU-27 countries experienced a work – related health problem in the past 12 months, which corresponds to 20 million individuals. Among them, 22% experienced considerable limitations in normal daily activities. Two or more work – related health problems were reported by 2.1% of workers. Sickness was reported by 62% and absence for at least one month by 27% of those with a health problem. Therefore, 1.9% of all workers in the EU-27 countries were off for at least one month in the past 12 months due their serious work – related health problem. This percentage increases with age. Work – related health problems are more likely among older workers, skilled manual workers, and persons working in the Agriculture sector, Mining and quarrying, Health and social work. Bone joint, muscle problems and stress, anxiety or depression were most prevalent. Musculoskeletal disorders are the most common health problem and

are related to physical, ergonomic and psychosocial factors, such as vibration from tools, painful or tiring positions at work, heavy loads, and repetitive movements. In addition, occupational skin diseases (dermatitis) and occupational respiratory diseases (asthma) are related to chemical exposure and have the greatest effects on productivity costs, ranging from 16.5 to 23 billion euros, respectively (Theodossiou & Pouliakas, 2010; Eurostat, 2009).

Figure 3.2: Work – related health problems in the past 12 months



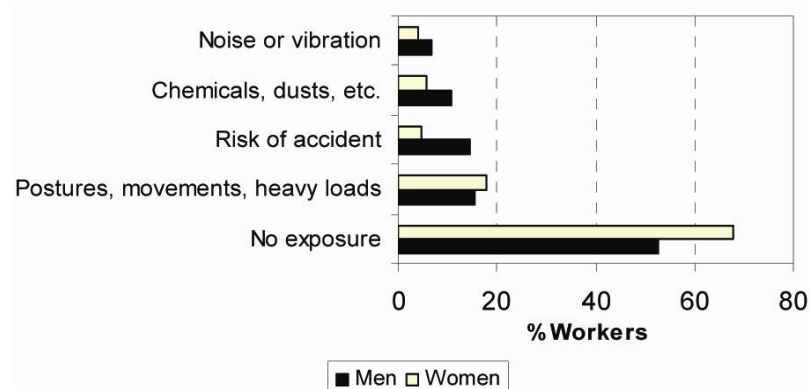
Source: Eurostat, 2009

In addition, recent studies show that the number of work – related diseases seems to be underestimated, for instance in the case of work – related cancers, musculoskeletal disorders, respiratory diseases, psycho –social problems, and circulatory diseases. In companies, prevention activities focus more often on occupational accidents than on work –related diseases. The decrease in accident rates supports this assumption. Work – related diseases often have a long latent period and might be the result of different work – related factors like working time and workload (Hamalainen et al., 2009).

Many papers indicate that controlling for personal characteristics, (adverse) working conditions are associated with poor health status – both physical and mental. The study of Cottini & Lucifora (2009) provides evidence of a causal effect of (adverse) working conditions and (low) pay on health at the workplace. It is found that working conditions are an important determinant of health status at the workplace, and that health policies should pay special attention at improving working attributes and pay. Another study examined the impact of age on a range of work-related self-reported health outcomes. Workers who remain in employment are typically those in better health and facilitating employment for those who otherwise may choose not to work is likely to be associated with deterioration in work-related health outcomes (Jones et al., 2011).

Furthermore, exposure to one or more workplace factors that can adversely affect physical health was reported by 40% of employees (80 million) in the EU – 27 countries. The main factor was exposure to difficult work postures, movements and heavy loads. Reported levels of exposure to physical risks in the workplace unfortunately show an upward trend (Eurofound, 2012).

Figure 3.3: Factors affecting physical health



Source: Eurostat, 2009

It is important to mention that European workers remain as exposed to physical hazards as they did 20 years ago, reflecting the fact that many European' s jobs still

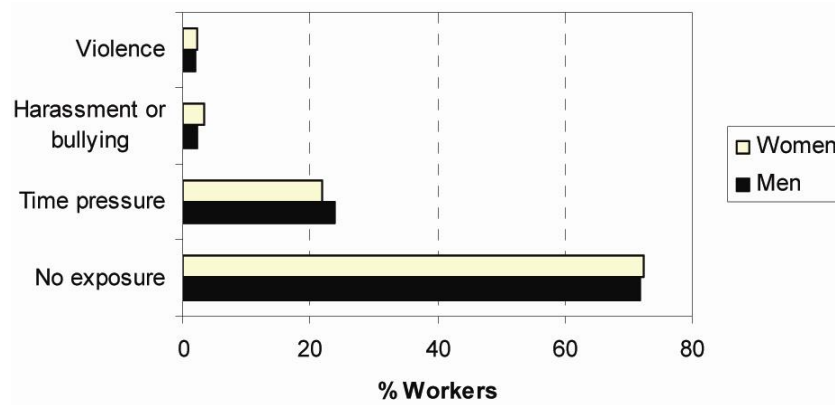
involve physical labour. In particular, in 2010, nearly 30% of workers in the EU27 were exposed to loud noise for at least a quarter of their working time, a figure unchanged since 2000. Meanwhile, 15% either breathe in smoke, fumes, dust or handle dangerous chemicals, the same proportion as 10 years previously. In addition, 23% of workers were exposed to low temperatures, again the same proportion as in 1995 (Eurofound, 2012).

In brief, exposure to factors affecting physical health is more likely among men and skilled manual workers, while exposure to factors affecting mental well-being is more likely among highly skilled non manual workers (Eurostat, 2009). The gap in physical risk exposure levels between the manual and the clerical professions, in the last decade, is still prevalent (Eurofound, 2012).

Psychosocial risks result in an increase level of stress and can lead to serious deterioration of mental health. Around 30% of the European population is exposed to stress caused by work. The 5th European Working Conditions Survey refers to a number of indicators of psychosocial risks which are grouped into six dimensions. The EWCS reveals an overall increase in work intensity due to long working hours and high demands in most European countries over the past two years. Excessive emotional demands, lack of autonomy, ethical conflicts, poor social relationships and work insecurity are associated with absenteeism, work related accidents and health problems, such as burn out, musculoskeletal disorders, high blood pressure and cardiovascular diseases (Eurofound, 2012). Psychosocial health problems typically affect individuals employed in the health and social work and education sectors, rather than in blue-collar jobs. Nevertheless, working conditions such as heat, noise, shift work and precarious contracts contribute to rising stress levels. According to literature, the effect of stress is mainly reflected in absences. Furthermore, 27% of

employees (56 million) are exposed to one or more factors that can adversely affect mental well-being in the workplace. Exposure to time pressure and overload was reported most often as the main factor (Theodossiou & Pouliakas, 2010).

Figure 3.4: Factors affecting mental well being



Source: Eurostat, 2009

Research regarding physical and mental health indicators (Cottini and Lucifora, 2010; Cottini *et al.*, 2010) exhibit that compared to men, women report better health (31.99% versus 34.84%) and better overall working conditions, while they are over-represented in the low pay group (16.3 % versus 8.1%). In particular, physical health problems appear to be more prevalent among men compared to women (i.e. 40.5% versus 35.3%) while mental health problems among women (64% versus 59.5%). The ranking of countries shows Greece and Sweden at the top of the chart, while the lower incidence of total health problems is found in the Netherlands and Ireland. Below standard working conditions appear positively associated to worse physical and mental health status, while countries with a higher share of low pay also have, on average, a higher incidence of health problems. Overall, the results show that, controlling for personal characteristics, (adverse) working conditions are associated with poor health status – both physical and mental. Low pay plays a role, mainly for men and when interacted with working conditions, suggesting that stigma and

deprivation effects may be correlated with health at work. There is evidence that the association of health with poor working conditions is attenuated by the low pay status (Cottini & Lucifora, 2009). The lowest prevalence of exposure is observed in Sweden and the highest in Greece. Significant differences in job strain exposure are observed between countries even after controlling for covariates. Working in a Southern, Eastern European or Bismarkian welfare state regime is associated with a higher risk of exposure than working in a Scandinavian or a Baltic regime. These results may be useful for decision-makers in the orientation of prevention policies at European level (Sultan-Taïeb et al., 2011).

Results show that controlling for a broad selection of personal and work attributes, working conditions are associated with work related health problems – both physical and mental. With respect to mental health at work, males suffer more from high work demands/ low job autonomy compared to females. In fact there could be differences between men and women in psychological attributes, coping mechanisms, or affective responses to their job that could determine the perception of health at work (Cottini, 2012). Workplace attributes, such as: working in shifts, performing complex and intensive tasks and having restricted job autonomy, lead to a higher probability of reporting mental health problems. There is also evidence of a positive causal effect of adverse overall working conditions on mental health distress. Countries with high levels of LMR (labor market institutions) and low levels of SHR (health and safety regulations) are associated to critical levels of mental health distress (Greece, France and Italy), while higher levels of SHR and intermediate level of LMR appear, on average, to reduce workers mental health distress (Austria, Ireland, United Kingdom and Denmark). Conversely, countries with both high SHR and LMR show a high

incidence of mental health problems (Sweden and Finland) (Cottini & Lucifora, 2010).

Lastly, job anxiety is found to be strongly related to the demands of the job as measured by factors such as occupation, education and hours of work. However, employees who report having more control over their work and (confirming the importance attached to it in the preceding study) greater support from management are less likely to report high levels of job anxiety. Average levels of employee job anxiety, in turn, are positively associated with work-related psychological illness among the workforce as reported by managers. Work-related psychological illness is found to be positively related to absence and negatively related to labor productivity, suggesting that a focus on such illness and its causes is vital for organizations seeking to improve their own performance in such areas (Jones, Latreille & Sloane, 2011).

3.2.2 Absence trends and patterns

The section attempts to present the trends and the potential patterns of absenteeism across European countries. The majority of absence is generally attributed to health problems or incapacity, but there may be other reasons. Musculoskeletal and respiratory problems are very commonly identified as being among the top two causes. Back pain and syndromes such as repetitive strain injury also feature. A wide range of sources agree that musculoskeletal disorders are the main occupational disease suffered by European workers (European Foundation for the Improvement of Living and Working Conditions, 2010). Furthermore, absenteeism rates are of great importance since they are closely related to work injuries and the subsequent absences due to the experience of a work related injury. However, it seems that absenteeism rates are not uniform among the EU countries. There is an extremely high absenteeism rate observed for Norway and Sweden, where the number of mean work

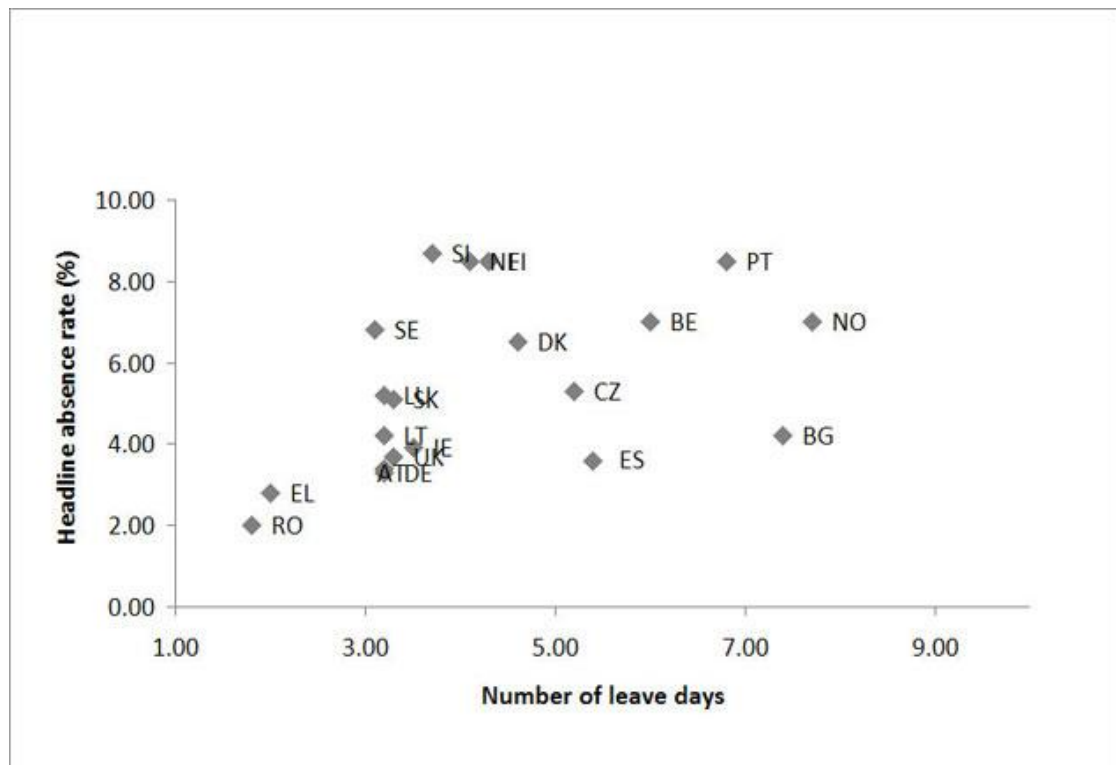
injuries is rather low. Perhaps, absenteeism rates in these countries are encouraged by the institutional labor market framework and therefore they are not affected by workplace injuries severely. It might be the case that absenteeism is mostly driven by the national labor market legal framework and not so much, by the tendency of employees who suffered a workplace injury to take a job leave (Davies *et al.* 2009).

Absenteeism statistics are generally derived from health insurance statistics and surveys of employers or individuals. The mean absence rate for EU countries is 3.8% with a median of 3.3%. Trends vary between countries. The Nordic countries used to be marked by high absence levels because of their generous welfare systems. Norway's high figure is consistent with this hypothesis. Sweden's low figure is thus notable and has possibly been affected by efforts to control sick pay costs since the early 1990s. National differences in absence rates may reflect differences in the structure of the working population. It should also be mentioned that there have been concerns about people being absent when they had no good reason to do so. Hard data on this question is always elusive, but the Dutch Working Conditions Survey – the main source of absence data in that country – finds that 94% of respondents denied taking time off work when they were not sick, and only 1% had done this for more than one day in a year (European Foundation for the Improvement of Living and Working Conditions, 2010). On the contrary, 39% of workers in the European Working Conditions Survey report having worked when they were sick. This phenomenon referred as presenteeism can have serious negative consequences for health as well as loss of productivity (Eurofound, 2012). Furthermore, the literature indicates the impact of several factors, such as age, gender, job tenure, size of the firm and economic sector on absence rates. The determinants of absenteeism are exhibited comprehensively in the subsections below.

Age

Factors that might increase absence levels include the age of the work force. France, for example, has an ageing work force, and here older workers generally report more absences than younger ones. The general pattern is for older workers to be absent more than younger ones. However, the data in some countries, for example Estonia, shows that averages can mask important variations: older workers here are more likely to attend work, although if they are absent, it tends to be for a relatively long time. In Belgium, young workers have the greatest frequency of absence while older workers are, on average, absent for a longer duration. This is consistent with arguments going back to the 1950s, that young workers may use short absences as a form of escape from the demands of work, while older workers become accustomed to the demands of work, and they are absent for health reasons (Hill and Trist, 1955). Such an interpretation might explain the UK data, where absence is reported to be higher for young workers.

Figure 3.5: Absence rate and self-reported leave days



Source: European Foundation for the Improving of Living & Working Conditions, 2010

Gender

It is commonly argued that rates of absence for women are greater than those for men. There are marked differences in Belgium and Sweden (where stated rates for women are 60% more than those for men) and in Denmark, Slovenia and the UK (with a differential around 40%). There is no clear explanation for this result, though it may reflect patterns of labour market participation. There is no uniform male–female differential. This suggests that it is the interaction of gender with other factors, such as the extent and nature of women’s labour force participation, the distribution of family obligations and the extent to which the social security system permits time off for family needs, and not gender itself, which is the important influence. For instance, an international comparison by Barmby et al. (2002), referring to 8 European countries and Canada, suggested that single men have the lowest absence rates while

married women have the highest absence rates. This difference is probably explained by different social responsibilities for gender groups outside the workplace.

Job tenure

In most countries, absence increases almost monotonically with job-tenure. Seniority may be accompanied with increased job responsibilities; therefore individuals may experience higher levels of stress and job-related pressure that may have a detrimental effect on health. Furthermore, as Barmby *et al.* (2002) argue this may also be due to a job security effect or an age effect. According to the former, employees with longer accumulated job tenure may regard their jobs as more secure, therefore exhibit higher absenteeism compared to junior employees. Also, tenure is positively correlated with age, and absence increases with age (Livanos & Zangelidis, 2010).

Firm size

In several countries, long spells of absence account for a substantial proportion of the total days due to absence. For instance, Austria absences of over 14 days account for about 60% of the total, Czech Republic absences over 19 days account for 41% of the total and Poland absences over 11 days account for 44% of the total. In several countries, there are no data on this issue. A few countries relate absence to the size of the employing organisation. The general picture is one of low absence rates in small organisations that workers report a relatively high quality of work and also that sick pay provisions are less generous than they are in larger organisations. However, in Finland there seems to be little difference in this respect.

Economic Sector

As for economic activity, results needed to be treated with caution: sector categorisation differs between countries, and in some cases only very broad categories

are available. Seven countries have no data at all. There seems to be a pattern of absence being more prevalent in the public sector than it is in the private sector. In relation to specific sectors, financial intermediation seems to have particularly low levels of absence, with eight countries (Austria, Bulgaria, the Czech Republic, Denmark, Finland, Norway, Slovakia, and the UK) reporting rates notably lower than the national average. In some countries, utility companies (electricity, gas and water) also report low levels of absence. In other countries, health and social work, and public administration, score relatively highly. However, this is not a uniform result. It thus appears that absence rates are not strongly determined by the kind of employment involved. According to Livanos & Zangelidis (2010), absence is higher in occupations that have a lower degree of responsibility in the workplace and that may be more physically demanding.

Concluding this section about absence trends and patterns, it is also important to mention the financial impact that absence from the workplace may have. It is notable that over half the national reports are unable to identify mechanisms for establishing the costs of absence. This is particularly common in some eastern European countries. The lack of clarity on how cost statistics are compiled has certain implications. It may mean that there is no available data on the cost to employers or governments. The methods of computing costs are not given and it is extremely difficult to compare reported costs, as it is unclear what is or is not included in such estimates. Costings are most commonly divided into direct and indirect. Direct costs may include the salary of the absent employee (or statutory sick pay), replacement costs and overtime costs. The indirect costs may include the effects on productivity, administration, quality of service, social security contributions and the hiring of replacement workers. The various methods used to calculate costs, plus the fact that several countries are

unable to identify any methods at all, mean that any figures produced need to be considered cautiously. The differing methods in collecting data mean that it is difficult to compare the costs of absenteeism for each country. The OECD has recently puts the cost of sickness benefits at 0.8% of GDP in 2005 across OECD countries. Among the countries considered here, the range stated is from 5.4% in Estonia to zero in Portugal. Absenteeism is clearly costly, but just how costly it is in any one country is hard to establish; with international comparisons particularly hazardous. It is possible that absence is not seen as a primary concern and other areas are given higher priority. Ironically, it may be more likely that this area is a low priority because the full costs remain unclear. However, it is clear that, overall, the costs of absence are high, that measurement of these costs remains highly variable, and that direct comparison between countries is risky (European Foundation for the Improvement of Living and Working Conditions, 2010).

3.2.3 Sickness Absence

Given previous discussion, this section will discuss the relevant literature focusing on a specific type of absenteeism: sickness absenteeism. Absence from work due to sickness is a labor market phenomenon entailing great economic and social costs (Livanos and Zangelidis, 2010). Sickness absence is measured as the ratio of the hours reported absent due to illness to contracted hours in the reference period (e.g. the last week before the interview date) (Barmby *et al.*, 1999; 2004; Ercolani, 2006; Livanos & Zangelidis, 2010). Regarding the overall patterns of international absenteeism, one can observe that there is variation in the sickness absence ratio across the European countries. At one end of the spectrum are the Scandinavian countries with sickness absence rate above 4%, and at the other end one finds many Eastern European and Balkan countries, like Bulgaria, Estonia, Greece, Latvia,

Lithuania, Romania, and Slovakia with sickness absence rates below 1%. Labor supply characteristics, insurance provisions and labor market institutions may shed some light over these differences as suggested by Bonato and Lusinyan (2007). Higher labor market participation, and particularly female labor market participation, and more generous sickness and unemployment insurance systems are associated with higher levels of sickness absence. Another interesting pattern one can observe is the seasonal variation of sickness absence within countries. Particularly, in the winter and autumn months (first and fourth quarter) absence rates are higher than in the spring and summer months (second and third quarter). This is more evident in Austria, Denmark, Estonia, Germany, Netherlands, Slovenia and the UK.

In almost all countries, sickness absence increases monotonically with age up to the age of retirement, a pattern that may be explained partly by the positive correlation between age and illness. Interestingly, the 65 and over age group exhibits notably lower absence rates. One plausible explanation may be that on average it is those with good health who remain in the labor market after the retirement age. As Ercolani (2006) argues, the individuals who have low propensity for illness and a high propensity for attendance are more likely to work beyond the statutory retirement age and their low propensity for absence becomes more evident when observing only the post-retirement sample. Female workers almost universally exhibit higher sickness absence than men. A possible explanation may be that their increased household responsibilities and childbearing role have a detrimental effect on their health. The industrial breakdown reveals that overall individuals working in more labor intensive sectors have higher sickness absence rates. The only two exceptions are Sweden and the UK. The absence rates by occupational group suggest that sickness absence is higher in occupations that have a lower degree of responsibility in the workplace and

that may be more physically demanding. Individuals with lower levels of education appear to have higher sickness absence. Individuals on temporary contracts, who enjoy lower overall employment protection, are less sickness prone compared to those in permanent contracts. The opposite is true for those in part-time employment, where their absence rate is significantly higher compared to those in full-time employment. White-collar workers exhibit lower propensity to absence compared to blue-collar workers. That improving healthcare systems across Europe may lead to lower rates of absence from work (Livanos & Zangelidis, 2010).

In summary, female workers aged 26-35 are found to exhibit higher absenteeism, possibly reflecting the level of pressure from their household and childcare responsibilities. Increased job insecurity, captured by temporary contracts, and labor market uncertainty, reflected in higher unemployment rates, have a negative effect on absenteeism. Furthermore, sickness absence increases with age and decreases with level of educational qualifications. The estimates also reveal a link between tenure and sickness. In addition, the rate of sickness absence appears to increase with contracted hours of work, those in part-time employment exhibiting a higher absence rate compared to those in full-time employment. Finally, individual sickness absence is lower in countries with a higher proportion of dependent/out of the labor market individuals, probably because of the increasing pressure the labor active people may experience to produce.

3.2.4 Job satisfaction

This section provides an overview of the main research findings regarding job satisfaction issues. Initially, the discussion examines EU level studies and then it focuses at some EU countries. Job satisfaction is ranked as one of the most important factors of life satisfaction and life quality. Several studies have found that job

satisfaction may have an indirect effect on employees' physical and mental health and that improvements in job satisfaction appear to prevent employees from health deterioration. Job satisfaction can also have an impact on productivity, absenteeism and turnover (see, for example, Furnham, 2005; Cabrita and Perista, 2006). One of the important contributors to the satisfaction of workers is having a balance between working time and family or private commitments.

Intrinsically rewarding work and job satisfaction are considered in the international policy debate where quality of work and sustainable working careers are promoted (see, for example, European Commission, 2010a). Job satisfaction has been promoted as a synthetic indicator summing up all individual preferences. This approach, however, has been shown to have limitations. The European Working Conditions Surveys (EWCS) measures job satisfaction with an overarching question on perceived satisfaction with working conditions, as well as specific questions on the intrinsic rewards of the job and commitment to the organization. The EWCS also investigates the complex relationship between job satisfaction and working conditions. The perception that health or safety is at risk because of work, bullying and verbal abuse, job insecurity or a high level of work intensity decrease the likelihood that workers will report a high level of satisfaction with work. By contrast, the perception of being well paid for their work, having a good fit between working time and private life, having good career prospects and, for employees, having good leadership make it more likely that workers will be satisfied.

The European Quality of Life Surveys data show a slight drop in job satisfaction between 2003 and 2007, but from 2007 to 2009 (years in the middle of the economic crisis), the trend was stable (Eurofound, 2010b). In the EWCS, the only drop in satisfaction between 2000 and 2005 was among skilled agricultural workers, although

this had increased again by 2010. Craft and related trades workers show a linear increase in satisfaction over the 10-year period. For other occupations the levels remained stable. The 2010 data reveal that 90% of managers, 89% of professionals, and 89% of technicians and associate professionals are satisfied with their working conditions whereas the percentages are below 80% for skilled agricultural workers, plant and machine operators, and those in elementary occupations. Less than 80% of workers in the agriculture and transport sectors are satisfied with their working conditions, leaving more than a fifth of workers in these occupations and sectors not satisfied. The self-employed (especially self-employed with employees) report the highest levels of satisfaction. Higher educated workers also tend to report a higher level of job satisfaction compared with workers with low or medium levels of educational attainment. Generally there is a consensus that job satisfaction is a multidimensional concept combining various aspects of working conditions, but also living conditions and personal dispositions (see, for example, Dorman and Zapf, 2001).

Another study using International Social Survey Programme (ISSP) data from 21 countries (Bulgaria, Cyprus, the Czech Republic, Denmark, France, Germany, Hungary, Iceland, Italy, Japan, New Zealand, Norway, Portugal, the Russian Federation, Slovenia, Spain, Sweden, Switzerland, the Netherlands, the UK and the USA) found that having an interesting job and good relations with management are the most important determinants of job satisfaction across countries. Pay and job security were important in some but not in all the countries (Sousa-Poza and Sousa-Poza, 2000). The expected benefits of workplace innovation have a positive impact on companies' overall profitability, improve job satisfaction and reduce sickness absence, save energy and resources, and sustainably improve the productivity of the

organization. These benefits will reduce long-term costs to companies (EESC, 2011). The high level of satisfaction of workers with their working conditions has declined slightly, as has the high level of balance between work and non-work. However, the proportion of workers who report that they would like to do their job at the age of 60 has increased slightly. It should be kept in mind that although good working conditions positively affect satisfaction, high levels of satisfaction do not necessarily imply good working conditions. Using unique dataset of low skilled workers of EU countries shows empirically low job satisfaction in Europe due to inferior working conditions. Furthermore, after analysing almost 500 studies of job satisfaction, a clear indication of a strong relationship between job satisfaction and both mental (burnout, anxiety, depression) and physical health is found. In addition, may act as a mediating factor that lowers the chance of a work – related accident occurring (Theodossiou & Pouliakas, 2010).

In this point, it is essential to switch to EU country studies concerning job satisfaction information. According to Bonsang & Van Soest (2010), Sweden reported as the country with the highest level of job satisfaction, with Denmark in second place, but at substantial distance. Greece is the country with worst job satisfaction. Moreover, women report to be more satisfied with their job than men. On the other hand, less satisfied workers retire earlier than more satisfied workers. Compared to other EU countries the level of job satisfaction in the UK has been relatively high. Using data from the ECHP (2001), it is found that on a scale from 1 to 6 (6 being the highest level of job satisfaction) UK employees state an average value of 4.4. Using data from the BHPS, it has also been shown that during the 1990s mental illness and stress scores increased, particularly within the public sector (Oswald & Garner, 2001). A plethora of studies, primarily with the economic profession, have recently

examined the determinants of job satisfaction and its relation with aspects of individual health and overall well-being. Job satisfaction is the most important domain of individual life satisfaction and it is strongly correlated with aspects of workplace performance, including absence (Freeman, 1978; Clegg, 1983; EPICURUS, 2007). A plausible factor that may contribute to lower job satisfaction in Europe may be several bad working conditions such as high workload, dangerous substances, low quality working environment, overtime hours, harassment and stress (Pouliakas, 2007; Bockerman & Ilmakunnas, 2006). Faragher et al. (2005) argues that employee self-reported job satisfaction emerged as having by far the strongest link with employee wellbeing. Furthermore, after analyzing almost 500 studies of job satisfaction, a clear indication of an immensely strong relationship between job satisfaction and both mental and physical health was found. It is confirmed that dissatisfaction at work can be hazardous to an employee's mental health and wellbeing, though the correlation with subjective physical illness is more modest.

Based on the Quality of life at work Spanish Survey data (MTIN, 2008), more than seven in ten workers (73%) reported that they are satisfied or very satisfied with their jobs. The higher level of satisfaction is related to the activity developed, 7.7 points, followed by the level of satisfaction with the autonomy and personal development. The mean level of satisfaction related to health and health and safety at work is 7.4 points. On the other hand, there is no really good time series data on job satisfaction in Finland. However, in general, job satisfaction in Finland is thought to be at a reasonably high level, compared to many other countries (Kristensen & Johansson, 2008). Results of the Study "Work Conditions and Risks in Latvia" (2007) demonstrate that employees generally have a higher job satisfaction than self-employed. More or less satisfied with their current jobs are 75% of employees and

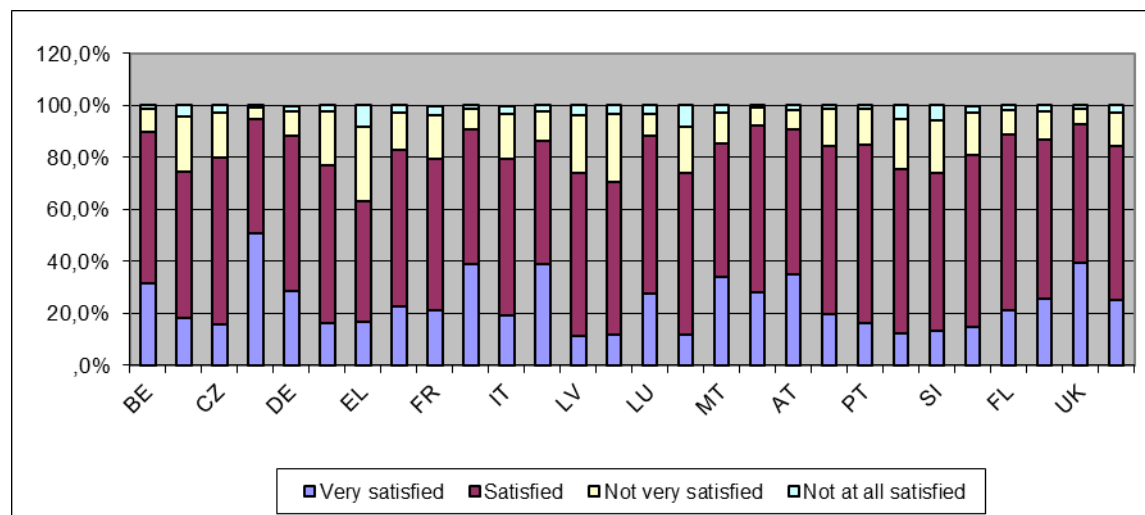
56.1% of self-employed. The reasons why people are satisfied with their current jobs differ between employees and self-employed. For self-employed, the most often mentioned reasons are “I like the work that I do”, “being more independent” and “possibilities to earn more”. On the other hand, employees most often mentioned “job security and stability, stable salary”, “good salary”, “interesting, creative, dynamic job” and “pleasant social contacts with colleagues”.

In addition, data from EQLS and EWCS show that the level of job satisfaction in Belgium has been relatively high compared to other EU countries. Belgian workers are less likely to find their work boring than workers in any other European country. Belgian workers are also less likely to perform their work tasks to tight deadlines than the EU-15 average. Chirumbolo and Hellgren (2003) investigate the relationship between job insecurity, job satisfaction, and mental health complaints in four European countries: Belgium, Italy, the Netherlands, and Sweden. Using data from a postal survey administered in Belgium in the period of November-December 1998, the study finds that job insecurity significantly predicts both job satisfaction and mental health complaints of Belgian workers in the hypothesized directions. Nevertheless, when controlling for job satisfaction, the effect of job insecurity on mental health was reduced, though still statistically significant. The authors interpret this as indicating that job satisfaction partially mediates the effect of job insecurity on mental health complaints. De Witte and Naswall (2003) find that temporary work and job insecurity are both associated with a reduction in job satisfaction. Verhofstadt et al. (2007) examine the association between educational level and job satisfaction. The results show that higher educated workers seem to be more satisfied with their job than lower educated workers, because they have jobs of better quality. However, after controlling for all job characteristics, the association between education and job

satisfaction turns negative. This indicates the need for further empirical studies in order to reveal the true effect of educational level on job satisfaction.

Lastly, in a study of nursing assistants and cleaning staff in the Danish Public-Sector Hospitals (see Eskildsen & Løkke, 2008) all interviewed employees feel that they have the necessary aid to perform their job, and no one reports any risks as regards e.g. the use of cleaning chemicals. Among cleaning staff at hospitals there is a high degree of job satisfaction primarily as a result of good cooperation and comradeship among colleagues. They do, however, also report the job as being highly stressful. The nursing assistants are also characterized by a high degree of job satisfaction. According to the workers in the focus groups this is due to a good working relationship with colleagues. Furthermore the nursing assistants generally find their job interesting and prestigious.

Graph 3.2: Job Satisfaction across countries (2010)



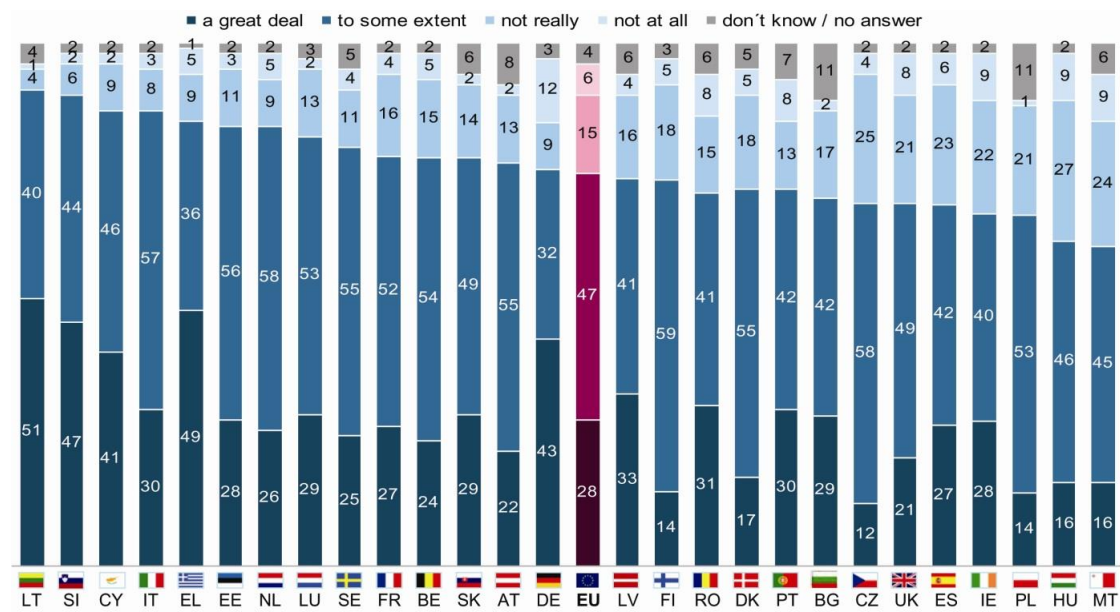
Source: Eurofound, 2012; own calculations

3.2.5 EU workers' viewpoint on OSH issues

In the previous pages we saw some very interesting research findings concerning occupational health and safety indicators such as occupational accidents and health

problems, absenteeism and job satisfaction. In this section we present the point of view of European Union workers concerning occupation health and safety issues. The European Agency for Safety and Health at work conducted in 2009 a pan- European workers' perception poll on five OSH inquiries: decisive factors when looking for a new job, work as a cause of health problems, development of OSH risks, the impact of the economic crisis and the level of information about OSH risks. Among four decisive factors when looking for a new job, (including salary, job security and working hours), safe and healthy working conditions took the third place. Moreover, 47% of individuals believe that ill health is caused 'to some extent' by their work, while 28% believe that it is caused 'a great deal' by work. Greece has the second higher percentage (49%) of individuals who reported work as the main cause of ill health. According to 5th European Working Conditions Survey, two – thirds of workers report that work does not affect their health, while one quarter that their work affects their health mainly negatively. The highest proportion of workers reporting that work affects their health negatively is found in Latvia (53%), Slovenia (45%), Estonia (44%) and Greece (41%) (Eurofound, 2012).

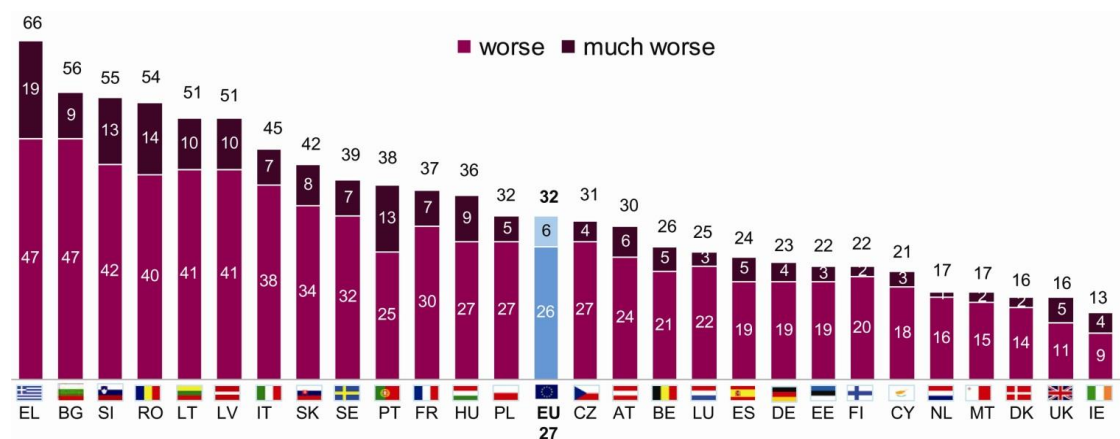
Figure 3.6: Work as a cause of ill health – EU 27



European Agency for Safety and Health at Work, 2009

Regarding development of health and safety at work, 48% of individuals think that it has improved over the last 5 years. However, Greece has the highest rates in EU concerning the belief that over the last 5 years health and safety at work has got worse, 47% compared to 26% across the EU-27 countries.

Figure 3.7: Development of Health and Safety at Work – EU27

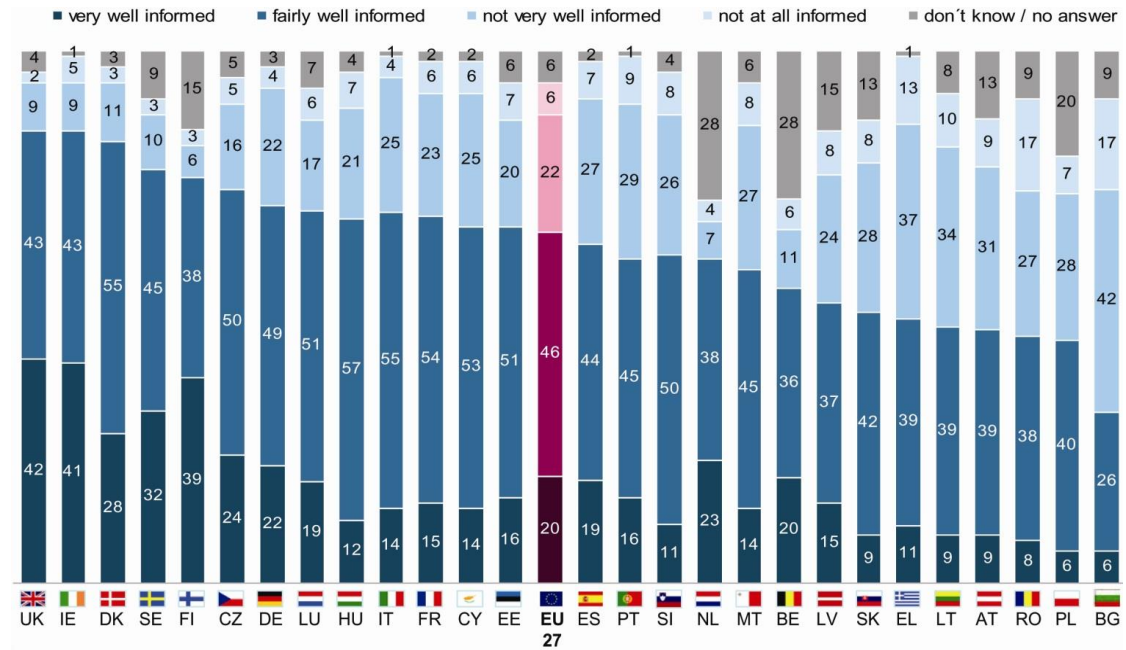


European Agency for Safety and Health at Work, 2009

Regarding safety and health risks at the workplace, 46% consider themselves 'fairly well informed'. A low percentage of workers in Greece feel very well informed

about health and safety at workplace than in Europe, 11% compared to 20% across the EU-27 countries. In addition, 39% of Greek workers feel fairly well informed, while 37% consider themselves not at informed.

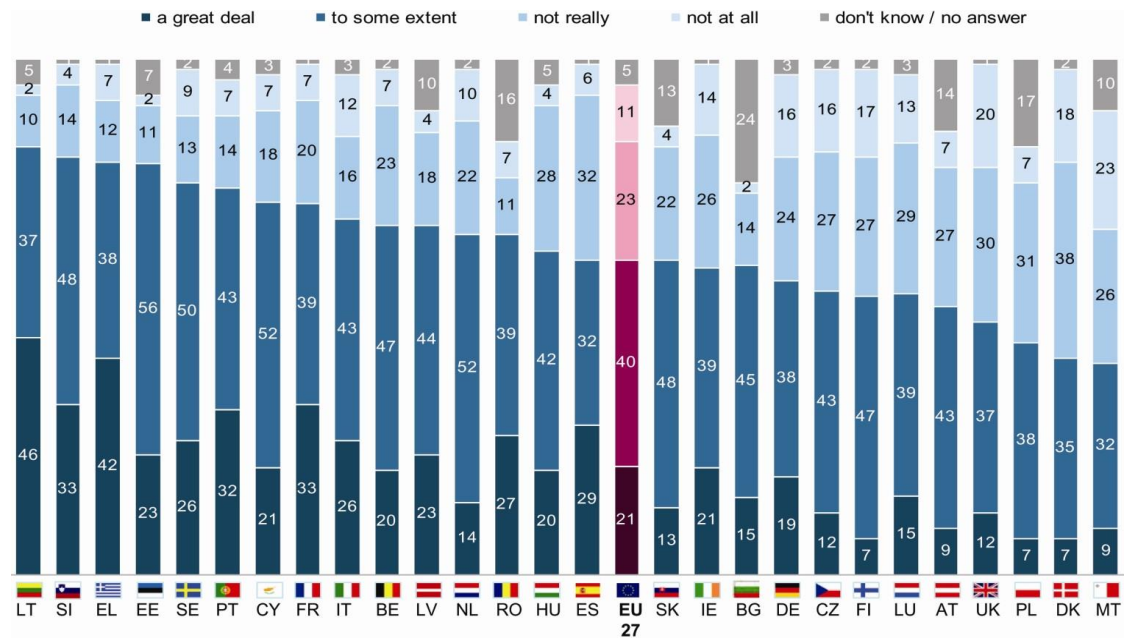
Figure 3.8: Level of information regarding health and safety at workplace – EU 27



European Agency for Safety and Health at Work, 2009

Regarding the impact of the Economic Crisis, 46% of EU workers expect, to some extent, that health and safety conditions at work might deteriorate due to the economic crisis. A pretty high percentage of workers in Greece expect that safety and health conditions at work might deteriorate a lot due to the economic crisis, 42% compared to 21% across the EU-27 countries.

Figure 3.9: Impact of the Economic Crisis – EU 27



European Agency for Safety and Health at Work, 2009

3.3 Implementation of policy issues

Given the above, European countries implemented several health and safety policies which aim at a reduction in the total incidence rate of work related accidents and the improvement of working conditions. There is an attempt to review these health and safety policies recently implemented in each one of the European countries.

More specifically, the protection of health and safety at work is an absolute priority for Italy. For the first time the legislature requires the employer to assess risks in the health and safety of workers related to work stress or to differences in gender, age and ethnicity and pregnant workers. On the other hand, the Danish system of surveillance incorporates that physicians and dentists are obliged to report suspected and confirmed cases of occupational and work related diseases. In 2008, Poland introduced the national OSH program “Improvement of safety and working conditions”, aiming to improve human resources, new products, technologies,

management methods and systems. The UK is believed to have one of the best health and safety records, which is attributed to the prevention and health surveillance policies espoused by the UK government. The Management of health and safety regulations made explicit that employers must carry out risk assessments, namely careful examinations in the workplace of factors that could cause harm to employees so that enough precautions can be taken to avoid harm. The Greek health and safety strategy for the period 2007-2013 focuses attention on small and medium enterprises which are more vulnerable since they have fewer resources to put proper protection systems.

The Spanish strategy for health and safety at work for the same period establishes the general framework for occupational risk prevention policies in order to reduce the industrial accidents rate by 25% and achieve continual improvements in health and safety at work. The strategy contains a set of measures related to education, training, research and development, health and safety services and furthermore it seeks to achieve quality and efficacy in risk prevention. In France, the occupational health plan that is in force has the aim to improve the promotion prevention among companies, to reduce the injuries at work and stabilize the number of occupational diseases which has doubled in ten years. In addition, in Finland, the OSH strategy defines several focus areas which are: maintaining and promoting work ability and functional capacity, preventing occupational accidents and diseases, preventing musculoskeletal disorders, mental well-being at work, control over one's work and reduction of sickness absences. Moreover, the German OSH strategy consists an important factor of a considerable progress over recent years in OSH strategies, particularly in the area of prevention, coordination of policies and OSH institutions. Progress in developing safety and health at work has been also achieved in Lithuania, defining the rights of

an employee and establishing the infrastructure to monitor and improve the work health situation in the country. Lastly, Latvia seeks to implement the regulatory requirements in all workplaces and achieve further marginal gains after the initial improvements from the recent legal framework (Cottini & Lucifora, 2011).

To conclude, European Union countries also pointed some additional policies which need to be applied. In general, changes in working conditions over the last 20 years have been limited. On the other hand, the policy attention to changing employment status as well as the structural change of jobs may have lacked attention from transforming the nature of work. According to the 5th EWCS, policy solutions should be multidimensional, incorporating lifelong learning, working time and work life balance, health and safety, pay and work organization practices. There is a need to address inequalities at the workplace, as well as to develop gendered analyses and policies in relation to working lives. Consultation and employee representation, as well as appropriate social support are fundamental to the effectiveness of policies to improve working conditions and increase productivity (Eurofound, 2012).

3.4 Conclusions

This chapter reviewed the current state of knowledge and issues related to the socio-economic impact of occupational health and safety at work in the European Union. There is an increasing awareness that work can have a major impact on public health thereby creating a considerable cost to society (Kreis and Bödeker, 2004). Every year, the direct insurance costs alone of workplace accidents are estimated to be €20 billion and 149 million working days are lost (European Agency for Health and Safety at Work, 2001). For the European Union and its Member States, the improvement of working conditions and prevention of workplace accidents are among the primary objectives. As highlighted by Rantanen *et al.* (2001) and Theodossiou *et*

al., (2010) it is essential that these indicators are comparable across countries and are easily available.

Good health at work helps to improve public health in general and also the productivity and competitiveness of firms. Furthermore, workplace problems of health and safety may create a high cost for social protection systems and therefore workers need to be provided with suitable working conditions if their general wellbeing is to be maintained or improved. The statistics concerning accidents at work show over a long period a clear improvement in the situation, but at the same time there is a worrying trend in certain sectors and with respect to some forms of atypical employment. Moreover there has been deterioration in working conditions and an increase in occupational ill-health. In particular, the deterioration in working conditions has been focused on certain categories of workers or sectors. Accidents occur most often in the youngest age groups and are more likely among men, skilled manual workers and those who work in blue collar jobs. The same categories apply to the cases of work related physical and mental health problems. The incidence of occupational accidents is related to several factors such as age, low family income, job satisfaction, stress, lack of experience, firm size, shift work, atypical working hours, economic recessions, risk underestimation, hazards' exposures and unionization. Although the total number of fatal and nonfatal occupational accidents and illnesses has increased over 10 years around the world, for EU countries there seem to be a decrease, due to the stricter OSH legislation. However, working in a southern, eastern European regime is associated with a higher risk of exposure than working in a Scandinavian regime.

Concerning the issue of absenteeism, the Nordic countries are marked by high absence levels because of their generous welfare systems. National differences in

absence rates may reflect differences in the structure of the working population. The literature indicates the impact of several factors, such as age, gender, job tenure, size of the firm and economic sector on absence rates. Considering the financial impact, absenteeism is clearly costly, but the measurement of these costs remains highly variable, and the comparison between countries is risky. In addition, sickness absence increases with age and part time employment and decreases with level of education.

Furthermore, job satisfaction is a multidimensional concept combining various aspects of working conditions, but also living conditions and personal dispositions. Several European studies found that job satisfaction can have an impact on workers' physical and mental health, productivity, absenteeism and labour turnover. Given the EU workers' perception concerning OSH issues, the most decisive factor for a new job is the salary, while the safe and healthy working conditions took the third place. In addition, the higher percentage of workers report that ill health is caused "to some extent" by their work. Regarding the development of OSH measures, most workers think that they has improved over the last 5 years, while they expect to deteriorate "to some extent" due to the economic crisis. To conclude, EU countries implemented several health and safety policies in order to achieve a reduction in the total incidence rate of accidents at work, focusing on the prevention, the social and demographic change and the coordination between policies on H&S at work and policies on public health.

After the discussion of the occupational health and safety issues regarding EU countries, the study proceeds to an examination of the case of Greece. Thus, the following chapter presents a comprehensive review of current state of research regarding OSH issues in Greece. The chapter presents the main points of the Greek OSH legislation framework, the research findings regarding the incidence and the risk

factors of occupational accidents and diseases, as well as the methodological shortcomings and gaps of the existing literature.

Chapter 4

State of knowledge of Greece

4.1 Introduction

The previous chapter focused on studies investigating available health and safety at work indicators, such as occupational accidents, work related health problems, absenteeism and job satisfaction. It also compared their effects across EU countries, offering some essential insights. Under this light, this chapter presents an overview of the Greek legislation framework regarding OSH issues, and the current status of empirical research on the subject in Greece, utilizing numerous publications, reports and Institutions' databases. In addition, there is an attempt to identify the knowledge gaps and methodological shortcomings of the existing literature.

There is a growing international evidence that points to the link between health risk factors and productivity and health care costs (for a review see Edington and Schultz, 2008). Thus, Occupational Safety and Health (OSH) and the goal of preserving and maintaining specific working standards, is drawing increasing attention by policy makers. For instance, a recent European Commission report (2009) states explicitly the goal of reducing occupational accidents and diseases among the 27 members of the EU. The “New European Strategy for Health and Safety at Work” sets the objective of reducing the total incidence of workplace accidents among the EU-27 by 25 per cent by 2012. According to this report, approximately four million accidents at work resulting in more than three days of absence from work were recorded in the EU-15 for the year 2005. However, a significant decrease is noted in comparison to

1995, with a drop of 17.4 per cent in working accidents. The decrease is much higher (at 35.6 per cent) for fatal accidents. The observed decreasing trend in non-fatal accidents is higher for transport, storage and communication and construction sectors. However, the electricity, gas and water supply sector recorded a significant increase in accidents risks from 1995-2005 by approximately 18 per cent. In the case of fatal accidents, construction, agriculture and transport sectors exhibit higher risks for occupational accidents leading to death. Males and younger age groups (up to 24 years of age) seem to be more vulnerable to the risk of a non-fatal working accident. However the incidence of fatal accidents seems to be higher among older workers. The economic and social costs are considered to be extremely high, resulting in a higher absenteeism in comparison to 1995. In particular, 143 million annual days lost were recorded for the 15 EU members in 2005, corresponding to 35 days of absence from work per accident.

The goal of achieving work standards that will facilitate employees' performance and safety is considered quite significant in Greece as well, since fatal work-related accidents are higher in comparison to the international level. In addition, the growing attention of OSH issues is demonstrated by the fact that the Greek Ministry of Employment and Social Protection has set the goals of recording a list of occupational illnesses, reducing work-related accidents and synchronising and improving the monitoring mechanisms and the legislation implementation of OSH (Lamprousaki, 2009; Soumeli, 2002).

In order to present a detailed review of current state of health and safety at work in Greece, the chapter is structured as follows: section 4.2 and its subsections indicate the main points of the OSH legislation in Greece, while section 4.3 presents an outline of the Greek health system. In addition, section 4.4 includes subsections about main

OHS indicators, Greek datasets and econometric techniques used in Greek research. The following section presents the main research findings regarding work related accidents, occupational health problems, job satisfaction and absenteeism concentrating also on potential shortcomings. Section 4.6 discusses the economic impact of OSH indicators while section 4.7 provides OSH policy implementation attributes. A concluding section will close the chapter.

4.2 Health and Safety Legislation

The section provides an overview of the Greek OSH legislative framework, including three subsections concerning workers' rehabilitation, policies regarding social and demographic changes in Greek labor market, as well as the health and safety regulation agencies.

The first attempts of setting up regulations for the protection of workers in Greece appeared in the early nineteenth century. However, the provision and implementation of a safe working environment started to attract the interest of policy makers in the beginning of the twentieth century. The main OSH broad categories that are addressed are industrial injuries and fatal occupational accidents, occupational diseases and psychological work-related problems (Drakopoulos et al., 2006). The general framework follows the guidelines of the European Union for the hygiene and safety at work.

The legislation framework that was adopted in the 1980s established a universal health insurance coverage system aiming at reducing inequalities among members of the workforce. In general, researchers agree that in the past two decades there has been a great advancement in the legislative framework of Greece in line with the EU legislation (Bazas, 2001; Karakioulafi, 2005; Soumeli, 2003). The "Hygiene and Safety of the Employees" Law was enacted in 1985 in order to address OSH issues at

workplaces in Greece. However, this Law excluded the implementation of economic sectors such as manufacturing, mining and fishing. This was considered to be a great flaw of the Law, since the majority of work-related accidents are reported for blue-collar jobs. On the other hand, the 1985 Law acknowledged the obligation of employers to provide a safe working environment to their employees and furthermore, provided the right to employees to form OSH committees and monitor the implementation of the law. Finally, the Law established the OSH National Council and Committees responsible for monitoring and facilitating its implementation in the labor market.

Several improvements and extensions were introduced in the subsequent years with a number of Presidential Decrees aiming to improve the legislation, cover wider workforce categories and protect the rights of sensitive working force categories such as pregnant women (Soumeli, 2003). Unfortunately, the Greek legislative framework is still lacking in monitoring occupational illnesses since there is a rather inadequate list of occupational illnesses/diseases that should be covered. Still, in 2007 a procedure was initiated to include the European list of occupational illnesses into national legislation which is crucial for the protection of employees and for their right to be compensated for several types of diseases (Lamprousaki, 2009).

The general spirit of the Greek law is that the employers bear the primary responsibility of providing and maintaining OSH standards in the workplace. Proven offenders of occupational health and safety regulations pay fines and they can even be forced to close down depending on the severity of their actions. Furthermore, employees can take appropriate action against employers for work related injuries when the latter have not provided a safe and healthy working environment as defined by the regulations. In case of a work-related accident or disease, employees are

entitled to benefits or disability pensions on privileged terms and conditions (Bazas, 2001). On the other hand, employees are also obliged to follow the OSH regulations. For instance, they are obliged to use equipment provided by the employer and seek knowledge and information on work-related safety and health through seminars, education programs, etc. (Drakopoulos et al., 2006).

It is also important to notice the fact that some enterprises adopted specific models, such as work life programs and wellness programs, in order to reduce health and pharmaceutical cost, to improve job performance and to adopt a health promotion culture. There are Greek companies which have elaborated sickness prevention plans in order to reduce absence from work. For instance, the healthcare products company Johnson & Johnson Hellas implements a Work-Life Balance Programme that provides flexibility in employees' starting times, mandatory lunch breaks, the option of teleworking, with all necessary equipment provided, shorter working hours on Fridays (six instead of eight hours), a free annual check-up and coverage of dental expenses, special reductions in membership fees for gyms or swimming pools near the company premises, more days of leave than the law provides for young fathers, psychological and financial support for employees in need (e.g. support for earthquake victims).

In general, the Greek legislative framework regarding OSH issues has been greatly updated and advanced in the past two decades following the relevant EU legislation (Bazas, 2001; Karakioulafi, 2005; Soumeli, 2003). However, an important issue is the limited impact of the relevant legislation in Greece. It seems that several shortcomings in the Greek labor market hamper the efforts to achieve efficient OSH measures. Such shortcomings are the lack of trained personnel (physicians etc.) at workplaces; the lack of occupational health inspectors to monitor the enforcement of the law; and the lack of education and information among employees and employers

regarding occupational health. Relevant studies emphasize the need for better education of the employees since they seem unable to handle working accidents by providing first aid, assessing vital signs and assisting the victims (Hatzakis et al., 2005; Karakioulafi, 2005). Christopoulou and Makropoulos (2007) and Karakioulafi (2005) provide findings of a national survey undertaken in 2003, in which approximately 36 per cent of the respondents stated that there are no health and safety provisions in the company they work or that they are not aware of such provisions, while half of the respondents declared that there is no Occupational Doctor in their company. Similarly, about half of the employees of the sample are employed in blue-collar jobs -mainly in construction and manufacturing-, note that there is a lack of occupational risk assessment in their company, while the respective percentage for public sector employees is even higher (66 per cent). Furthermore, the great majority of respondents (67-80 per cent) argue that they are not adequately informed about OSH legislation (Bazas, 2001; Karakioulafi, 2005; Kretsos, 2004; Hatzakis et al., 2005). In addition, Greece exhibits marginally lower spending on social public policies (20,5% of GDP) compared to the EU average (20.6% OF GDP) but at the same time, the national social policy is often criticized for the lack of preventive measures and treatment of occupational accidents and diseases once they occur (Christopoulou and Makropoulos, 2007; OECD, 2010). For instance, the expenditure on disability and sickness programs reached the 1,3% of GDP and 6% of total public social spending for the year 2005, while the EU average was 2% of GDP and 10% of total public social spending. On the contrary, Northern European countries devote a much higher proportion of their GDP to social spending. For instance, UK exhibited 21.3% of GDP on public social spending, while 11% of total public social spending is devoted to disability and sickness programs (OECD, 2009; OECD, 2010).

4.2.1 Rehabilitation and reintegration of workers

In this subsection we discuss the issue of workers' rehabilitation in the Greek labor market after a period of absence due to occupational accidents or work related health problems. There is a lack of attention regarding rehabilitation and reintegration of workers in the Greek labour market. Nevertheless, Greece has been particularly active in issues concerning disabled workers.

The Hellenic Association for Supported Employment (EL.ET.YP.E) for individuals with disabilities was founded in 1997. The main goals of this private, non-profit, social benefit organization are to organize, plan and develop work options for the disabled in service centres, organizations and job funding agencies for people with disabilities. Furthermore, this organization aims to inform, educate and make the public more aware of EL.ET.YP.E and thus create new opportunities in the open labour market. It also aims to represent Greece in European Union of Supported Employment as an active participating member. For the accomplishment of these goals, EL.ET.YP.E aims to put in place improvements throughout Greece. In order to develop, enhance and upgrade services in job funding, training and employing people with disabilities, EL.ET.YP.E conducts collaborative programs with various service provider agencies and provides continuing education for staff working with disabled. Moreover, it collaborates with various organizations (universities, public and private services and European agencies) and participates in research programs for the development of education and the promotion of Supported Employment.

There are also the Centres of Education, Social Support and Training for persons with Disabilities, belonging to the National Organization of Social Care, according to the Law (No 2646/1998, art. 13, paragraph 1b). These centres aim at timely diagnosis with the provision of advice and support people with disabilities, developing methods,

techniques, policies and programs for issues concerning disabilities and providing professional training and functional rehabilitation.

On the other hand, the European campaign, within the framework of European Week 2007 for Safety and Health at Work, intends to promote an integrated management approach to tackle musculoskeletal disorders (MSDs) also embracing prevention of MSDs, and the retention, rehabilitation and reintegration of workers who already suffer from MSDs. Run by the European Agency for Safety and Health at Work, the Lighten the Load campaign involved employers, workers, workers' safety representatives, practitioners, preventive services, policy makers and other stakeholders in improving MSD prevention at workplace level. A one day seminar was organised on 24-10-2007 in Ioannina, the capital city of the region of Ipiros.

Moreover, the EU faced a substantial challenge in achieving the targets set by the Council of Ministers in relation to reducing the numbers of older people leaving work through early retirement and extending the working life of older workers. In order to achieve these targets, the proportion of workers in the 45-60 age range taking early retirement as a result of ill-health and disability should be radically reduced. The project entitled “Integrated e-learning for managing job retention and return to work” promotes development tools to upgrade the skills and competences of employers concerning preventing employees at risk of disability and dismissal (European Foundation for the Improvement of Living and Working Conditions, 2010, Annual review of working conditions 2009 - 2010).

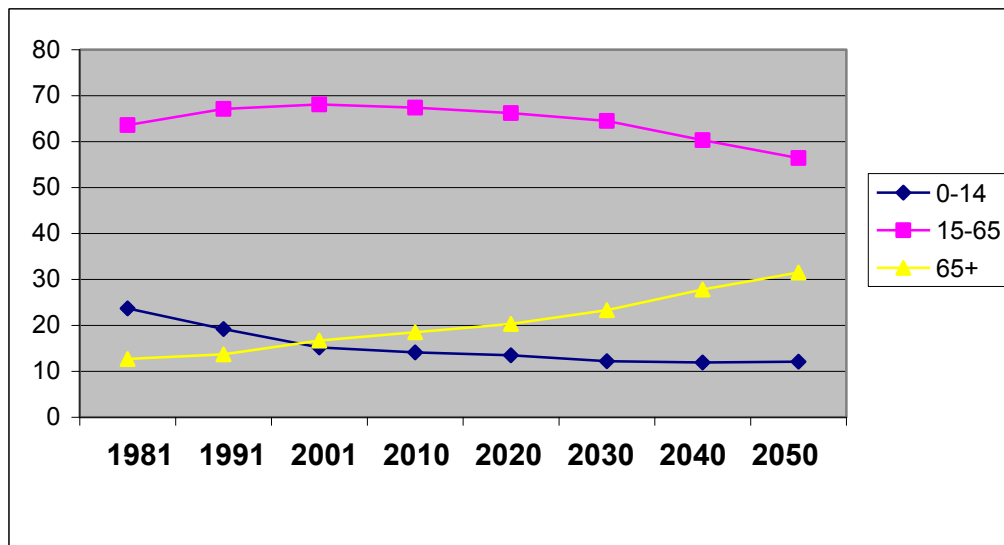
4.2.2 Responses to social and demographic change

In this subsection we discuss the potential Greek policies directed to social and demographic changes in the domestic labor market. Although there are no specific policies at the national level, there is an effort to take into account issues concerning

ageing workforce, feminization on the workforce, young workers and migration. The Hellenic Ministry of Labour and Social Security provides reports concerning the relevant issues.

The Commission has adopted a new EU strategy for youth policy for the coming decade. Entitled "Youth – Investing and Empowering", the new strategy acknowledges the fact that: (1) young people are one of the most vulnerable groups in society, especially in the current economic and financial crisis, and (2) in our ageing society, young people are a precious resource. The new strategy is cross-sectoral, with both short and long-term actions, which involve key policy areas that affect Europe's young people, particularly youth education, employment, creativity and entrepreneurship, social inclusion, health and sport, civic participation, and volunteering. The new strategy also emphasises the importance of youth work and defines reinforced measures for a better implementation of youth policies at the EU level. The young generation is a dwindling resource, whose present share of 20% of the population is projected to fall to 15% by 2050. The strategy "Youth – Investing and Empowering", which is a follow-up to the renewed social agenda announced by the European Commission in 2008, has the following goals: to create more opportunities for youth in education and employment, to improve access and full participation of all young people in society, and to foster solidarity between youth and society (European Foundation for the Improvement of Living and Working Conditions, 2010, Demographic change and Work in Europe).

Graph 4.1: Population size of Greece



Source: European Foundation for the Improvement of Living and Working Conditions, 2010, *Demographic change and Work in Europe*; own calculations

It is essential to mention that there is a noticeable increase of Greek ageing population (65+ years), while the child population (0-14 years) has decreased considerably. The increase of the proportion of older people in the whole population, is above all the result of significant economic, social and medical progress giving Europeans the opportunity to live a long life in comfort and security that is without precedent in our history. However, it is also one of the main challenges that the European Union will have to face in the years to come, since the demographic ageing is leading to far-reaching consequences and challenges for the world of work. The demographic challenge facing the European Union is that, over the next 20 years, the average age of the working population will increase and the number of people of working age will decline. To achieve more sustainable economic and social development, the EU has set itself the target of increasing the employment rate of older people. In Greece, the age of retirement for civil servants reaches 65 years. In 2009 the *Council Conclusions on equal opportunities for women and men: active and dignified ageing* recommended that Member States the following: integrate the issue

of ageing into all relevant policies; cooperate with the social partners to promote active ageing policies for older workers; encourage and support employers in recruiting and retaining older workers in employment; and create the necessary conditions for their success as workers as well as for their self-fulfilment.

4.2.3 Health and Safety Regulatory Bodies and Monitoring

The last subsection presents the regulatory bodies at national and European level that monitor the OSH legislation implementation, provide consultation services and aim at improving the knowledge of the working population. The main bodies in Greece are:

- Ministry of Labor and Social Insurance which supervises the Center on Occupational Hygiene and Safety and the Advisory Committee on Occupational Hygiene and Safety. Their main activities are based on the legislative framework regarding prevention measures.
- The Ministry of Health and Welfare which supervises the Committee for Occupational Medicine and the Center for Diagnosis of Occupational Diseases, is mainly operating at the research level concerning exposure to unhealthy substances or gas in working places and at the same time, providing consultation and guidance on prevention measures.
- The Body of Labor Inspectors (SEPE) has a critical role, since it inspects the labor market with the purpose of monitoring whether OSH measures are being adopted by employers. It is also responsible for enforcing the relevant legislation and punishing offenders. Another of its objectives is to contribute to the education of both employees and employers regarding OSH standards and risks. However, this body was established quite recently (1999) and it still

lacks the sufficient number of specialized personnel that is needed to efficiently achieve its tasks.

- The Information Centre for Workers and Unemployed (KEPEA) is also a newly created foundation (operating since 2000) with the purpose of providing consultation on employment and social insurance issues and rights (Bazas, 2001; Christopoulou and Makropoulos, 2007; Glavinis, 2008).

At the European level, the continuously increasing interest of policy makers in OSH issues has led to the creation of the European Agency for Safety and Health at Work in 1994. Its main role is to gather and analyze technical and scientific information and research regarding OSH in the EU countries, to disseminate the available information and to promote and facilitate cooperation among member countries in the field of OSH. The European Foundation for the Improvement of Living and Working Conditions was initiated in 1975 having as its prime function the improvement of the living and working conditions in Europe. Issues such as working time and flexibility at work, working conditions and work-family balance life are under the Foundation area of interest (Kretsos, 2007). Finally, the newest OSH body is the Advisory Committee on Safety and Health at Work which was created in 2003 with the main role to participate in the decision making process and the implementation of such decisions related to OSH in the member states.

The majority of the Greek population is insured under public insurance schemes. The Social Security Institution (SSI) covers the vast majority of the Greek population (Bazas, 2001). Its main role is to grant allowances (pension, pharmaceutical and medical treatment, sick pay, work-related injuries and diseases) for working employees and the unemployed. Sickness allowances in money are provided in case of work-related accidents or sickness pay, with the amount granted being an

increasing function of the duration of sickness absence (Drakopoulos et al., 2006). Sickness allowances can be provided in kind and include the use of the health care system with the SSI covering a substantial percentage of the cost of medical exams, surgeries, doctor visits, etc. while the remaining is paid by the employee (Bazas, 2001). Based on the Greek Labor Law work-related accidents are categorized as:

- *Light accidents*: absence from work for 0-3 days (in this case, the accident is considered as “illness” by the Greek law and the allowances are provided based on the illness legislation schemes)
- *Accidents*: absence from work for 4-30 days
- *Severe accidents*: inability to work for 30+ days or more (Drakopoulos et al., 2006)

Work-related injuries and diseases are covered by the SSI and allowances/pensions are provided from the first day of the occurrence of the injury, under the restriction that the absence from work exceeds three days. Yet, the current insurance system is heavily criticized because of its high degree of centralization, the observed fragmentation of coverage and its observed distortions in the allocation of resources (Glavinis, 2008).

4.3 Greek Health System

The section refers to the Greek health system, which is characterized by a mix of public and private funding and delivery, as well as to the national health expenditures compared to other EU countries and EU average. It is important to mention that the Greek national health system is extremely centralized. The Ministry of Health and Welfare is responsible for the National Health System (NHS). The Ministry of Labor and Social Insurance is responsible for the insurance funds, which play a significant

role in financing and providing health services. The Ministry of Finance is responsible for retrospectively subsidizing the NHS and health insurance funds. Public financing consists of taxation and social insurance and private financing plays also a significant role in the health system (Mossialos et al., 2005).

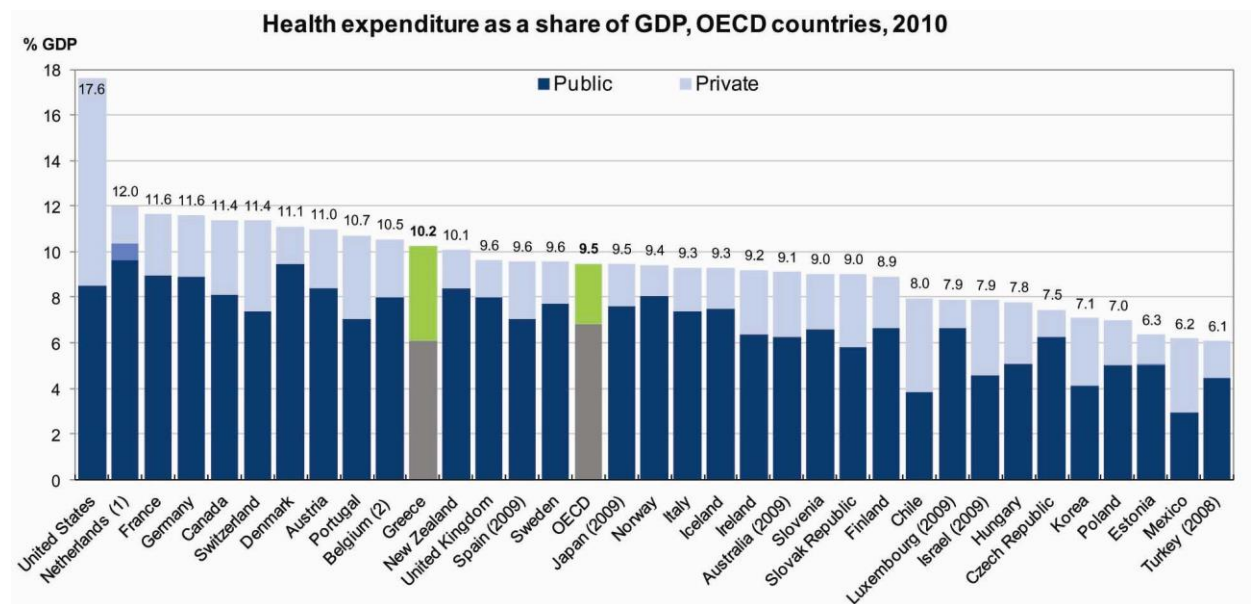
The health care system in Greece is divided into primary, secondary and tertiary health care. The secondary and tertiary levels deliver hospital services while the primary level provides clinic-based services. The Social Security Institution is the main social insurance provider in Greece. The Institution's services include monetary and non-monetary allowances to the employed and unemployed under certain circumstances. Concerning hygiene and safety at work, there is an obligatory legal framework applying to both the employees and employers, in accordance to E.U. regulations in order to prevent and reduce the number of industrial accidents (Drakopoulos et al., 2006).

Primary health care in Greece was first established in 1938, the main principles of which are the following: Health is a social benefit and is not a matter of the laws of market profit; All the citizens, regardless to their socioeconomic status or residence, have the same rights for high quality social and health care; The state has the exclusive responsibility to protect the health of its nation, through the existence of a unified, decentralized, and democratic health system. At first, primary health care covered the urban population. In 1953 a legislative decree set the basis for regional health services. The bases of contemporary primary health care, and the requirements for the provision of primary health services, were set by the Congress of International Organisation of Health that took place at Alma-Ata in September 1978 (Ifantopoulos, 1988).

The secondary health care refers to the provision of health services to patients that are hospitalised. The conditions in the secondary health care system changed radically in the second half of the 20th century, when Greece followed trends in other European countries. Nowadays, the hospital services are provided in Greece by three main institutions: Public hospitals, Independent charities and Private clinics that operate as independent economic units. Furthermore, tertiary health care is similar to the Secondary health care and therefore sometimes they are considered as one. In particular, the tertiary health care includes the health services provided by university hospitals and university clinics (Ifantopoulos, 1988).

An essential issue refers to the domestic public and private health expenditure. Total health spending accounted for 10.2 % of GDP in Greece in 2010, above the average of 9.5% in OECD countries, but down from 10.6% in 2009. The financial and economic crisis initially led to a rapid increase in the health spending to GDP ratio, as the Greek economy slumped but health spending was maintained. However, a subsequent cut in public spending has seen the health share of GDP fall. Health spending as a share of GDP is highest in the United States (which spent 17.6% of its GDP on health in 2010), followed by the Netherlands (12.0%), and France and Germany (both 11.6%) (OECD, Health Data, 2012).

Figure 4.1: Health expenditure as a share of GDP, 2010



Source: OECD, Health Data, 2012

4.4 Research on Health and Safety at Work in Greece

4.4.1 Key Indicators of OSH in Greece

The subsection refers to OSH indicators that have been investigated in Greek literature and will be discussed extensively at the sections below of this chapter. The indicators used in the Greek studies refer either to specific causes of work related injuries, such as falls, bad use of machinery, concussions, limp fractures, musculoskeletal problems etc. (Alexe et al., 2003; Alexopoulos et al., 2003) or to the knowledge of providing first aid during working accidents (Hatzakis et al., 2005). Alexopoulos et al. (2003) examined musculoskeletal problems due to work, for instance musculoskeletal complaint of the back, neck, or shoulder, chronic musculoskeletal pain and musculoskeletal complaint which led to a period of sickness absence. Tsigilis et al. (2006) examined the determinants of burnout at work, from a detailed questionnaire to an employee sample of Greek educators. There are also secondary indicators such as age, sex, region, size of the firm, type of injury, the part

of body injured, casual agents & diagnosis of occupational diseases etc. Furthermore the basic risk factors as described in the literature are:

Demographic risk factors: A review of ILO data describing injury deaths at work for 21 countries indicates that males accounted for 91% to 99% of all deaths from injury at work in all countries, independently of the level of economic development of the country. According to EU data, men are around three times more likely to have an accident at work compared to women and eleven times more likely to have a fatal accident at work, which can be attributed to the fact that they are usually working in more high – risk sectors and doing more full-time work. This implies that the role of gender itself as a risk factor remains unclear.

Behavioural risk factors: Risk-taking behaviours such as alcohol consumption, non-use of seat belts, use of violence, riding a motorcycle have been suggested as possible risk factors for occupational injury. Also, sleep disorders, smoking, and lack of physical activity have been found to alter health status and work ability, thus leading to fatigue and altered risk perception, which increase the likelihood of injuries.

Environmental risk factors: environmental stressors such as high ambient noise levels, heat, poor lighting, high physical effort, overcrowding and need for sustained attention may be precipitating factors for occupational injuries. Other important risk factors suggested as injury risk factors are physical effort and climate discomfort. Since workstations are usually overcrowded with high ambient noise levels and bad lighting, workers are often subjected to a multitude of harsh conditions, which can ultimately have a cumulative effect on injury risk (Vlachantoni & Kuhn, 2008).

In this chapter we focus on specific OSH indicators which are presented in the table below. The table also presents the institutions from where we drew the Greek data concerning these indicators.

Table 4.1: Indicators & data sources

Indicators	Data sources
<i>Occupational accidents</i>	Social Insurance Institute, Body of Work Inspection, National Statistical Service of Greece
<i>Fatal occupational accidents</i>	Social Insurance Institute, Body of Work Inspection, National Statistical Service of Greece
<i>Occupational diseases</i>	Social Insurance Institute
<i>Mental health</i>	National Statistical Service of Greece, European Foundation for the Improvement of Living & Working Conditions
<i>Occupational stress</i>	Not available
<i>Absenteeism</i>	Social Insurance Institute, European Foundation for the Improvement of Living & Working Conditions
<i>Job quality & job satisfaction</i>	European Foundation for the Improvement of Living & Working Conditions
<i>Costs for health & safety at work measures</i>	Hellenic Institute for Occupational Health and Safety

4.4.2 Greek Datasets

Given the above, this subsection presents a detailed overview of the institutions whence we drew information for the mentioned Greek indicators. The available statistical data concerning occupational safety and health in Greece comes mainly from the Hellenic Statistical Authority (EL.STAT.), which provides statistical data to the relevant institutions of the European Union, from the Social Insurance Institute

(IKA), the biggest social security organisation, and from the Labour Inspectorate (SEPE) which is the national authority for the enforcement of the OSH legislation.

The *Hellenic Statistical Authority* contains datasets on occupational fatal & non-fatal accidents by age groups, gender, the part of the body that was wounded, the type of wound, region and occupation. EL.STAT. conducted in 2008, for the first time, a large scale survey on occupational accidents and work-related health problems. The sample size was 4.73 million individuals and was conducted by using survey questions including questions on occupational accidents and absent days by gender, nationality, age group, occupation and level of education. In the same survey, more than seven million respondents answered also questions on work-related health problems by gender, occupation, type of health problem. They also reported causes which affect negatively their mental health (such as violence, harassment, work-load, time pressure) and their physical health (such as noise, chemicals, arduous tasks, injury risk).

The *Social Insurance Institute* covers almost all employees in the private sector in Greece. This means that the relevant statistical data through the years provide a reliable picture of the course of accidents at work, in respect to the development of workforce. IKA registers occupational fatal and non-fatal accidents, since 1937. IKA publishes an annual report about accidents and fatal accidents at work and a separate annual report about occupational diseases with descriptive statistics and graphs. The publications about accidents at work contain data from the records of accidents at work sustained by employees insured by IKA and comprise tables presenting reduced distribution figures for all accidents, an analysis of a sample of fatal accidents at work and incidence rates of accidents at work in regard to the total number of individuals insured by IKA. The records contain fatal and non-fatal accidents at work distribution

by region, sector of economic activity, speciality (occupation), age, gender, enterprise size, days of absence, cost of accidents, date (month - day of the week - day), type of injury, injured part of body, working activity, material agent, days of compensation, subsidy and pension expenses. The publications also contain incidence rates of accidents at work per 1000 employees. The last data on accidents and fatal accidents at work was published in 2006.

The record and process of Occupational Diseases is an initial effort but its coverage of employees is limited only to individuals insured with IKA who are applying for a pension. The publications refer to seven years, from 2003 till 2009. The recording form is drafted according to the directions of the Methodology for European Occupational Diseases and is fully compatible with European Union standards. The sample analysis contain occupational diseases by age, gender, occupation, diagnosis, disability percentage, causal agent of exposure, employer's economic activity, substance containing the exposure agent.

Every year, from 1999 till 2009, *SEPE*, which is supervised by the Ministry of Employment and Social Protection, makes references in its annual report, to the methods of preventing and reducing workplace accidents and occupational diseases. Its activities include workplace inspections, improvement requirements and imposition of sanctions in case of infringements. According to the labour legislation, the employers have the obligation to report all the work related accidents to the Labour Inspectorate. Nevertheless, the annual statistics of labour accidents are limited in size compared to relevant statistics of IKA, due to a lower notification rate from enterprises. The reported accidents are recorded, investigated by the Labour Inspectors, and they are statistically elaborated and classified by the relevant department of the *SEPE*. The statistics refer to fatal and non-fatal accidents at work

reported to the SEPE by region, sector of economic activity, occupation, age, gender, month and day of accident, type of injury, injured part of body, type of accident material agent, working activity, unsafe condition, unsafe activity. The statistics also refer to fatal and non-fatal work-related accident frequencies, the trend in fatal accidents at work by industry and the causes of fatal accidents in the construction industry.

There seems to be though, considerable differences in the figures recorded among the three bodies, probably due to the different samples used. The discrepancy in the data is not the only disadvantage. The public sources mentioned above are quite limited and the lack of data about health and safety at work indicators such as absenteeism, occupational stress, job satisfaction, are considered to be among the disadvantages of the specific databases.

The *European Foundation for the Improvement of Living and Working Conditions* is the only official public source that provides integrated and large scale datasets which include basic and newly derived health and safety indicators, referring to Greece. Since 1991, the European Working Conditions Survey is conducted every five years to study working conditions in Europe (1995, 2000, 2005, 2010). The most recent wave of EWCS was carried out in the EU-27 countries (plus Norway, Croatia, the Yugoslav Republic of Macedonia, Turkey, Albania, Montenegro and Kosovo) during 2010. The questionnaire covered issues of precarious employment, leadership styles and worker participation as well as the general job context, working time, work organisation, pay, work-related health risks, cognitive and psychosocial factors, work-life balance and access to training.

There are also, EU funded research projects which conduct surveys on related content and construct integrated datasets. For example, the *SOCIOLD* database

(derived from an EU research project) covered a large representative sample of individuals in Attica, Thessalonica and other Greek cities in 2004. The participants responded to a questionnaire of 40 minutes duration. The data include detailed information about occupational accidents, occupational diseases, sickness absence and about individual characteristics such as health problems, marital status, gender, age, occupational sector, weekly work hours and wage. The data are suitable for more processing in order to construct new indicators.

After a thorough evaluation of the data available to the authors, it is apparent that labour force survey data for Greece is inadequate. There are only three official public databases which contain data on some basic indicators such as work related accidents and fatal accidents, occupational diseases and mental health, but those data are descriptive and not easily suitable for more processing. There are no integrated and updated datasets except of the European Working Conditions Survey and datasets derived from EU research projects such as the SOCIOLD database. Therefore, the feasibility to construct and use large scale datasets with individual information on work injuries / illnesses and individual characteristics (such as age, gender, job task, income, etc.) is rather limited in Greece.

4.4.3 Econometric Techniques Undertaken in Greek Research

In this subsection we attempt to present techniques and tools utilized in Greek empirical research, as well as the potential shortcomings. Empirical up to date research in Greece is rather inadequate. A limited number of studies utilised large samples of workers for a large time span, in order to examine the frequency and the determinants of occupational accidents, while the remaining studies provide findings based on small – scale personal interview surveys. Furthermore, only one study used econometric techniques (logistic regression) to investigate the work-related and

personal characteristics that might affect systematically the probability of having a work related injury (Alexopoulos et al., 2003). Such factors are job demand, decision latitude, age, gender, marital status, education, employment history, employment duration and job characteristics related to autonomy, creativity, skills, task variety, learning new things, and amount of repetitive work. The majority of Greek studies use descriptive statistics tools to examine work-related accidents (Alamanos et al., 1986; Alexe et al., 2003; Hatzakis et al., 2005; Karakioulafi, 2005; Tsigilis et al., 2006). Therefore their findings should be handled with caution, based on the lack of large sample data and the absence of econometric methods to validate the findings.

4.5 OSH Research findings

4.5.1 Occupational Injuries

This subsection exhibits statistics from institutions' databases and empirical findings concerning work related nonfatal and fatal accidents in Greece. Occupational injuries are defined as injuries due to an external cause resulting from an exposure related to the person's work. The definition corresponds to injuries that are employment-related and are the result of a traumatic event while a person is on duty. Work-related injuries of workers are commonly separated into three groups: work-road injuries, workplace injuries and injuries that occur whilst travelling to or from work (Vlachantoni & Kuhn, 2008).

It has been argued that work related injuries are more intense among older women, young individuals and migrant workers (Alexe et al., 2003). In particular, migrant workers in the agricultural sector are found to be one the most sensitive groups among the sample, suffering from multiple injury causes (namely, upper limbs injuries, concussions, injuries from falls, etc.). For some injury cases examined in the study, female workers in the agricultural sector are found to report increased work-related

injuries, such as lower limb fracture and young workers as well. As the authors underline, the severity of work related injuries is found to be high and frequently treatment demands hospitalization of the worker.

A very frequent cause of work-related disability among workers is attributed to musculoskeletal problems while the economic costs arising due to compensating schemes, medical expenses, lost days of work and reduced productivity are thought to be enormous. It has been found that heavy work load, high job demand and low job control are significant risk factors for the onset of musculoskeletal problems. However, no evidence is found on the relationship between individual demographic characteristics (age, gender, education, tenure) and work-related musculoskeletal problems. However, as age increases, sickness absence also rises. However, due to the moderate size of the study population, the findings should be interpreted with caution (Alexopoulos et al., 2003). In line with the above, other studies provided evidence that both the incidence and severity of work-related accidents are increasing as age increases, independently of any physical impairment (Alamanos et al., 1986).

According to the publication of IKA, (from 1999 to 2007), there are some general research conclusions about occupational accidents. The research revealed that most accidents at work take place in the administrative regions of Attica & Kentriki Macedonia. The months with greatest number of accidents were May, June, July & September. Moreover, men sustain more accidents than women and employees from 25 to 34 years of age sustain the greater percentage of accidents. Most accidents involve upper and lower extremities such as fingers, knees and ankles. The most frequent types of injury are fractures & contusion injuries. Most accidents occur in the construction sector and took place in small enterprises. Occupational category of extraction & building trade workers present the highest number of accidents. The

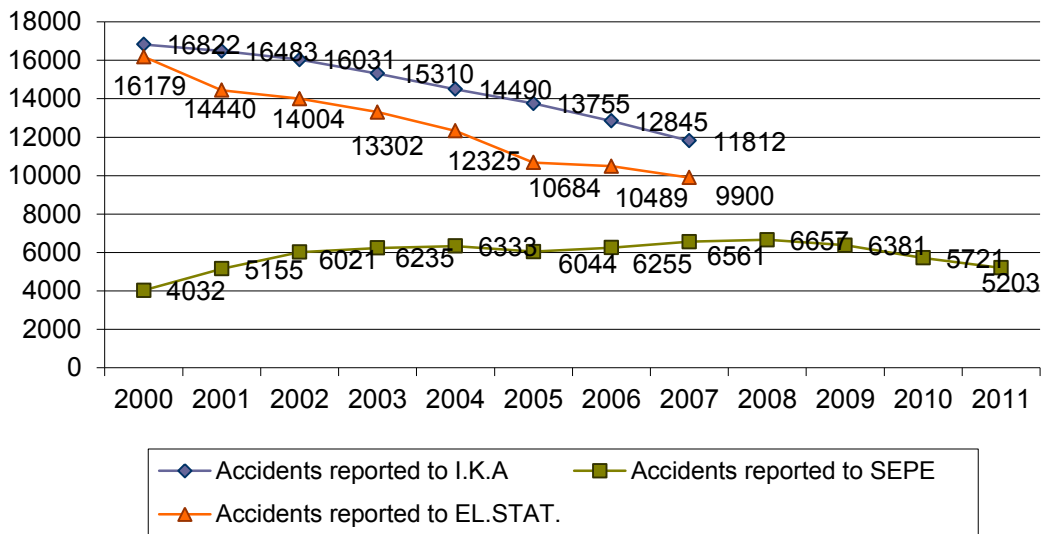
sectors of Extraction & building trade, Agriculture-Hunting, Mines-Quarries, Constructions, Manufacturing Industries present higher accident frequencies. The two most prevalent causes of accidents at work are collision with immobile objects and falling from a height. During the 1998-2007 decade, there was an annual drop in the number of accidents, at a 5.6% mean rate of reduction (IKA, 2007). By and large, the IKA data show that from 1977 to date the number of accidents at work has steadily decreased. Specifically, whereas, in 1977, 3.81% of insured people suffered accidents at work, in 2001, that percentage had dropped substantially to around 0.85%. Table 4.2 (Annex B), presents the registered number of work-related accidents from the IKA database from 1948 onwards. While there seems to be a downward trend in work-related accidents, based on the SSI database, working accidents in Greece continue to be quite high.

In line with academic research, younger age groups are those recording the highest number of accidents annually. The working injuries are quite high for the ages from 15 up to 49 years, where as they start to decline gradually for employees aged over 50 years of age. In line with the findings as well, male employees exhibit continuously higher working injuries in comparison to females (see Table 4.3, Annex B). Blue-collar workers are those with higher records of working injuries in comparison to the remainder for the year 2007. The extraction and building workers and the labourers in construction, mining, manufacturing and transport are those two economic categories reporting the greatest number of working injuries, while the lowest amount is reported for managers and teaching associate professionals. Furthermore, upper extremities, lower extremities and the head are the body parts that are mostly harmed during working injuries.

Based on the latest Annual Report for Accidents at Work (IKA, 2007), 11,812 accidents at work were recorded of which 87 were fatal. The accidents in 2007 are lower compared to the respective number in 2006 by 8.0%. Male employees report four times the work-related accidents females report. The most frequent type of injuries is fractures and contusions. The mean age of employees with a fatal work-related accident is 40 years) while the respective mean age of employees who reported non-fatal work-related accidents is 37.6 years. The highest incidence of injuries is reported for Agriculture-Hunting, Mines-Quarries, Construction and Manufacturing Industries. It is also estimated that approximately 6 accidents occur for every 1000 employees, whereas there are 8 accidents for every 1000 males and 2 for every 1000 female employees.

The figure below presents the number of occupational accidents reported to IKA, SEPE and EL.STAT., during the last decade (2000-2011). There seem to be considerable differences among them, probably due to the different samples used. Employers have the legal obligation to report certain workplace accidents and incidents. Unfortunately, the number of reports of the Greek Corps of Labor Inspectors (SEPE) is limited and fluctuates between 30% and 50% approximately. On the other hand, Social Insured Institute offers data that refer only to private sector insured employees. Accidents at work reported to the Corps of Labor Inspectors have risen in the 2000-2005 period. Partial responsibility for the increase in accidents at work, particularly between 2001 and 2004, is attributed to the effort to complete works for the Olympic Games, which necessitated an intensified pace of work (Ministry of Employment & Social Protection, SEPE). According to the latest Annual Report (2011) the highest incidence of injuries is reported for Retail Trade (18,6%), Construction (7,1%) and Food Industries (5,4%).

Graph 4.2: Work-related Accidents reported to IKA, SEPE & EL.STAT.



Source: SEPE, 2011; EL.STAT., 2007; own calculations

There are considerable differences in the working accidents recorded annually from the three main databases that exist in Greece: the Corps of Labor Inspectors (SEPE); the Social Insurance Organization (IKA) and the Hellenic Statistical Authority (EL.STAT.). For example, for the year 2001 the SEPE argues that work related accidents came up to 5,155 cases, while IKA provides a very different number of 16,483 and EL.STAT. similarly reports 14,440 cases. According to the data from SEPE, there were 6,021 workplace accidents (153 of them fatal) in 2002, compared with 5,155 in 2001 (188 of them fatal) and 4,032 in 2000 (27 of them fatal). The insurance data from IKA are even far higher: 16,483 workplace accidents in 2001, compared with 16,822 in 2000. Finally, the pattern of workplace accidents, according to data provided by the Hellenic Statistical Authority was as follows: 16,179 in 2000 and 14,440 in 2001 (Karakioulafi, 2005).

One big study conducted in Greece by the Hellenic Statistical Authority (EL.STAT.) and although it is a cross-sectional study, it employs information on a very large sample of employees and it also addresses the issue of work-related

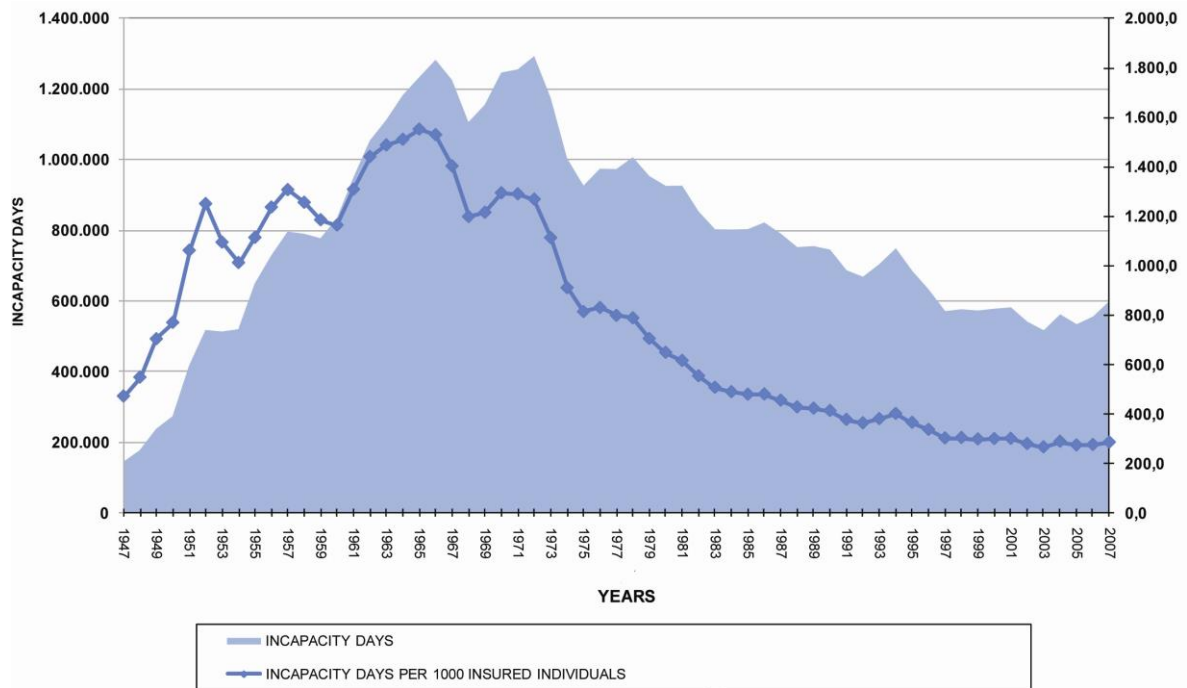
diseases, which is rather ignored by the national studies (Lamprousaki, 2009). Based on this study workplace accidents are greater for: males, immigrants, workers in craft and related trade workers, workers in plant and machine operators, while they are fewer for: professionals and clerks. It seems that employees in lower educational classes are those mostly hampered by occupational accidents, while the same stands for middle-aged employees. The incidence of work-related accidents is decreased for employees over the age of 65 years, but maybe this is mainly attributed to the fact that the majority of employees retire after the age of 65, so this age category is rather under-represented in the dataset.

Most of the related studies conducted in Greece drew information by conducting personal interviews to workers of specific sectors (nursing personnel, agricultural workers, manufacturing workers, etc.). Unfortunately, they only obtain information on very small samples (250-350 workers) which is available only at cross-sectional level (Alexopoulos et al., 2003; Hatzakis et al., 2005; Karakioulafi, 2005). Only two studies to the authors' knowledge drew data on work related accidents for a long time span from the Social Insurance Organization database (Alamanos et al., 1986; Alexe et al., 2003). In specific Alexe et al. (2003) drew injury data from the Emergency Department Injury Surveillance System in Greece for the period 1996-2000, while demographic and injury details were drawn by personal injuries. The final sample consisted of 4,326 unintentional farm injuries. Alexopoulos et al., 2003 conducted personal interviews in 2000-01 to the nursing personnel of six general hospitals in the area of Athens.

Assessing annual variation in the number of accidents from 1988 to 2007, the average drop in the number of accidents was 4.7%, while in 2007 there were 63% fewer accidents than in 1988. In addition, it was estimated that during this period the

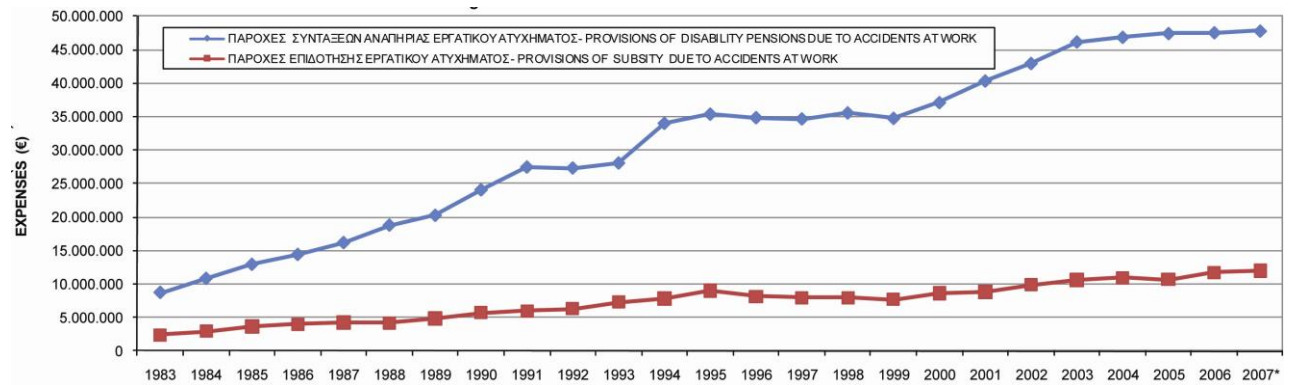
annual percentage variation in the number of accidents per 1000 employees from 1988 to 2007, showed an average drop of 6.0%. During the 1998-2007 decade, there was an annual drop in the number of accidents, at a 5.6% mean rate of reduction. For the 1968-1977, 1978-1987 and 1988-1997 decades, corresponding mean rates of reduction were 3.0%, 2.7% and 5.1%, respectively. Furthermore, taking into account the annual total number of incapacity days and the number of insured individuals, we see that, on average, the number of incapacity day per 1000 employees during the last four decades presented a drop of 4.1%, 5.9%, 3.6% and 0.6%, respectively (SSI, 2007).

Figure 4.2: Incapacity days, 1947-2007



Source: IKA, 2007

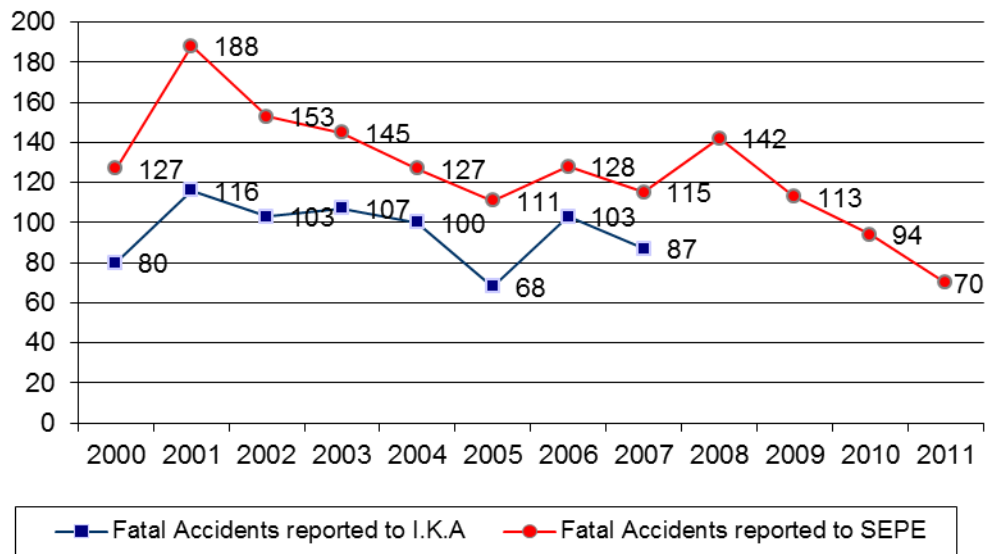
Graph 4.3: Subsidy & pension expenditure due to occupational accidents



Source: IKA, 2007

In regard to fatal accidents, research of the Social Insurance Institution indicated that men sustain the greatest number of fatal accidents at work and the employee's aged between 35 and 54 sustain the greater percentage of fatal accidents. Most fatal accidents at work take place in the administrative regions of Attica & Kentriki Macedonia and occur in the construction sector. Furthermore, most prevalent causes of fatal accidents are collision with immobile objects & falling from a height and involve cranio-cerebral injury. Fatal Accidents reported to the Corps of Labor Inspection (Ministry of Employment & Social Protection) have followed an overall downward course in the period from 2000 to 2011, although an increase was seen mainly in 2001 and also in 2002.

Graph 4.4: Fatal Accidents 2000 – 2011



Source: SEPE, 2011; own calculations

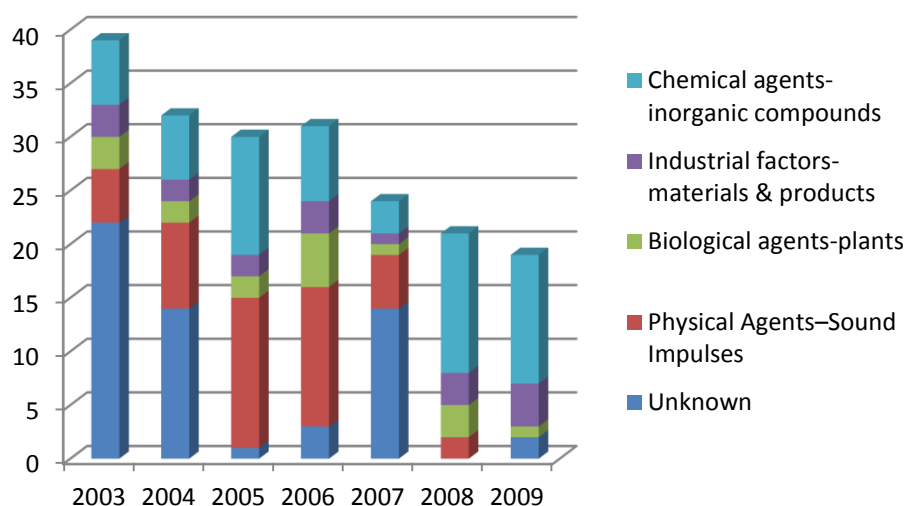
4.5.2 Occupational Health Problems

After the overview of occupational nonfatal and fatal accidents in Greece, we present a detailed overview of work related health problems. Work related health problems, according to Lampousaki (2009), are greater among: males, skilled agricultural and fishery workers, craft and related trade workers and fewer among professionals and clerks. In addition, the most common work related health problem is musculoskeletal disorders (MSD). The data are taken from a special sampling survey on accidents at work and work – related health problems, which was conducted during the second quarter of 2007. The percentages were calculated based on all the individuals who reported that they suffer during the last 12 months from a health problem caused or exacerbated by their work. Among 7.061.606 participants, 359.604 males and 253.541 females reported at least one health problem (EL.STAT., 2007).

From 2003 that has begun the recording and processing of Occupational Diseases up to 2009, 112 different cases have been recorded which are re-examined by the committees in a fixed time. This has as consequence data of previous years to be re-

defined and modified. Because of this a retrospective analysis concerning years 2003-2009 has been performed which covers the age and follow-up time of the cases annually examined by the committees but also for the 112 distinct cases.

Figure 4.3: Work-related Diseases by Casual Agents



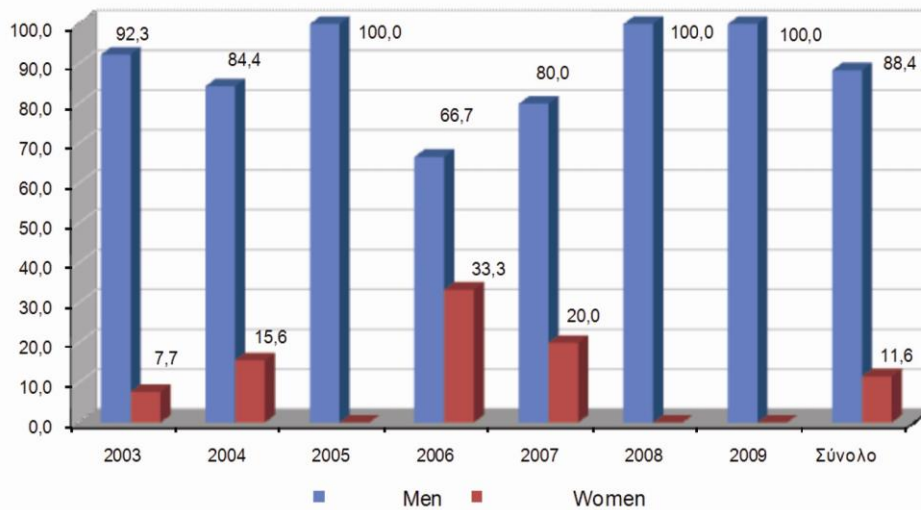
Source: IKA, 2009; own calculations

Briefly, for the 112 cases, 99 are males and 13 are females. Most of the cases are elementary occupations workers & crafts & related trades workers. The basic diagnoses are allergic contact dermatitis, toxic effect of metals & asthma. Chemical & industrial agents are described for most cases as casual agents of exposure to disease (SSI, 2009).

The lack of information concerning Occupational Diseases has created the need for recording and processing Occupational Diseases. This recording concerns insured individuals examined by Occupational Diseases Committees in order to provide pensions, regardless of whether these individuals are first time cases or are being re-examined and regardless of whether the total disability percentage they are ascribed makes them eligible for a pension or not. Data recorded are in accordance with EU methodology concerning Occupational Diseases. It is an initial effort to record

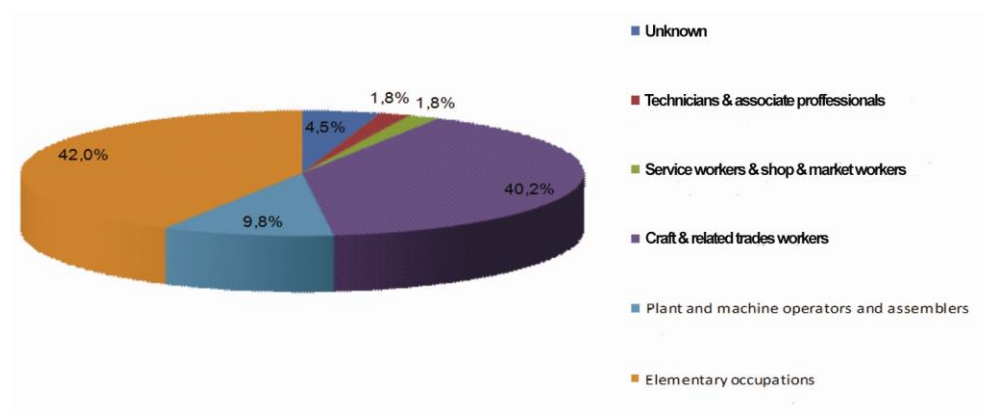
occupational diseases but it is not a full recording. This is because the action covers only individuals insured with IKA-ETAM who are applying for a pension and does not include those applying to primary or secondary health care, where there is no system for the announcement of Occupational Diseases by health bodies, physicians or hospitals (SSI, 2009).

Figure 4.4: Occupational Diseases by Gender and Year of Entry in the Study, 2003-2009



Source: IKA, 2009

Figure 4.5: Occupational Diseases by Occupation, 2003-2009



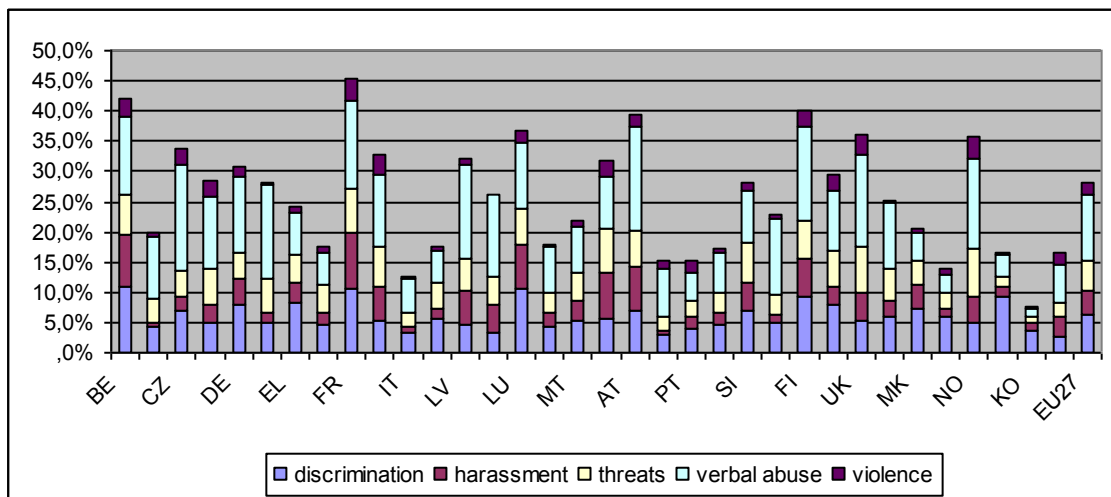
Source: IKA, 2009

The lack of information concerning mental health of employees at work has created the need for the recording negative agent effects. The first publication (2008)

of National statistical service of Greece concerning the year 2007, is an initial effort to record mental health effects at work, by contacting personal interviews to a large sample of employees. It was a cross – sectional study that draws information regarding a variety of indicators and also the occupational and demographic characteristics of the respondents. According to the results of this sampling research, the percentage of employees, who believe that they are exposed to violence or harassment affecting their mental health, is very low (>1%). In addition, more than 1 to 10 employees (<13%) are under time pressure. Men sustain greater mental health effects than women (Table 4.4, Annex B).

In 2010 the fifth European Working Condition Survey by European Foundation for the Improvement of Living and Working Conditions, covering 34 countries, including Greece, was conducted. A number of questions were related to Harassment, violence and discrimination. As the results of Table 4.5 (Annex B), men seem to sustain greater mental health effects than women.

Graph 4.5: Reported answers of employees regarding their exposure to undesired situations at work (EU27)



Source: European Foundation for the Improvement of Living and Working Conditions, 5th European Working Conditions Survey, 2010; own calculations

The European Commission guidance defines stress as a pattern of emotional, cognitive, behavioral and psychological reactions to adverse and noxious aspects of work content, work organization and work environment. It is a state characterized by high levels of arousal and distress and often by feelings of not coping (Koukoulaki, 2002).

According to many studies, stress seems to be linked to aspects of the individual's personality, as well as, elements of the work and organizational environment, in general (Ross and Altmaier, 1994; Schultz and Schultz, 1995). It has been demonstrated by several studies that occupational stress has an important affect on physical and psychological health (e.g. Fletcher, 1988). Specifically, high blood pressure (hypertension) and heart disease are gradually becoming generally accepted as having a link to stress (Fletcher, 1988). Headaches have also been associated with occupational stress (Fletcher, 1988). Burnout is an additional negative effect of stress. It is manifested through emotional exhaustion, apathy, depression, irritability and boredom (Schultz and Schultz, 1998). Absenteeism and tardiness, for example, caused by high levels of stress can lead to great amount of financial loses. The effect of errors made by workers who are working under impaired conditions is suggested, also, to be an important negative effect of stress. Errors made under the effect of occupational stress may lead to a financial cost, a corporal injury, or even loss of human lives. Moreover, mental illnesses, such as depression, which may result from occupational stress, incur costs in health care and compensation expenses as well as lost work time (Ross and Altmaier, 1994).

Stress is the second most common health symptom reported by European workers. Stress and features of work organization like pace of work, time pressure and repetitive work were found to be highly correlated (Koukoulaki, 2002). The 22% of

workers from EU report occupational stress. In Greece there is no statistics yet, but there are some recent studies about occupational stress and professional burnout. Professional burnout can be described as a syndrome of physical and psychological exhaustion. In this context the workers lose interests for their job, cause to derive any satisfaction from it and create a negative self-image. Its identification is made through specific behaviour and attitudes of the employees, often accompanied by physical and psychosomatic symptoms (Dimitropoulos & Filippou, 2008).

Work – related stress is not directly included in the list of occupational illnesses recognised by Greek legislation. However, after the adoption of the European Framework Agreement, there is an increased interest about occupational stress and professional burnout in several occupational sectors (Lampousaki, 2010). There are studies about nurses, physicians, teachers, librarians, doctors, police officers. Most of these reported emotional exhaustion, negative self-image, depersonalisation, lack of achievement and job dissatisfaction (Antoniou, 2003; Antoniou, 2006; Bellali et al., 2007; Koustelios, 2001; Joiner, 2001; Vemi et al., 2007;). Feelings of inadequate control over one's work, frustrated hopes and expectations and the feeling of losing of life's meaning, seem to be independent causes of burnout. Burnout is more common than generally believed and may affect every aspect of the individual's functioning, have a deleterious effect on interpersonal and family relationships and lead negative attitude towards life in general. Empirical research suggested that burnout and depression may share several qualitative characteristics, such as low levels of job satisfaction (Iakovides et al., 2009).

Tsigilis et al. (2006) and Platsidou & Agaliotis (2008) examined burnout due to work and its relationship with job satisfaction among Greek educators. Job satisfaction is found to be negatively related to burnout due to work and furthermore,

work-related stress and burnout seems to be related to specific job characteristic aspects (public or private sector, promotion and pay aspects, etc.). Similar results are also provided by Nakakis & Ouzouni (2008)'s literature review study. They argue that interrelationships, the organizational ability and leadership and job satisfaction are strong determinants of job-related stress among the nursing personnel.

Recent research by Mantelou et al. (2010), examined the job burnout syndrome and its three components (emotional exhaustion, depersonalization, reduced professional efficacy) among Greek bank clerks, as well as the demographic factors that seem to have an impact on it. According to the results, all demographic factors, except gender, were correlated to job burnout dimensions. In addition, there is no correlation between job burnout and two other concepts, self – efficacy and job satisfaction. A descriptive correlational study of Stathopoulou et al. (in press), investigated the presence of anxiety and stress symptoms among emergency nursing personnel in Greece. Using descriptive statistics, nonparametric comparisons, as well as correlational tests, anxiety levels were found to be mild among women and nursing personnel employed in public sector hospitals. In addition, work experience in the emergency department was correlated to anxiety states. The most commonly reported manifestations of psychiatric symptomatology were sleep disturbances, anxious and depress mood. Staff counseling, continuing professional education and empowerment strategies are recommended to be implemented to prevent psychiatric morbidity, job dissatisfaction and resignations.

The study of Labour Relations and Agreements Secretariat of OTOE (2008) examines individual goal-setting schemes implemented in banks as stress factor. The study showed that individual goal-setting involves 2/3 of all bank staff. Individual goals, however, are judged by the staff to be arbitrary (42%), exhausting (28%) and

unrealistic (27%). According to the same study, the impacts of individual goal-setting on executive's quality of work and life are: authoritarianism/pressure on subordinates (33%), extended working hours with unpaid overtime (18%), psychosomatic illnesses (12%), job insecurity (9%), family problems (9%), advancement and career opportunities in the enterprise (9%), and discouragement (5%). The impacts of individual goal-setting on employees are: extended working hours with unpaid overtime (28%), authoritarianism/pressure on subordinates (17%), psychosomatic illnesses (14%), discouragement (13%), family problems (11%), job insecurity (5%), competition/poor relationships with colleagues (4%) (Lampousaki, 2010).

According to Velonakis and Lambropoulou (1999) and Lampousaki (2010), workers believe that the most important among the various causes of stress are the bad relations with other workers or with supervisors, simultaneously occupied with many tasks, pace too fast, too difficult work, poor physical work environment, repetitive work, fear of dismissal, lack of free time. In addition, the most common work related stress outcomes are sleeping difficulties, anxiety and pervasive stress, bad mood, chest tightness or pressure on back of neck, less libido, excessive consumption of food, unwarranted fatigue, increased smoking.

4.5.3 Job Satisfaction and Health

This subsection provides an overview of the main research findings regarding job satisfaction issues in Greece. Job satisfaction is a key indicator since it is closely related to individual performance and efficiency and it is greatly affected by personal and job characteristics. Koustelios (2001) examined job satisfaction levels among a small sample of Greek teachers and argued that work autonomy, career prospects, working conditions are strongly affecting job satisfaction. Work autonomy and working conditions are also found to be strong determinants of job satisfaction among

Greek accountants (Spathis, 1999). Labiris et al. (2008) finds similar results in a small sample of employees in mental health services, by using LISREL regression techniques. In particular, it seems that job retention factors (namely, interpersonal relations, salary, organizational structure and management, working conditions) are more strongly related to the job satisfaction levels in their sample than the job motivation factors (recognition, achievement, advancement, responsibility). Markovits et al. (2007) also notes that organizational commitment seems to play a role in the job satisfaction of the employees in the public sectors but not to the employees in the private sector, due to the large difference in working conditions among them.

A descriptive, cross-sectional study was undertaken by questionnaire on a random sample of Registered Nurses. This study has added additional information to the knowledge concerning job satisfaction in nurses by concentrating on two distinct nurse populations working in the Greek health sector: civil hospitals and military hospitals (Mallairou et al., 2010). Nurses in the civilian sector who are allowed to practice autonomously, using independent judgment and critical thinking skills, have a greater sense of job satisfaction. Furthermore, findings of this research suggest that in military health organizations, educational preparation, and personal characteristics of registered nurses affect their level of satisfaction. The findings also suggest a lack of co-worker support and lack of social award of the profession were related to dissatisfaction in civilian nurses.

A diary study among Greek employees working in a fast food restaurant investigates how daily fluctuations in job resources (autonomy, coaching, and team climate) are related to employees' levels of personal resources (self-efficacy, self-esteem, and optimism), work engagement, and financial returns. Multi-level analyses

revealed that day-level job resources had an effect on work engagement. According to the results, employees were more engaged on those days that were characterized by job resources, including supervisor, coaching and a favourable team climate. Daily engagement, in turn, had a positive effect on same and next days' financial returns (Xanthopoulou et al., 2009).

Moreover, Alexopoulos et al. (2009) argue that risk perception among employees is not extensively addressed in the literature. They examine the way employees perceive work risk in the baking industry with information on employees from Great Britain and Greece. They argue that cultural factors are influencing to a large extent individual risk perception in the workplace. In detail, the Greek employees attribute mainly work risk to work experience. On the other hand, the British employees link job risk to the company's OSH plan.

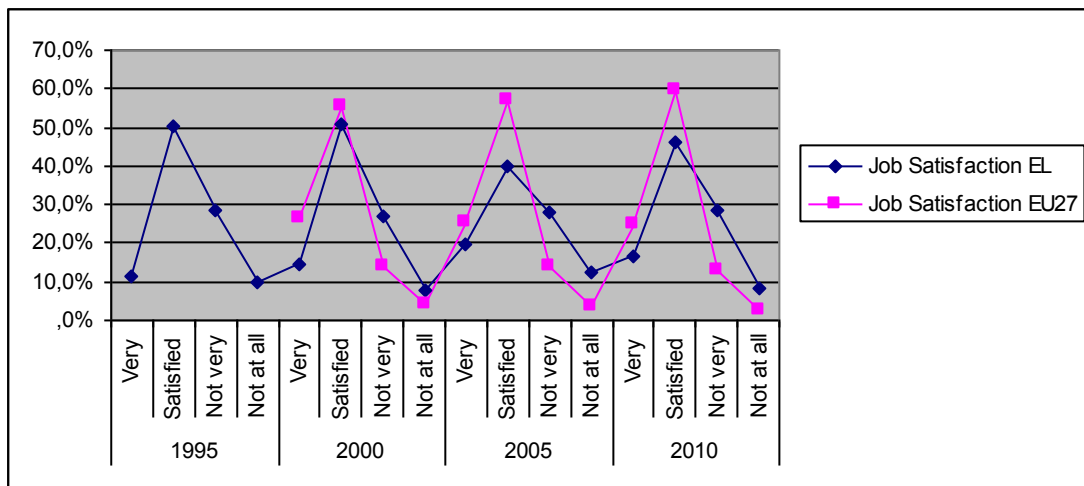
Another aspect which is taken into consideration is the work environment and its significant changes such as working time, years of employment, work organization, type of employment contracts and working conditions. The paper of Papadopoulos et al. (in press) examines the consequences of these changes on occupational and public health and safety. These include the disruption of human biological rhythms, the increase of workers fatigue due to changes in patterns of working hours and years, job insecurity and occupational stress, which have serious impacts on workers' health and may result to an increase in occupational accidents. In addition, unsafe work practices related to workload and time pressure resulted to an increase in occupational accidents rates. Katsakiori et al. (2010) utilized Linear Structural Equation Modeling techniques to analyse the effect of workplace and organizational characteristics on work injuries in the manufacturing sector in Greece. Work design and training are found to be significant risk factors of work injuries. However, the findings should be treated with

caution since the number of reported work injuries based on which information is drawn are 40; a relatively small sample.

Another paper reviews existing evidence on the effects of changing work environment on safety and occupational accidents. There is growing evidence that new work environment can have a negative impact to safety. Downsizing was linked to reduced safety outcomes where lean production industries have higher injury rates. Precarious or atypical (occasional) workers are more vulnerable to occupational accidents. Existing data also suggest a higher accident rate for migrant workers (Koukoulaki, in press).

According to fifth European Working Condition Survey, the percentage of job satisfaction in Greece is lower than in EU countries. The employees asked how satisfied were with working conditions in their main paid job (Graph 4.6; see also Table 4.6, Annex B).

Graph 4.6: Job Satisfaction Comparison between Greece & EU27



Source: European Working Conditions Survey, 2010; own calculations

In general, difficulties related to lack of time and lack of methodological tools, lack of training and unsafe work practises, underreporting of occupational accidents and occupational illnesses are still in the limelight.

4.5.4 Absenteeism

To conclude the section of OSH research findings, we present the available Greek data about absenteeism, as well as the potential shortcomings. In Greece, the issue of absenteeism has not been the subject of systematic investigation. The National Statistical Service of Greece provides no data in this regard. The Social Insurance Institute offers some primary data, which need to be processed. Policies to address absenteeism are mainly linked to health and safety legislation, the number of leave days, and legislation on arduous and unhealthy occupations.

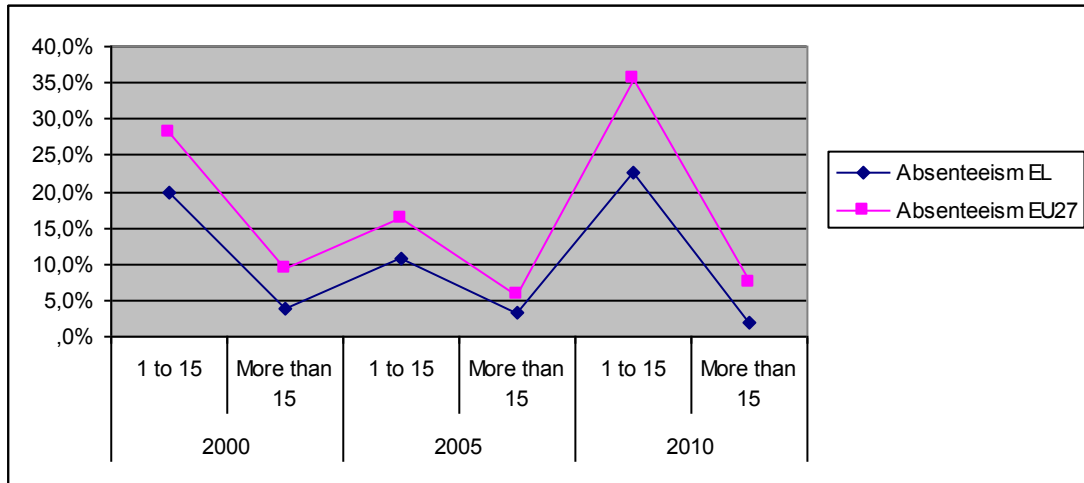
Absence is defined as non-attendance at work when attendance was scheduled or clearly expected. The law stipulates that insured people are entitled to sickness benefits from IKA when they are absent from work due to illness for longer than three days. The main data sources for absence from work at national level are included in the annual Social Insurance Institute. It should be emphasised, however, that these data are insufficient, because they refer only to private sector employees who are insured by IKA. According to the most recent IKA Statistical Bulletin for 2006, the following totals emerged:

- 6,337,686 days of subsidy for ordinary illness;
- 485,550 days of subsidy for workplace accidents;
- 3,700,647 days of subsidy for maternity leave.

According to a doctoral thesis entitled 'Employee absenteeism and the inhibitory effect of unemployment and non-standard forms of employment: The case of private sector employees in Greece' (Patra, 2004), annual days of absence per insured person were calculated at 4.87 days in 2000, based on IKA data. In addition, according to fifth European Working Condition Survey, the percentage of absent days in Greece is

lower than in EU countries. The employees reported the absent days from work for health problems over the past 12 months (Graph 4.7; see also Table 4.7, Annex B).

Graph 4.7: Absent Days Comparison between Greece & EU27



Source: European Working Conditions Survey, 2010; own calculations

4.6 OSH Costs

In this point, it is essential to mention the economic impact of OSH indicators which have been investigated in previous sections. Accidents and occupational diseases can give rise to heavy costs to the company. For small companies particularly, occupational accidents can have a major financial impact. Prevention of accidents has more benefits than just reducing damages. Preventing occupational accidents and diseases not only reduces the costs, but also contributes to improving company performance. Occupational health and safety can affect company performance in many ways. For instance, healthy workers are more productive and can produce at a higher quality; less occupational accidents and diseases lead to less sick leaves, in turn this results in lower costs and less disruption of the production processes; equipment and a working environment that is optimized to the needs of the working process and that are well maintained lead to higher productivity, better quality and less health and safety risks; reduction of accidents and diseases means less

damages and lower risks for liabilities (European Agency for Safety and Health at Work, 2002).

Cost data can also provide information about such occupational risks as back injury, carpal tunnel syndrome, fracture, burn, and even death. Adding the costs for these disparate injuries and diseases is a way to summarize the risks. Costs combine incidence with severity. On the other hand, costs expressed in terms of a monetary value are easily understood by researchers, employers, and workers alike. The costs of occupational accidents and diseases can be divided into several broad categories. Quality of life costs refer to the value attributed to pain and suffering by victims and families. Internal and external costs determine the gap between the economic incentive to the individual decision – maker and the corresponding incentive to society. Finally, direct and indirect costs determine whether the decision – maker will perceive the economic incentives that actually exist (Leigh et al., 2004).

The financial cost of absenteeism in Greece has been investigated very little. According to Patra (2004), 256,663,270 € was spent on subsidising days of absence of people insured by IKA and other social insurance providers in 2001. This amount covers five days of absence on average per insured person, beginning in each instance on the fourth day for absences of more than three days. For confirmed illness of up to three days, wages are paid by the employer.

Since IKA subsidises absences due to illness of five days on average, and the employer usually subsidises three days, the hypothesis has been put forward that spending by Greek employers to pay wages for their employees' days of absence amounts to three fifths of the annual spending of IKA and other social insurance providers. Thus, it is estimated that Greek enterprises spent €153,997,960 for this

purpose in 1998. Of course, this estimate does not take into account sickness absences of up to three days, for which the employer solely pays.

Costing is most commonly divided into direct and indirect. Direct costs may include the salary of the absent employee or statutory sick pay, replacement costs and overtime costs. The indirect costs may include the effects of productivity, administration, quality of service, social security contributions and the cost of hiring of replacement workers.

According to a research in Elefsina shipyards in 1991, concerning absent days and work-related costs, the direct cost was estimated at 1.142.181 drachmas (≈ 3352 €), the indirect cost of working hours lost was 5.163.750 drachmas (≈ 15154 €) and the indirect cost of insurance expenditure was 349.762 drachmas ($\approx 1026,45$ €). The total indirect cost was 5.610.712 drachmas (≈ 16466 €) and the total cost (direct - indirect) was 6.752.893 drachmas ($\approx 19817,73$ €) (ELINYAE, 2007). Another research regarding DEI (Public Power Corporation) estimated the financial cost of occupational accidents for the years 1994 and 1995. The results are presented in the table below (Table 4.8, Annex B).

According to the literature, there are two approaches to cost estimation: the prevalence approach for the annual expenditures and the incidence approach for the prospective cost. Targoutzidis et al. (2010) uses data from IKA –ETAM for the year 2007, in order to estimate the cost of subsidies, retirement pensions and lost contributions due to work-related accidents at work according to both prevalence and incidence approaches. According to the prevalence approach, the cost of retirement pensions due to work-related accident at work was estimated at 96.183.821,78 € and the lost contributions were estimated at 24.764.779,31 €. The cost of subsidies due to impermanent disability was 12.338.448,29 € for 606.497 subsidy days and the lost

contributions were 4.918.655,37 €. The total cost was estimated at 137.763.025,76 € (Table 4.9, Annex B). According to incidence approach, the cost of retirement pensions due to work-related accident at work was estimates at 36.867.274,38 € and the lost contributions were estimated at 11.009.495,89 €. The cost of subsidies due to impermanent disability was the same as the approach above. The total cost was estimated at 64.691.194,95 € (Table 4.10, Annex B).

Work-related accidents seem to incur a considerable cost for the enterprises. The lack of a common and easy method for the work-related accidents cost estimation, as well as the lack of research concerning financial costs of absent days at work due to occupational accidents and illnesses, are the main causes for the limited amount of knowledge of the extent, causes and costs of absence and occupational accidents (ELINYAE, 2007).

4.7 Greek SWOT Analysis

Given the above discussion, it seems that Greece attempted to implement health and safety policies aiming at the improvement of working conditions. The aim of the section is to review these policies and point potential inequalities. The implementation of health and safety policy and the likely development of health and safety indicators in Greece consist of strengths, weaknesses, opportunities and threats.

The establishment of public bodies and organisations, like SEPE and ELINYAE, with the responsibility to monitor the enforcement of the OSH law in order to reduce work accidents and diseases, to provide data and information on OSH indicators, to train and inform employees and to provide research on OSH issues consists an important feature of Greek health and safety policy and indicators. Moreover, among the advantages of Greece are the synchronization of Greek OSH legislative

framework in line with the EU guidelines, the current effort to provide a list with occupational diseases and the introduction of “work doctors” in the workplace.

Furthermore, Greece has acquired the opportunity to exchange ideas on OSH policies and workplace designs, as well as on the prevention ways, to cooperate with other countries, to hire specialised personnel to monitor the OSH legislation in the native labour market, and to accomplish more research on the risk factors that affect the probability of work injuries, on the workforce members that have a higher probability of experiencing an accident risk and on the prevention methods.

On the other hand, the Greek OSH legislative framework suffers from high degree of centralization, fragmentation of coverage, inequitable coverage and access to health services and distortions in the allocation of resources. OSH policy is targeting on treatment and not on prevention. The public expenditure on OSH targets and policies is rather low. There is a big discrepancy between law and practice in Greece, i.e. lack of trained personnel at workplaces, lack of occupational health inspectors, lack of education and information among employees and employers. It has been also considered lack of an up-to-date record of occupational illnesses, lack of indicators regarding occupational stress, job satisfaction/job quality, absenteeism, early retirement and lack of information concerning mental health of employees. Furthermore, the empirical research on OSH and the relevant public sources (datasets) are rather inadequate. The small number of samples in Greek studies, the lack of studies with data on a long time-span, the lack of advanced econometric tools and the mainly employ of descriptive statistic tools undermine the validity of the findings.

Employers neglect to conform to the OSH guidelines and they are not well informed nor on the job risks neither on the OSH prevention measures. Often, employees are pressured by employers to overlook OSH rules in order to achieve

higher productivity. The economic recession as depicted by national unemployment rates affects work accidents. During economic recessions, employers adopt cost cutting practices that might affect the OHS investments, for example reduce firm expenditure on training and safety equipment. Moreover, workers in employment tend undertake far riskier job tasks under the threat of high unemployment threats. They also underreport non fatal work accidents and injuries, under the fear of dismissal from their work. To conclude, the number of fatal work injuries in Greece seems to be high with increasing trend.

4.8 Conclusions

It is a common notion among researchers that while the law appears quite adequate, there is a greater need for both prevention strategies and enforcement of the existing safety regulations to be performed by policy makers. Given the inadequate monitoring of the implementation of the legislation, changes to the monitoring mechanisms and a greater focus on prevention strategies rather than treatment strategies is proposed by researchers (Karakioulafi, 2005). The need for more intense and systematic inspections at workplaces, as well as the need in training and OSH education of the labour force is emphasized by the majority of the relevant surveys presented in this study. OSH education should be a priority target so that employees can acquire adequate knowledge on both the risks and the prevention strategies of work-related injuries (Alexe et al., 2003). On the other hand, enrichment of worker protection legislation over the last decade should be combined with stricter monitoring measures by local SEPE offices (Lamprousaki, 2009; Soumeli, 1998) who also have to be reinforced since significant shortage of staff is observed since the day this body was created (Bazes, 2001).

While OSH is an issue of interest in current research at the international level, there is observed a great research gap in Greece. The studies that examined work-related

accidents and diseases are quite limited in number and they have the disadvantage that they are of cross-sectional character. Furthermore, the research results should be treated with cautiousness since the majority of the studies draw information from small samples and they use statistical tools to derive their findings. In addition, more systematic research should be done on the determinants of injuries, on the effects of injuries on job, productivity, etc. Occupational accidents and diseases as well as absenteeism and job dissatisfaction, can give rise to substantial costs to the enterprises. However there is limited knowledge of the extent, the causes and the costs of the occupational health and safety indicators concerning the Greek labor market. Priority should be given to the population groups that report systematically higher incidence of work-related injuries (e.g. migrants, males, middle-aged employees) and to the blue-collar jobs which seem to record the higher incidence of work-related injuries and diseases¹.

After the discussion of the occupational health and safety issues regarding EU countries and the case of Greece, we concentrate to the investigation of a potential causal relationship between injury absenteeism and job satisfaction. Although there has been an increasing interest concerning the issue of absenteeism, there is a lack of attention in the literature to injury related absenteeism which is a particular type of absenteeism. The following chapter attempts to fill this gap and examines the relationship between the two indicators by using Greek and UK data. The chapter also discusses possible policy measures towards reducing injury related absenteeism.

¹ For more discussion see paper Drakopoulos, Economou and Grimani, 2012.

Chapter 5

Injury - Related Absenteeism and Job Satisfaction Relationship using Greek and UK Data: *An Econometric Model*

5.1 Introduction

The previous chapters discussed the theoretical framework of occupational health and safety, as well as a comprehensive review of current state of research regarding OSH issues in EU countries and in Greece. In particular, the chapters presented, the main points of the OSH legislation framework, the research findings regarding the incidence and the risk factors of occupational accidents and diseases, the absenteeism and job satisfaction trends and patterns, as well as the methodological shortcomings and gaps of the existing literature. This chapter concentrates on the investigation of a potential causal relationship between job satisfaction and a particular type of absenteeism: the injury related absenteeism. Most of the literature on absenteeism suggests that absence from work is a complex issue influenced by multiple causes. Job satisfaction has also been identified as one of the factors affecting an employee's motivation to work attendance. Since there is no universal agreement concerning the relationship between absenteeism and job satisfaction and there is a lack of attention in the literature regarding the injury related absenteeism, this study attempts to fill the gap.

In recent years, there has been an increasing interest concerning the issue of absenteeism, spurred by a growing awareness that the economic and social costs of the phenomenon are quite substantial. Thus, it is not surprising that many studies have

concentrated on the determinants of absenteeism in an attempt to discover ways and policies to reduce it. Absenteeism, however, is influenced by many factors which make it difficult to quantify, qualify or rectify (Tylczak, 1990). Family obligations, working conditions, occupational accidents, and distance to work can be some of these factors (see Rhodes and Steers, 1990; Michie and Williams, 2003; Ose, 2005). Furthermore, the employee's level of job satisfaction in the workplace has also been suggested by different researchers as one of the main factors affecting absenteeism (e.g. Steers & Rhodes, 1978; Tylczak, 1990; George & Jones 2002; Gyekye & Salminen, 2006; Böckerman & Ilmakunnas, 2008). Job satisfaction is generally defined as an employee's attitude toward the job and the job situation. In particular, Robbins et al. (2003) define job satisfaction as the difference between the rewards employees receive and the reward they believe they should receive. Thence, the higher this discrepancy, the lower job satisfaction will be. This deterioration causes deceleration of the work, job success and job productivity, and increases occupational accidents and complaints (Brooke & Price, 1989; Iverson & Deery, 1997; Lum et al., 1998; Kilic & Selvi, 2009).

Absence from work is defined as non-attendance when attendance was scheduled or clearly expected. The majority of absences are generally attributed to sickness or incapacity, but there may be other reasons. According to Brown & Sessions (1996), there are three different classes of absenteeism: absence due to sickness, absence due to accidents and a residual class, interpreted as voluntary absence. The causes of absenteeism are in general multi-faceted, and are influenced not only by the health status of individuals, but also by the social insurance system, the work environment, biological factors, attitudes and commitment to work, macroeconomic conditions and

other social and psychological determinants (see Chelius, 1981; Drago & Wooden, 1992; Brown & Sessions 1996; Lokke Nielsen, 2008).

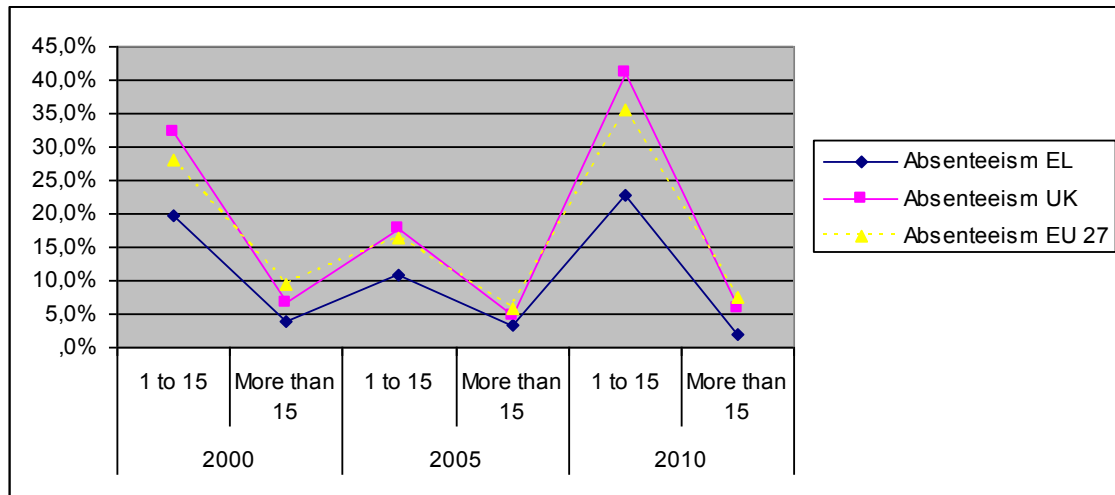
There is ample literature focusing on the relationship between job satisfaction and absenteeism. However, there is a lack of attention to the injury related absenteeism and its relationship with job satisfaction. A more detailed investigation of this issue might also increase our understanding concerning appropriate policy recommendations for reducing absenteeism. The study attempts to fill this gap by concentrating on relevant data from Greece and UK. Greece can be seen as a typical southern European country, while UK is considered a typical northern European country with the relevant socio – economic, institutional and cultural differences (see for example Gimeno et al., 2004)

The issue of the relationship between absenteeism and job satisfaction has not been the subject of systematic investigation in Greece. Most official Greek public databases provide no data in this regard, except from the Social Insurance Institute (IKA) which offers some primary data on absenteeism. It should also be emphasised that these data are insufficient, because they refer only to private sector employees who are insured by IKA. The most recent IKA Statistical Bulletin for 2006 and 2007 indicates that the level of subsidy for ordinary illness, workplace accidents and maternity leave, is quite significant². Greece is also an interesting case given that the percentage of absenteeism and job satisfaction is lower than the corresponding levels of EU-27 countries. Furthermore, the same difference also holds for UK (taken as a typical Northern European country) as the tables below indicate³.

² According to the most recent IKA Statistical Bulletin for 2006 and 2007, the following totals emerged: 6,337,686 days of subsidy for ordinary illness (2006); 556,848 days (2006) and 600,831 days (2007) of subsidy for workplace accidents; 3,700,647 days of subsidy for maternity leave.

³ The European Community Household Panel (ECHP), shows that on a 1 – 6.6 scale (6.6 being the highest possible level of job satisfaction), UK employees state an average value of 4.4, while Greek

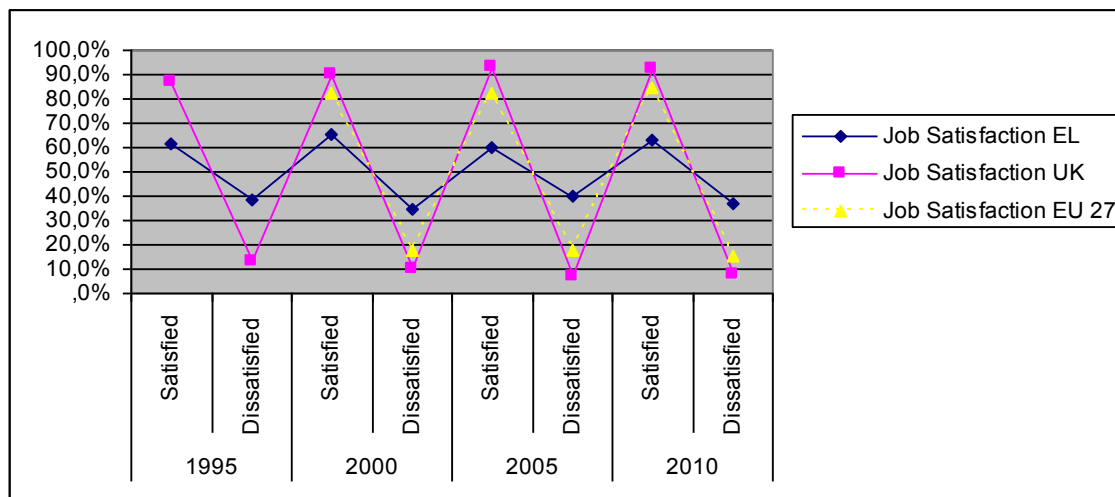
Graph 5.1: Absent days percentages (Greece, UK and EU-27 countries average comparison)



source: EWCS, 2010; author's calculations

The percentage of absent days in Greece is 22,7% (1 to 15 days span) and 2% (more than 15 days span), while the percentage of absent days in UK is 41% and 5,9% respectively. Thus, absenteeism in Greece is lower than UK and EU-27 countries average (5th European Working Condition Survey, 2010).

Graph 5.2: Job Satisfaction percentages (Greece, UK and EU-27 countries average comparison)



source: EWCS, 2010; author's calculations

employees state an average value of 3.8 approximately (Oswald & Gardner, 2001). Over the year 2004, approximately 4,5% of workdays on average were declared by managers as being lost due to sickness absence or absence at their establishments in UK (Barham & Begum, 2005; Pouliakas & Theodoropoulos, 2009).

The percentage of satisfied employees in Greece is 63,2%, whereas the percentage of dissatisfied employees is 36,8%. On the contrary, the percentage of satisfied employees in UK is 92,6%, whereas the percentage of dissatisfied employees is 7,4%. Thus, job satisfaction in Greece is lower than in UK and in EU-27 countries average. Compared to the EU-27 countries average, the level of job satisfaction in UK is relatively higher (5th European Working Condition Survey, 2010).

Given the above, this section will examine the relationship between injury related absenteeism and job satisfaction employing data drawn from a recent European research project (SOCIOLD). The 5.2 section will present an extensive literature survey concerning absenteeism and job satisfaction and also the nature of their relationship. The following sections 5.3, 5.4 and 5.5 will describe the data and the empirical methodology as well as the research findings regarding the statistical significant relationship (if there is any) between injury absenteeism, job satisfaction and other determinants. A conclusion with possible policy recommendations will close the section.

5.2 Literature Review of Job Satisfaction and Absenteeism Relationship

The connection between job satisfaction and absenteeism has attracted the interest of numerous studies. The paper by Steers & Rhodes (1978) was one of the first to attempt to construct a theory of absenteeism, attributing its incidence primarily to job dissatisfaction. In particular, job satisfaction was highlighted as the key to an individual's voluntary absence decision. This approach was also supported by Scott & Taylor (1985) and Brooke & Price (1989). The basis of the theory was that employees will withdraw or be absent from a work situation that is painful and dissatisfying (Waters & Roach, 1971; Muchinsky, 1977). Although, other factors such as avoiding

painful work situations and inability to come to work, are also included, motivation to attend work is assumed to be a major factor determining the rate of absenteeism (Scott & Mabes, 1984; Siu, 2002). Other empirical studies have supported the job satisfaction - absenteeism relation. In two early papers, Waters and Roach (1971) and Hrebiniak and Roteman (1973) reported that the level of frequency of absence and the number of absent days respectively was significantly related to job satisfaction. Oldham et al. (1986) suggested that the workers who felt under-rewarded were less satisfied and exhibited lower performance and higher absenteeism than employees who felt equitably treated. Moreover, Rosse & Miller (1984) and Hoque & Islam (2003) found that job dissatisfaction contributes positively to absenteeism, thus the lower the dissatisfaction levels, the higher absenteeism amongst the sample of workers. Lau et al. (2003) conducted a meta-analysis on 19 different studies and found job satisfaction effect (although a weak one) on absence from work.

In the same tone and from a more economic viewpoint, absences are understood as the outcome of the worker's labor - leisure choice. A worker is absent whenever the benefits of not working are greater than the costs (Allen, 1981; Böckerman & Ilmakunnas, 2008). Thus, one can argue that job satisfaction is a predictor of absenteeism.

It has to be pointed out though, that there is no universal agreement concerning the exact nature of the relationship between absenteeism and job satisfaction. As was mentioned above, researchers have generally believed that job satisfaction is inversely related to absenteeism. Since the early 1970's, many specialists started to question the nature of this relationship. More specifically, the established theory that an undesirable work situation causes absenteeism, was criticized by Nicholson (1976) by arguing that many findings were inconsistent. Thus, alternative hypotheses

concerning this relationship started to appear. One of those advanced by Steers & Rhodes (1978) and Clegg (1983) is that the relationship between job satisfaction and employee absenteeism is not direct. They suggested that undiscovered moderator variables may cause the mixed findings.

Other studies have challenged those that observed a strong relationship between job satisfaction and absenteeism. More specifically, in an early paper Nicholson et al. (1976) found that job satisfaction is not a major cause of absence. They suggested that under some situational and individual circumstances, there may be some causal relationship. Clegg (1983) and Goldberg & Waldman (2000) also found no relationship between the two variables, while others find a highly negative relationship (Farrell & Stamm, 1988). Spector (2000) has suggested that absence and job satisfaction might be more strongly related under some conditions (e.g. blue collar workers). Scott & Taylor (1985) concluded that the conflicting findings are a result of sampling error and measurement reliability, scale inadequacies and of different measures of job satisfaction and absence.

5.3 Data

The data used in this study was drawn from SOCIOLD (socioeconomic and occupational effects on the health inequality of the older workforce)⁴, a European research survey. This three – year research project contains data from six EU countries (UK, France, Finland, Denmark, Netherland and Greece). The participants were 45 – 65 years old, and were selected by the method of multistage sampling. The procedure had four stages of random and systematic sampling. Multi-stage sampling is similar to cluster sampling, but with several stages of sampling and sub-sampling. This method is usually used in large-scale population surveys as it gives more

⁴ Further information on the project can be found at <http://www.abdn.ac.uk/sociold/index.hti>.

objective and scientifically defensible evaluation findings and is less prone to bias. The participants responded to a questionnaire of 40 minutes duration, comprising of 58 questions relating to issues such as physical and mental health status, past working experiences, incidence of diseases, sense of well-being, job satisfaction, absenteeism and socioeconomic and occupational background of the participants of the labour force. The surveys were conducted in the summer-autumn of 2004 through internet (face-to-face interviews took place in Greece where internet penetration at the time was limited especially with regard to the sample population). Owing to missing information on some variables for some participants and after necessary data processing, the final sample consists of 1001 individuals from Greece and UK. The UK sample was the most consistent and similar to the one from Greece regarding our data of interest. In addition, the UK variable is utilized as a reference point in order to emphasize the difference between Southern and Northern European countries as some papers suggest (e.g. Gimeno et al. 2004).

The questionnaire data of interest included injury absenteeism and job satisfaction variables. It also included type of employment (three dummy variables = fixed (3,3%), temporary (3,4%) and permanent (59%) contracts); type of industry (seven separate dummy variables = Agriculture, forestry and fishing (2,6%); Construction (8%); Manufacturing (16,8%); Hotels & catering (3,5%); Transport & communication (6%); Banking, finance, insurance (6,2%); other services (39,6%); career path (25% of the respondents saw themselves as following a career path); the percentage of the spouse's contribution to the overall household income; UK dummy variable. Finally, the data contained personal variables such as age (from the record of the participants' birth date); gender (547 males & 454 females (55%) and (45%)); and education level (three dummy variables = low (30% re-primary & primary education), middle (35%

lower, upper & post secondary education) and high (30% first & second stage of tertiary education).

Injury absenteeism was assessed by the number of days off work due to a recent serious occupational injury that the participants experienced during their current or last job, if not employed or retired. According to the sample, 89% of the respondents reported no absence due to a recent serious injury at work, 3% reported 1 to 15 days absence and 8% reported more than 15 days absence. The job satisfaction measure was constructed from ten separate items - occupational characteristics (work environment, the respect you get from your employer, decision latitude, workload, job stress, working hours, physical risk, wage compensation, job security, career prospect) on how satisfied or dissatisfied the participants were with their present job, using a 1-6 Likert scale (1 was very dissatisfied and 6 was very satisfied). The constructed index variable was linearised by using z-scores transformation. The negative values of the z-scores were transformed into positive and the natural logarithm (ln) was estimated. Reliability and validity estimations were conducted prior to index variable construction. The internal consistency approach (Cronbach's alpha) was employed in order to assess the reliability of the scale. Cronbach's alpha is the most widely used method for evaluating inter-item reliability because it refers to the correlation of each item with every other item. According to the results, the Cronbach's alpha of the overall job satisfaction scale was 0.9587. This suggests that the internal reliability of the scale is very high, since an instrument with an internal consistency coefficient of 0.80 (scale total) or higher is considered to be adequate (Van Saane et al., 2003). The validity of the scale used, was also assessed by content validity. The term 'content validity' refers to the extent to which an instrument covers the whole concept. The content validity was assessed by examining the fit between

relevant work factors retrieved from the literature search, with work factors included in the instrument under assessment. The work factors were categorized in 11 related domains (Autonomy, financial rewards, promotion, workload, work demands, co-workers, work content, growth/development, supervision, communication, meaningfulness), representing the content of job satisfaction. The content validity was estimated as adequate under the assumption that the greater the number of work factors, the more this instrument would measure the concept of job satisfaction. The used scaled – instrument measured 10 work factors, thus the content validity of the instrument is considered to be satisfactory (see Van Saane et al., 2003).

Table 5.1: Definitions of variables

Variable	Definitions
Absentinjuries	Injury Absenteeism = number of days off work due to recent serious occupational injury
Age	Age = 45 - 65
Males	Males = 1, Females = 0
Fixedcontract	Fixed contract (lasting between 1 & 3 years) = 1, otherwise = 0
Temporarycontract	Temporary contract (lasting less than 12 months) = 1, otherwise = 0
Educlow	Low education (re-primary & primary education) = 1, otherwise = 0
Educmiddle	Middle education (lower, upper & post secondary education) = 1, otherwise = 0
Lnjobsatisf	Ln Job Satisfaction*
Industrydummy1	Agriculture, forestry and fishing = 1, otherwise = 0
Industrydummy2	Construction = 1, otherwise = 0
Industrydummy3	Manufacturing = 1, otherwise = 0
Industrydummy5	Transport & communication = 1, otherwise = 0
Industrydummy6	Banking, finance, insurance = 1, otherwise = 0
industrydummy7	Other services = 1, otherwise = 0
Dummyuk	UK = 1, otherwise = 0
Career	Career path = 1, otherwise = 0
spouseincdummy	Spouse's contribution (%) to the overall household income
Lnjobsatisf_pr	Ln Job Satisfaction predictors

Table 5.2a: Sum Statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
Absentinjuries	1001	10.57043	57.23549	0	900
Age	1001	52.73427	5.351945	45	65
Males	1001	.5464535	.4980862	0	1
Fixedcontract	1001	.032967	.1786395	0	1
Temporarycontract	1001	.033966	.1812323	0	1
Educlow	1001	.2997003	.4583557	0	1
Educmiddle	1001	.3556444	.4789474	0	1
Lnjobsatisf	1001	-1.437273	2.63434	-4.815758	1.074565
Industrydummy1	1001	.025974	.1591373	0	1
Industrydummy2	1001	.0809191	.2728471	0	1
Industrydummy3	1001	.1678322	.373904	0	1
Industrydummy5	1001	.0599401	.2374944	0	1
Industrydummy6	1001	.0619381	.2411635	0	1
Industrydummy7	1001	.3956044	.4892245	0	1
Dummyuk	1001	.5734266	.4948264	0	1
Career	1001	.2447552	.4301569	0	1
Spouseincdummy	1001	36.62537	33.14451	0	100
Lnjobsatisf_pr	1001	-1.437273	1.274887	-4.546059	2.532559

Variables are described in terms of the number of observations, the mean and standard deviation, minimum and maximum. There are 1001 observations. In case of dummy variables which ranges from 0 to 1 (the min and max values), the mean is actually the proportion of observations coded as 1. The standard deviation provides information regarding the spread of the distribution of the variables. According to the descriptive statistics, the values seem to be fine. Although the range of absent injuries seems to be wide, implying the presence of outlier, all the variables, including the dependent variable, have been properly processed.

Table 5.2b: Sum statistics by country

Variables	Greece			UK		
	Mean	Min	Max	Mean	Min	Max
Absentinjuries	3.11944	0	210	16.1132	0	900
Age	52.5855	45	65	52.8449	45	65
Males	0.4918	0	1	0.5871	0	1
Fixedcontract	0.0187	0	1	0.0435	0	1
Temporarycontract	0.0351	0	1	0.0331	0	1
Educlow	0.4215	0	1	0.2091	0	1
Educmiddle	0.3068	0	1	0.3920	0	1
Lnjobsatisf	-2.4694	-4.8158	1.0746	-0.6694	-4.8158	1.074565
Industrydummy1	0.0445	0	1	0.0122	0	1
Industrydummy2	0.1077	0	1	0.0609	0	1
Industrydummy3	0.1709	0	1	0.1655	0	1
Industrydummy5	0.0608	0	1	0.0592	0	1
Industrydummy6	0.0445	0	1	0.0749	0	1
Industrydummy7	0.4707	0	1	0.3397	0	1
Career	0.2319	0	1	0.2544	0	1
Spouseincdummy	47.4169	0	100	28.5976	0	100
Lnjobsatisf_pr	-2.4694	-4.5461	0.3306	-0.6694	-2.7395	2.532559

5.4 Empirical Methodology

The methodological tool for analysing absence data was the Tobit model. Although OLS regression remains the dominant model of absenteeism research, the Tobit model would seem to be a more appropriate and sensible approach, according to Hammer & Landau (1981); Leigh (1985); Baba (1990) and Green (1993). The Tobit model is a regression model designed to handle truncated data, where the truncated value occurs with a high probability and the variable is continuously distributed beyond that point (Tobin, 1958; Wooldridge, 2001). The Tobit model is espoused in order to provide more consistent, reliable and less biased estimates than the OLS model (Baba, 1990; Sturman, 1996).

Our equation of interest is:

$$A_j = \alpha_1 + \alpha_2 JS_j + \alpha_3 X_j + \varepsilon_j \quad (1)$$

Assume that Injury Absenteeism (A) for individual j in country c, then A_j , the dependent variable, is determined by a variety of factors. JS is Job Satisfaction, which

is the basic independent variable, X is a vector of other individual characteristics variables, such as *age*, *gender*, *type of employment*, *education level*, *industry dummies* and *career*, assumed to influence injury absenteeism. The a 's are the associated coefficients, and ε_j is a randomly distributed error term.

Theoretically, Job Satisfaction can simultaneously be affected by injury absenteeism (Clegg, 1983; Brooke, 1986; Erwin, 1995; Kumar & Bakhshi, 2008).

Thus

$$JS_j = \gamma_1 + \gamma_2 X_j + \gamma_3 Z + \varepsilon_j \quad (2)$$

Z is a vector of individual characteristics that influences Job Satisfaction (JS) and contains one variable that is not in X above. The X variables that were used are: *age*, *gender*, *type of employment*, *education level*, *industry dummies* and *career*. The Z variable has to be highly correlated to Job Satisfaction but it should not affect Injury Absenteeism directly. The *spouse's contribution to the overall household income* was used as Z variable.

From the above equation, Job Satisfaction is predicted from each individual. Then these predictions JS_{pr} are placed in the Injury Absenteeism estimation.

$$A_j = \alpha_1 + \alpha_2 JS_{pr\ j} + \alpha_3 X_j + \varepsilon_j \quad (3)$$

5.5 Results

The OLS regression (equation 1, table 3a) results, with robust standard errors, reveal that there is a strong negative relationship between injury absenteeism and job satisfaction. Four predictors exhibited significant relationship to injury absenteeism. The coefficients for males, fixed contract, job satisfaction and UK are statistically significant.

Table 5.3a: OLS Model (column A), Tobit model (column B)

	Absentinjuries	Absentinjuries
age	0.169 (0.404)	-0.176 (2.329)
males	10.49** (4.489)	99.092*** (28.623)
fixedcontract	-7.031*** (2.602)	-37.146 (74.659)
temporarycontract	2.279 (4.088)	42.002 (65.962)
educlowdummy	1.639 (3.661)	14.084 (33.895)
educmiddledummy	9.254* (4.822)	55.704* (29.526)
lnjobsatisf	-4.919*** (1.207)	-21.587*** (5.118)
industrydummy1	-8.424 (5.869)	23.119 (82.266)
industrydummy2	-0.195 (5.954)	62.613 (49.312)
industrydummy3	-4.242 (6.328)	14.003 (41.076)
industrydummy5	2.819 (8.584)	79.011 (52.016)
industrydummy6	2.095 (8.335)	-10.374 (63.255)
industrydummy7	-0.902 (5.726)	26.224 (34.917)
dummyuk	20.12*** (4.810)	121.307*** (29.226)
career	-2.714 (3.749)	-28.145 (30.887)
Constant	-24.67 (24.98)	-487.987*** (133.738)
Observations	1001	1001
R-squared	0.066	
Pseudo R ²		0.0288
Log likelihood		-932.03101

Robust standard errors in parentheses

* significant at 10%, ** significant at 5%; *** significant at 1%

A number of tests have been implemented. A heteroskedasticity test shows that the OLS model suffers from heteroskedasticity, since $\text{prob} < 0.05$. The test for multicollinearity shows no multicollinearity since the results are equal to 1.29 ($\text{VIF} > 1$). Moreover, a summary test of violations of the assumptions on regression errors reveals heteroskedasticity and skewness. In addition, a nonlinearity test reveals

that the residuals have stronger dependence not only between them but also with explanatory variables, meaning that the standard errors are wrong. To rectify the issues of heteroskedasticity and nonlinearity an OLS model with robust standard errors has been used.

The results of the Tobit model (equation 1, table 3b) reveal a strong negative relationship between injury absenteeism and job satisfaction. Moreover, three predictors exhibit significant relationship to injury absenteeism. The coefficients for males, job satisfaction and UK are statistically significant. For a one unit increase in age, there is a 0.17 point increase in the predicted value of Injury Absenteeism. There is a positive relation between injury absenteeism and gender, while males have higher percentage of absence. Moreover, injury absenteeism is higher for UK than for Greece.

It is well known that the validity of the Tobit estimator depends on the assumption of normality (Barros et al., 2010). Several potential misspecifications in the form of heteroskedasticity and incorrect normal assumption imply inconsistency for the Tobit estimation (Brannas & Laitila, 1989). Goldberger (1983) among others, showed that the Tobit estimator becomes inconsistent when the normal distribution assumption of the disturbance is not satisfied. A number of alternative tests for the normality assumption in the Tobit model have been suggested (Jeong & Jeong, 2010; Reynolds & Shonkwiler, 1991). An LM (Lagrangian multiplier) test was used to test the null hypothesis of no specification error of the Tobit model (Vincent, 2010). The LM-statistic has been computed for testing the Tobit specification against the alternative of a model that is non-linear in the regressors and contains an error term that can be heteroskedastic and non-normally distributed. A rejection of the null hypothesis

suggests that the Tobit specification is unsuitable (Vincent, 2010). The results indicated that there was no specification error of the Tobit model.

Table 5.3b: LM test of Tobit specification

lm	Bootstrap critical values		
	%10	%5	%1
39.257	3.407	5.519	13.248

The results from the OLS model (equation 2, Table 4), with robust standard errors, reveal a strong negative correlation between job satisfaction and Z variable (*spouse's contribution to the overall household income*) that is consistent with Clark's (1996) findings. In addition, eight of the independent variables (age, males, fixedcontract, temporarycontract, educlow, industrydummy6, dummyuk, career) exhibit significant relationship to job satisfaction.

Table 5.4: OLS Model (with robust standard errors)

	Lnjobsatisf
Age	-0.048*** (0.013)
Males	0.870*** (0.183)
Fixedcontract	1.408*** (0.236)
Temporarycontract	1.317*** (0.290)
Educlow	-0.413** (0.203)
Educmiddle	-0.294 (0.181)
Industrydummy1	0.048 (0.539)
Industrydummy2	0.147 (0.328)
Industrydummy3	0.225 (0.245)
Industrydummy5	0.549 (0.348)
Industrydummy6	0.831** (0.337)
Industrydummy7	0.197 (0.210)
Dummyuk	1.445*** (0.178)
Career	0.567** (0.171)
Spouseincdummy	-0.010*** (0.002)
Constant	-0.043 (0.798)
Observations	1001
R ²	0.23

* significant at 10%, ** significant at 5%; *** significant at 1%
Robust standard errors in parentheses

Comparing the instrumental variables regression model with the OLS regression (equation 3, table 5a) considering the issue of the endogeneity in the Job Satisfaction – Injury Absences relationship, the results are very similar. There is a marginally statistical significant negative relationship between injury absenteeism and job satisfaction. In order to check the requirement of instrumental variables techniques, a

test for endogeneity has been used. The results indicate that any endogeneity among the regressors would not have deleterious effects on OLS estimates.

Table 5.5a: OLS Models concerning endogeneity

	IVReg Absentinjuries	OLS (<i>considering endogeneity</i>) Absentinjuries
Injobsatisf	-15.73** (6.905)	
Injobsatisf_pr		-15.73* (8.720)
age	-0.354 (0.498)	-0.354 (0.423)
males	22.87** (8.932)	22.87* (12.25)
fixedcontract	7.902 (14.51)	7.902 (10.68)
temporarycontract	16.70 (14.18)	16.70 (11.63)
educlowdummy	-2.692 (5.869)	-2.692 (4.906)
educmiddledummy	6.269 (5.103)	6.269 (4.539)
industrydummy1	-7.624 (13.02)	-7.624 (5.111)
industrydummy2	1.851 (8.530)	1.851 (5.870)
industrydummy3	-2.532 (6.559)	-2.532 (6.168)
industrydummy5	8.688 (9.990)	8.688 (8.597)
industrydummy6	10.76 (10.53)	10.76 (11.02)
industrydummy7	0.756 (5.514)	0.756 (6.095)
dummyuk	37.46*** (11.86)	37.46** (15.69)
wealth_5	4.226 (6.455)	4.226 (4.979)
Constant	-31.67 (20.99)	-31.67 (28.11)
spouceincdummy	0.056 (0.096)	0.056 (0.076)
Observations	1001	1001
R-squared		0.033

Standard errors in parenthesis Robust Standard errors

* significant at 10%, ** significant at 5%; *** significant at 1%

Considering the issue of the endogeneity in the Job Satisfaction – Injury Absences relationship, the utilization of the Tobit model (equation 3, table 5b) indicates a negative relationship between injury absenteeism and job satisfaction. The coefficients for males, job satisfaction, industrydummy5 (transport & communication) and UK are statistically significant. For a one unit increase in age, there is a 3.4 point decrease in the predicted value of injury absenteeism. The results indicate a positive relation between injury absenteeism and sex (males). In the present study, the predicted value is higher for men than for women. It is also higher for individuals with temporary and fixed contract than for those with permanent contract. Moreover, there is no effect of career neither of education on absenteeism. The predicted value is lower for low education individuals, and higher for middle education individuals than for those with high education. This implies that individuals with middle education are more prone to absenteeism. The spouse's contribution to the overall household income is not significantly related to injury absenteeism. Finally, injury absenteeism is higher for UK than is for Greece.

Moreover, in order to enhance the statistical analysis, we estimated the effects of marginal changes. The marginal effects were computed for the expected value of the dependent variable conditional on being uncensored. Marginal effects measure the expected instantaneous change in the dependent variable as a function of a change in a certain explanatory variable while keeping all the other covariates constant. The marginal effect measurement is required to interpret the effect of the regressors on the dependent variable and is also needed to infer the substantive significance of coefficients (for a discussion, see Green, 2003). According to the results, marginal effects did not differ from level effects (Tobit regression) in terms of significance.

An instrumental variables Tobit model (IV Tobit), which controls for the endogeneity problem, has also been estimated. Compared to the Tobit model considering endogeneity, the IV Tobit estimation supplies very similar results. However, the relationship between absent injuries and job satisfaction is marginally significant. The marginal effects obtained from the IV Tobit estimation are also very similar to those from the Tobit estimation considering endogeneity, but as before, the relationship between absent injuries and job satisfaction is marginally significant at 10%.

Table 5.5b: Model outputs concerning endogeneity and marginal effects for the expected value of y conditional on being uncensored for Tobit and IVTobit

	Tobit (considering endogeneity)	Marginal effects after Tobit	IVTobit	Marginal effects after IVTobit
	<u>Absentinjuries</u>	<u>Absentinjuries</u>	<u>Absentinjuries</u>	<u>Absentinjuries</u>
Injobsatisf			-91.381* (47.403)	-17.230* (8.871)
Injobsatisf_pr	-91.460** (46.266)	-14.980** (7.538)		
Age	-3.436 (3.304)	-0.5628 (0.540)	-3.594 (3.416)	-0.678 (0.642)
Males	177.745** (60.178)	28.802** (9.608)	177.661** (62.149)	33.146** (11.292)
Fixedcontract	53.634 (100.760)	9.344 (18.65)	61.683 (103.210)	12.373 (21.988)
Temporarycontract	125.789 (92.075)	23.895 (20.128)	133.663 (95.030)	28.893 (23.341)
Educlowdummy	-12.766 (39.598)	-2.078 (6.406)	-12.643 (40.676)	-2.371 (7.587)
Educmiddledummy	41.302 (32.994)	6.866 (5.558)	36.680 (34.288)	6.996 (6.601)
Industrydummy1	33.368 (85.750)	5.681 (15.162)	31.265 (88.899)	6.084 (17.833)
Industrydummy2	82.101 (52.197)	14.651 (10.086)	77.639 (54.957)	15.706 (11.824)
Industrydummy3	19.817 (43.492)	3.298 (7.352)	26.271 (45.120)	5.046 (8.813)
Industrydummy5	119.453** (60.738)	22.343* (12.832)	120.061* (63.785)	25.411* (14.944)
Industrydummy6	44.275 (74.793)	7.605 (13.468)	44.323 (76.950)	8.711 (15.756)
Industrydummy7	35.036 (36.766)	5.791 (6.124)	37.259 (38.415)	7.085 (7.339)
Dummyuk	249.251** (80.757)	39.774** (12.602)	233.269** (82.504)	42.926** (14.715)
Career	11.690 (43.311)	1.929 (7.197)	16.819 (44.767)	3.200 (8.597)
Constant	-558.873*** (143.882)		-530.437*** (147.392)	
Spouseincdummy	0.381 (0.715)		0.438 (0.687)	
Observations	1001		1001	
Pseudo R ²	0.0214			
Log likelihood	-939.03839		-3186.6275	
y		108.96221		139.94376

* significant at 10%, ** significant at 5%; *** significant at 1%
Standard errors for tobit, ivtobit and marginal effects in parentheses.

In order to check the strength of the instruments against the null hypothesis of weak instruments, a test of over-identification restriction it has been used (Staiger &

Stock, 1997). The test of over-identification restrictions supports the validity and the relevance of the instruments. It performs tests of the coefficient on the endogenous variable after the instrumental-variables (IV) model. The tests are robust to the weak instruments problem, which occurs when the correlation of instruments to the endogenous variable is weak and renders the standard inference tools unreliable, producing spuriously significant results. In particular, it calculates the minimum distance version of the Anderson-Rubin (AR) test statistic which is a joint test of the structural parameter and the over identification restrictions (Finlay & Magnusson, 2009). The Wald test and the Wald confidence interval are also presented in the results. We found that the reported p-values of the Anderson-Rubin (AR) test, indicate high significance, and therefore the weak instrument problem is not present in our estimations.

Table 5.5c: Weak instrument robust tests and confidence sets for IV Tobit

Test	Statistic	p-value	95% Confidence Set
AR	4.31	0.0379	[-224.642,-6.91981]
Wald	3.72	0.0539	[-184.289, 1.52632]

5.6 Discussion and Concluding Comments

In contrast to other European countries, the issue of absenteeism in Greece has not been the subject of systematic investigation. This study utilized a large sample to test the issue of injury absenteeism – job satisfaction relationship. In particular, by using the Tobit model, the results indicated a statistically significant inverse relationship between the number of days employees stay absent due to occupational injury, and their job satisfaction levels. This implies that a low level of employee job satisfaction is associated with an increase in the number and frequency of injury absences. This is

an important result indicating that a specific type of absenteeism is associated with job satisfaction.

Although there is a lack of attention concerning injury absenteeism in the literature, prior empirical research on absenteeism in general provides some insights regarding the main variables. As was pointed out, there is no unanimous agreement supporting the idea that all of the predictors should relate to absenteeism. In this study, three predictors exhibited significant relationship in this study. A non-significant negative relationship between age and injury absenteeism has been found. The negative relationship could be explained by the fact that older workers usually take up higher responsibility at work and are more satisfied, appreciating greater benefits (see for instance, Siu, 2002). However, it is consistent with Hoque & Islam (2003) who found a non-significant relationship between age and absenteeism, with Gellatly (1995), who suggested that age is negatively related to absence and also to Hackett (1990) who suggests that the relationship is quite complex implying that other factors play a role too.

Furthermore, there is a significant relation between injury absenteeism and gender (males). Previous evidence on gender differences in their associations with absence has been inconsistent. In one study, Barmby et al., (2002) found that in most countries women have higher absence rates than men. Various factors relating to home and private life have been suggested to explain female excess in absence (Laaksonen et al., 2007). In this study males tend to show higher absence percentages than females, and this is consistent to other empirical work such as Gimeno et al. (2004), in which males tend to show higher absence percentages than females. The result might be also explained by the fact that males are more prone to occupational accidents and thus to injury absenteeism (see also Rhodes & Steers, 1990).

Although there is no effect of type of employment and education on absenteeism, permanent workers exhibit less absenteeism rates (Böckerman & Ilmakunnas, 2008), while individuals with middle education are more prone to absenteeism. Moreover, there is no effect of career neither of type of industry on absenteeism. Finally, injury absenteeism is higher for UK than for Greece, hence absence percentages in Southern European countries are lower than in Central and Northern European countries (Gimeno et al., 2004).

The present study also has a limitation that need to be acknowledged. The limitation concerns the survey instrument used which was a self-reporting measure of satisfaction. This implies that the information presented by participants is based upon their subjective perceptions. Although participants were assured of confidentiality, it is therefore possible that they either over- or under-reported their level of satisfaction. However, self-reporting measures are widely used in many similar contemporary empirical studies (see for instance, Böckerman & Ilmakunnas, 2008; García-Serrano, 2009).

The issue of the absenteeism – job satisfaction relationship has been the subject of substantial research but with no conclusive findings. The results of the present study indicate that a specific type of absenteeism might offer more empirical information to the complex absenteeism – job satisfaction relationship. Furthermore, it might provide some scope for policy recommendations. As was mentioned earlier, the relevant literature has identified a number of crucial job satisfaction determinants such as salary, job autonomy, opportunities for promotion, quality of supervision, and good working conditions. In terms of possible policy recommendations, the results of this study imply that the above factors which have a high impact on increasing job satisfaction, might also lead to a reduction of injury related absenteeism. Apart from

the obvious benefits to employees, this reduction will also lead to lower absenteeism costs and increased labor productivity. However, further research and more inter country comparisons of absenteeism similarities and differences are clearly needed for the greater understanding of this important issue⁵.

After the investigation of the relationship between injury absenteeism and job satisfaction and the discussion of the possible policy measures towards reducing injury related absenteeism, we concentrate to the potential effect of labor earnings on employees' psychological well-being and distress. There has been an increasing interest concerning the issue of the employees' psychological well-being in the workplace. The next chapter presents a comprehensive literature review regarding psychological well-being and aspects of psychological distress, as well as the nature of the relationship between psychological well-being and labor income. The chapter also attempts to examine the relationship between the two indicators by using data from thirty three European countries and Turkey.

⁵ For more discussion see paper Drakopoulos and Grimani, 2013.

Chapter 6

Psychological well-being and labor earnings: An Econometric Analysis

6.1 Introduction

The previous chapter concentrated on the investigation of a potential causal relationship between job satisfaction and the injury related absenteeism, as a particular type of absenteeism. This chapter aims to investigate the effect of labor earnings on employees' psychological well-being and distress. There is a growing body of evidence that earnings and other socioeconomic predictors can influence mental health. Understanding the employees' well-being is important because working exhibits a substantial psychological dimension for self-identity and sense of purpose. Furthermore, it contributes substantially to overall subjective well-being from a duration weighted perspective given that adults spend an average of about 33.6 hours per week at work (Kahneman et al., 2004; Tay & Harter, 2013).

Psychological well-being has been defined as a combination of feeling good (hedonic perspective) and functioning effectively (eudaimonic perspective). The hedonic component is concerned with subjective experiences of pleasure while eudaimonic component is concerned with fulfillment and the realization of human potential and actualization (Deci & Ryan, 2008; Huppert, 2009; Steptoe et al., 2008). High levels of psychological well-being at workplace allow employees to flourish and achieve their full potential for the benefit of themselves and their organization (Grant et al., 2007). Furthermore, psychological distress is defined as a sense of negative

mental mood, a state of emotional suffering, a combination of symptoms ranging from depression and anxiety to personality traits, functional disabilities and behavioral problems (Mirowsky & Ross, 2002).

Health and well-being at work are key dimensions of the overall European strategies for growth, competitiveness and sustainable development. A healthy economy depends on a healthy population. A healthy workplace is where employees and managers collaborate in order to promote health, safety and well-being of all workers as well as the sustainability of the workplace (World Health Organization, 2010). Without this, employers lose out on worker productivity and citizens are deprived of potential longevity and quality of life. Occupational health and well-being have an intrinsic value and are fundamental to the concept of progress of individuals and the functioning of society, because of their direct link with issues such as labor force participation, productivity and sustainability. In addition, both depression and work related stress are the focus of increased attention, as they can lead to lower well-being and incapacity for work (World Health Organization, 2011; Eurofound, 2012).

Employees' with high levels of psychological well-being tend to be more productive, confident and motivated, make higher quality decisions, show greater flexibility and originality, are more mentally and physically healthy and are less likely to engage in a variety of harmful and unhealthy behaviors (such as smoking, drinking alcohol, unhealthy eating). Moreover, high levels of psychological well-being are related to low levels of sickness absence and labor turnover. Hence, improving psychological well-being of a workforce has social and economic effects, since it brings benefits for both the employees and the organization and influences individual's social behavior, employment relations and productive performance in the

workplace (Lyubomirsky et al., 2005; Grant et al., 2007; Danna & Griffin, 1999; Panos & Theodossiou, 2007).

Given the above, this section will examine the relationship between psychological well-being and labor earnings employing data drawn from the 5th European Survey on Working Conditions (2010). Section 6.2 will present an extensive literature survey concerning psychological well-being and aspects of psychological distress and also the nature of the relationship between psychological well-being and labor income. The following sections (6.3, 6.4 and 6.5) will describe the data and the empirical methodology as well as the research findings regarding the statistical relationship between psychological well-being, labor earnings and other determinants. A conclusion will close the section.

6.2 Theoretical Framework

6.2.1 Psychological well-being and psychological distress

The employees' psychological well-being in the workplace is an important concern and it deserves detailed study. Psychological well-being refers to an overall, long-term state of well-being that includes both cognitive and affective components (Ahuvia & Friedman, 1998; Malka & Chatman, 2003). In addition, psychological well-being essentially stresses pleasant emotional experience and can be treated as two independent dimensions which are called pleasure and arousal. Competence, autonomy, aspiration and self-esteem are also aspects which determine the level of an individual's affective well-being as they tend to be valued as indicators of good mental health (Danna & Griffin, 1999).

Aristotle has been cited as the first written source of the idea that all human action is implicitly motivated by a desire to increase individuals' subjective well-being or eudaimonia, which referred to specific psychological experiences that were seen as

the essence of a good life. He believed that only ethical actions were successful in achieving this goal. Rational choice theory suggests that revealed preferences imply motivation. Hence, individuals, who strive for money, believe (at some conscious or unconscious level) that it will increase their happiness (Ahuvia, 2008).

According to the relevant literature, psychological distress is often applied to the undifferentiated combination of depression, anxiety and personality traits, functional disabilities and behavioural problems. These components may be tied with somatic symptoms such as insomnia, headaches, lack of energy, fatigue (see for instance Kirmayer, 2001).

Stress has been defined in different ways over the years. Originally, it was conceived as pressure from the environment, and as strain within the person. It is the psychological and physical state that results when the resources of the individual are not sufficient to cope with the demands and pressures of the situation (Michie, 2002). It can be a reaction exhibited by the people who have to face excessive pressures originating from various demands placed on them. It can also be labeled as the harmful physical and emotional responses that occur when the requirements of the job do not match the capabilities, resources, or needs of the workers. Job stress can lead to poor health and even injury (Yahaya et al., 2010; Ganster & Rosen, 2013).

Occupational stress has been established as a major issue for both companies and workforce since it is amongst the most frequent health problems related to work. Its most obvious consequences are: financial burden for firms and individuals, lost working hours, medical expenses and reduction in productivity. The development of work related stress may be due to the personal characteristics of the employees and the workplace features (Harnois & Gabriel, 2000; Danna & Griffin, 1999). According to a study by the American Psychological Association (2011), more than one third

(36%) of employees report they are typically stressed out during the workday and one in five (20%) employees report that their average daily workplace stress is high. Low salaries were selected as having a significant impact on work stress, more than any other factor.

The epidemic of workplace stress can be seen as a result of changing workplace and economic conditions over the past 20 to 30 years. During the 1990s, a major restructuring of work was beginning to take place, as many organizations engaged in substantial downsizing. This new economic culture has created more stressful work environments, as seen through the increasing physical and mental tolls on employees, as well as increasing costs for employers in the way of lost productivity, absenteeism, turnover, and disability leave (Bickford, 2005; Ganster & Rosen, 2013).

The three most influential and prevalent theories of occupational stress include the person-environment (PE) fit theory, the framework of occupational stress, and the demand-control-support model. The basic premise of the person-environment (PE) fit theory is that stress arises from a misfit between person and environment, creating diverse strains which affect workers' health and wellbeing. The occupational stress theory is based around the same framework as the PE fit theory, sharing two basic premises: a) stress arises from the misfit between person and environment, and b) subjective perceptions of work environments primarily determine strains. Finally, the demand-control-support model emphasizes the role of work content (such as high job demands, low job control and low social support) as the major source of workplace stress and health problems (Bickford, 2005; Johnson & Hall, 1988). High job demands that employees cannot control, because they have little or no discretion over the place and content of their work, produce job stress (Pfeffer, 2010).

On the other hand, burnout as a complex physical, mental and emotional reaction to constant levels of high stress, can result in depression and unhappiness than can threaten individuals' health, jobs and relationships. Personal characteristics that may lead to burnout include the tendency to place too high expectations as well as excessive compulsiveness, perfectionism and inflated self-confidence. It is also important to look at workplace stress from a financial and economic standpoint. It is generally accepted that workplace stress along with depression and anxiety are associated with increased levels of employee absenteeism and turnover, decreased levels of profit and productivity, as well as lost workdays due to disability or sick leave (Williams, 2003; Bickford, 2005).

6.2.2 Literature Review of Psychological well-being and labor earnings relationship

Although happiness was the subject matter of other social sciences, and mainly of psychology, in the last decade, an increasing number of economists have started to study the concept of happiness at both the microeconomic and the macroeconomic level. The terms “job satisfaction”, “subjective well-being”, and “happiness” are used interchangeably in most recent studies. One of the most important topics of happiness research is the study of the relationship between income and happiness levels. In recent years there has been notable interest in well-being as a determinant of individual economic behavior. The relationship between economic variables and well-being has been subject to rigorous empirical analysis, with data for different countries, different points in time and using different model specifications (Ahuvia & Friedman, 1998; Cummins, 2000; Diener & Biswas-Diener, 2002; Malka & Chatman, 2003; Senik, 2005; Ferrer-i-Carbonell, 2005; Ahuvia, 2008; Dunn et al., 2011; Al-Zoubi, 2012; Diener et al., 2013).

The existing empirical research reveals that the richer countries are happier than poorer countries and within each country, the richer members of the society are happier than the poor. Yet on the other hand, time-series analyses show that higher per capita incomes have failed to generate any noticeable improvement in happiness levels throughout the developed countries. In particular, within a country at a given time those with higher incomes are, on average, happier. However, many studies have found that raising the incomes of all does not increase the happiness of all. This presents researchers with a paradox, termed usually as the happiness or the Easterlin paradox (Diener et al., 2013; Cummins, 2000; Mentzakis & Moro, 2009; Easterlin, 1995; 2001).

Three different theories are advanced to explain this happiness paradox. These are: the theory of adaptation, social comparison theory and the aspiration level theory. The adaptation theory says that an increase in the income will temporarily increase people's well-being, but overtime they will adjust to their higher income such that their well-being reverts back towards its original level (Mentzakis & Moro, 2009). According to the research of Di Tella et al. (2010), the size of adaptation is sufficiently large that no significant income effects on happiness remain after the fourth year. In the same framework consists the example of the long-term paraplegics and the lottery winners who do not report themselves as unhappy nor particularly happy, respectively (Kahneman & Krueger, 2006; Gardner & Oswald, 2007).

On the other hand, the aspiration level theory states that it is the gap between aspirations and achievements, rather than the achievements themselves which determines well-being. If an increase in income leads to a commensurate increase in income aspirations, the magnitude of this gap will remain constant, hence well-being will not increase (Mantzakis & Moro, 2009). This view is based on the idea that

individuals tend to form expectations early in adulthood, which is configured by their education, accumulated experience and social interaction (Panos & Theodossiou, 2007). The reported evidence for the formation of individuals' aspiration levels and their effects on well-being offers an explanation for various empirical observations. For instance, if average aspirations in society increase at the same rate as income per capita, it can be understood why people in industrialized societies did not become happier over the last decades, despite substantial growth in their economic wealth (Stutzer, 2004).

The concept of comparison income is another idea which can also contribute to an explanation of the happiness paradox (Clark & Oswald, 1996). The main thrust of the comparison income argument in the context of happiness research is that individuals do not extract much happiness from their absolute income but from their position relative to other people's incomes. Thus, raising everybody's income might not result in an increase of general happiness (Ferrer-i-Carbonell, 2005).

An additional explanation regarding Easterlin paradox is the idea of hierarchical choice. The hierarchical approach implies that there are some basic human needs which must be satisfied before non-basic needs come into the picture (Maslow, 1954). This might also be an alternative explanation of empirical findings showing a positive relationship between income and happiness up to certain level of income (Drakopoulos, 2008; Drakopoulos, 2013). According to Ahuvia and Friedman (1998), income above a fairly low threshold has a measurable but extremely small relationship with overall subjective well-being. The incorporation of Maslow's theory could provide an important additional insight, if we make the reasonable assumption that basic needs are best satisfied by income (Drakopoulos & Grimani, forthcoming).

Current income alone is an unstable predictor of well-being as it does not accurately reflect consumption or saving behavior nor other components of financial security which contribute to well-being. Family income is positively related to overall life satisfaction as well as to its economic and non-economic domains (Douthitt et al., 1992). Although there is a large body of research on income and happiness, few researchers have investigated the relation between income inequality and happiness, which has produced mixed results. Some researchers have found a negative association between income inequality and happiness, but other researchers have found no association (Oishi et al., 2011). Ott (2005) suggested that inequality is apparently not required for achieving higher levels of happiness. Americans were on average less happy in years with more societal income inequality than in years with less societal income inequality (Oishi et al., 2011). Moreover, theories of interdependent preferences claim that individuals' earnings can affect well-being in two opposite ways, through the affective, relative deprivation (negative effect), and the cognitive (positive) effect (Panos & Theodossiou, 2007). In addition, according to Ahuvia & Friedman (1998), income correlates weakly with subjective well-being because among the prosperous, money seems to have little unique value in helping individuals achieve their goals. In addition, the hedonic perspective states that money leads to well-being primarily to the extent that it enables individuals to use their time in more satisfying ways. Money correlates weakly with desirable experiences because enjoyable leisure is available at all price points, while enjoyable work is not always highly paid. It has also been found that rising income led to higher divorce rates, greater stress, lower global well-being, and less enjoyment of small activities (Diener & Biswas-Diener, 2002).

On the other hand, Binswanger (2006) attempted to explain the paradox of happiness using various treadmill effects. The positional treadmill and the hedonic treadmill describe how people's concern about status and rising aspirations keep happiness from rising along with income. The multi-option treadmill explains why the emergence of more options to spend time and money does not add to people's happiness beyond a certain threshold level. Furthermore, the time-saving treadmill captures the fact that time-saving technological progress fails to mitigate time pressure in people's life. Another suggested explanation of happiness paradox is that the things that bring happiness simply are not for sale. Nevertheless, money allows people to live longer and healthier lives, to buffer themselves against worry and harm, to have leisure time to spend with friends and family, to control the nature of their daily activities, and to have better nutrition and better medical care, all of which are sources of happiness. However, they are not that much happier than those who have less. A potential explanation is that individuals do not spend their money right (Aaker et al., 2011; Dunn et al., 2011). The purpose of money is not to boost happiness. Its function is to aid autonomous goal attainment. Money is not a happiness-giver but rather a fungible facilitator of unfettered goal pursuit. Even if money does not make people happy, it seems able to make people less unhappy, since it is a resource that enables its owner to solve problems and avert suffering (Vohs & Baumeister, 2011).

6.3 Data and Participants

The data used in this chapter was drawn from the 5th European Survey on Working Conditions⁶, which aimed to provide a comprehensive picture of the everyday reality of men and women at work. The research was conducted in the first half of 2010 (face to face interviews) and contains data from thirty three European countries and Turkey.

⁶ Further information on the project can be found at www.eurofound.europa.eu/surveys/ewcs/index.htm

The target sample size of 1000 interviews was set for most countries. The participants were adults (aged 18 to 65), were in employment at the time of the survey and were selected by the method of multi-stage stratified random sample. They responded to a questionnaire of about 44 minutes duration, comprising of 89 questions relating to issues such as working time duration and organisation, work organisation, learning and training, physical and psychosocial risk factors, health and safety, work-life balance, worker participation, earnings and financial security, as well as work and health.

The questionnaire data of interest included psychological well-being, psychological distress and labor earnings variables. It also included type of occupation (four dummy variables: high skilled clerical, low skilled clerical, high skilled manual, low skilled manual), previous occupational status (seven dummy variables: employed with an indefinite contract, employed with a fixed term contract, employed with a temporary employment agency contract, employed, unemployed, in education or training, other) and working hours per week. In terms of countries, the sample consisted of thirty four dummy variables: Albania, Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Kosovo, Latvia, Lithuania, Luxembourg, Former Yugoslav Republic of Macedonia or FYROM, Malta, Montenegro, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Turkey, United Kingdom. Finally, the data contained personal variables such as age and age squared, gender and educational level (three dummy variables: none & primary education, secondary, including lower, upper & post secondary education and tertiary, including advanced level of tertiary education (see Table 6.1).

Table 6.1: Definitions of variables

Variables/ Definitions	
Ln Psychological well-being & distress (LnPWBD)	Austria = 1, otherwise = 0
Ln Psychological well-being (LnPWB)	Portugal = 1, otherwise = 0
Working Stress (self-reported experience on a 5 point scale)	Sweden = 1, otherwise = 0
Males = 1, Females = 0	France = 1, otherwise = 0
Age (18 – 65 years)	Ireland = 1, otherwise = 0
Age ²	Italy = 1, otherwise = 0
Primary Education = 1, otherwise = 0	Luxembourg = 1, otherwise = 0
Secondary Education = 1, otherwise = 0	Netherlands = 1, otherwise = 0
Low skilled manual = 1, otherwise = 0	UK = 1, otherwise = 0
Low skilled clerical = 1, otherwise = 0	Bulgaria = 1, otherwise = 0
High skilled manual = 1, otherwise = 0	Cyprus = 1, otherwise = 0
Working hours per week (1 – 84)	Czech republic = 1, otherwise = 0
Fatigue (yes = 1, no = 0)	Estonia = 1, otherwise = 0
Depression (yes = 1, no = 0)	Hungary = 1, otherwise = 0
Insomnia (yes = 1, no = 0)	Latvia = 1, otherwise = 0
Employed with an indefinite contract = 1, otherwise = 0	Lithuania = 1, otherwise = 0
Employed with a fixed term contract = 1, otherwise = 0	Malta = 1, otherwise = 0
Employed with a temporary contract = 1, otherwise = 0	Poland = 1, otherwise = 0
Self-employed = 1, otherwise = 0	Romania = 1, otherwise = 0
In education or training = 1, otherwise = 0	Slovakia = 1, otherwise = 0
Other = 1, otherwise = 0	Slovenia = 1, otherwise = 0
Ln Labor earning predictors (weekly)	Turkey = 1, otherwise = 0
Ln Labor earnings (weekly)	Croatia = 1, otherwise = 0
Belgium =1, otherwise = 0	Norway = 1, otherwise = 0
Denmark =1, otherwise = 0	FYROM =1, otherwise = 0
Germany =1, otherwise = 0	Albania = 1, otherwise = 0
Spain = 1, otherwise = 0	Kosovo = 1, otherwise = 0
Finland = 1, otherwise = 0	Montenegro = 1, otherwise = 0

The psychological well-being (PWB) variable covers five positively worded items, related to positive mood (good spirits, relaxation), vitality (being active and waking up fresh and rested) and general interests (being interested in things), all experienced over the previous two weeks. Each of the five items is rated on a 6-point Likert scale from 1 (= at no time) to 6 (= all of the time). In addition, of the five scores created an index, which was linearized by using z-scores transformation. The negative values of the z-scores were transformed into positive and the natural logarithm (ln) was estimated. Reliability and validity estimations were conducted prior to index variable construction. The internal consistency approach (Cronbach's α) was employed in order to assess the reliability of the scale. According to the results, the Cronbach's α

of the psychological well-being scale was 0.8814. This suggests that the internal reliability of the scale is high, since an instrument with an internal consistency coefficient of 0.80 (scale total) or higher is considered to be adequate (Nunnally, 1978; Cronbach, 1951). The validity of the scale was assessed by construct validity, using factor analysis. The results are considered to be satisfactory, since the loadings were far from 0 and uniqueness less than 0,50.

In addition, the psychological well-being and distress (PWBD) variable covers the five positively worded items mentioned above as well as four negatively worded items. Those are related to working stress, which is rated on a 5-point Likert scale from 1 (= always) to 5 (= never), depression or anxiety, overall fatigue and insomnia or general sleep difficulties, which are binary variables (Table 6.2). Adding the nine scores created an index, which was linearized by using z-scores transformation. The negative values of the z-scores were transformed into positive and the natural logarithm (ln) was estimated. Reliability and validity estimations were conducted prior to index variable construction. The Cronbach's α of the psychological well-being and distress scale was adequate (0.8094). The validity of the scale was also assessed by construct validity, using factor analysis. The results are considered to be satisfactory, since the loadings were far from 0 and uniqueness less than 0,50.

The labor earnings variable was assessed by reports on the level of weekly, monthly or annual net earnings from main paid job of the participants (exact figure, an estimate or an approximate range). Given that the labor earnings variable is not continuous, we applied the required transformation by assessing the median from each of the reported approximate weekly range and the natural logarithm (ln) was estimated.

Table 6.2: Summary statistics and frequencies

Measures of Psychological well being	Mean	At no time (1)	Some of the time (2)	Less than half of the time (3)	More than half of the time (4)	Most of the time (5)	All of the time (6)
I have felt cheerful & in good spirits	4.394	1.37%	9.20%	9.32%	22.60%	43.74%	13.77%
I have felt calm & relaxed	4.243	2.29%	10.14%	12.23%	24.33%	38.32%	12.69%
I have felt active & vigorous	4.264	2.17%	9.73%	12.35%	25.08%	36.57%	14.11%
I woke up feeling fresh & rested	4.029	4.96%	12.77%	14.27%	22.78%	32.78%	12.45%
My daily life has been filled with things that interest me	4.320	2.12%	10.79%	10.83%	21.69%	38.37%	16.20%
Measures of Psychological distress		Always (1)	Most of the time (2)	Sometimes (3)	Rarely (4)	Never (5)	
You experience stress in your work	3.141	10.46%	15.69%	38.80%	19.42%	15.63%	
		Yes	No				
Depression or anxiety	1.882	11.76%	88.24%				
Overall fatigue	1.569	43.03%	56.97%				
Insomnia or general sleep difficulties	1.786	21.32%	78.68%				

6.4 Empirical Methodology

The methodological tool for analysing psychological well-being data that will be employed in this research is the ordinary least-squares (OLS) regression. The psychological well-being and distress (PWBD) is the dependent variable for the first model, while psychological well-being (PWB) is the dependent variable for the second model. Both are determined by a number of variables including labor earnings. Concerning depression, fatigue and insomnia, logistic regression will be used, since the dependent variables are binary. In addition, an ordinal logistic regression will be used regarding working stress as a dependent variable which has more than two categories. Moreover, because of the lack of interpretation of the coefficients in the Logit and Ordered Logit regressions, the marginal effects method will be utilized, estimating the partial effects on the predicted probabilities. The marginal effects

methodology is employed in order to interpret the statistical output substantively and also to report standard errors and discrete changes (Williams, 2008; Green & Hensher, 2010).

Theoretically, labor earnings can simultaneously be affected by psychological well-being (De Neve & Oswald, 2012). Thus, there might be an issue of endogeneity, which can be dealt with by also employing an instrumental variables (IV) regression model. More specifically, we first estimate a labor earnings equation using the same variables as our basic equations with the addition of a variable which should be correlated to labor earnings but which does not affect psychological well-being and distress variables. Consequently, we will use the predicted values of labor earnings, which we then place in the psychological well-being and distress estimations in order to overcome the endogeneity issue. Before we proceed to the report of the results, we should also mention a limitation of the present study that needs to be acknowledged. The limitation concerns the survey instrument employed, which was a self-reporting measure of psychological well-being and distress. This implies that the information presented by the participants is based on their subjective perceptions. Although participants were assured of confidentiality, it is possible that they either over- or underreported their level of psychological well-being and distress. However, self-reporting measures are widely used in many similar contemporary empirical studies (for instance, see Fordyce, 1988; Charness & Grosskopf, 2001; Senik, 2005; Kahneman & Krueger, 2006; Danna & Griffin, 1999).

6.5 Results

In line with the theoretical part and with our discussion of the empirical methodology section, our equations of interest for labor earnings are:

$$PWBD_j = \alpha_1 + \alpha_2 LE_j + \alpha_3 X_j + \varepsilon_j \quad (1a)$$

$$PWB_j = b_1 + b_2 LE_j + b_3 X_j + \varepsilon_j \quad (2a)$$

It is assumed that the psychological well-being (Equation (1a) including psychological distress variables and Equation (2a)), is determined by a variety of factors. These factors are: LE is the labor earnings, which is the basic independent variable; X is a vector of other individual socioeconomic variables, such as *age*, *age*², *gender*, *education level*, *type of occupation*, *hours of work*, *country dummy variables*, assumed to influence psychological well-being (Dolan et al., 2008; Panos & Theodossiou, 2007; Ferrer-i-Carbonell, 2005). The α and b are the associated coefficients, and ε_j is a normally distributed error term.

The results of the OLS regression models (with robust standard errors, Table 6.3, columns A and B), which are very similar, reveal a positive statistical significant effect of labor earnings on psychological well-being. Nevertheless, that relationship seems to be weak in the sense that the coefficients are relatively small with respect to what economic theory usually presumes (Cook & Weisberg, 1999). An increase of a 100% in weakly labor earnings raises psychological well-being in 0.051 (column A) and 0.075 (column B). The relationship is also weak in the sense that the R squared coefficients are very low (0.068 and 0.059 respectively) which indicates that labor earnings, together with some socio-demographic variables, explain less than 7% of the variability in psychological well-being.

Most of the predictors exhibited significant relationship to psychological well-being at 1% or 5% level. The predicted value is higher for males, which implies that

women's psychological well-being is worse than that of men. With regards to age, a negative relationship with psychological well-being is revealed. In addition, individuals of middle level education and high skilled clericals have higher psychological well-being. Moreover, working hours are associated with a decrease in the levels of psychological well-being. Greece being the omitted country, seems to have lower psychological well-being than Kosovo, Malta and the Former Yugoslav Republic of Macedonia and higher than Baltic and eastern European countries.

Table 6.3: OLS model (A) - dependent variable: Ln Psychological well-being & distress (LnPWBD). OLS model (B) – dependent variable: Ln Psychological well-being (LnPWB)

VARIABLES	(A)	(B)
	OLS model: LnPWBD	OLS model: LnPWB
Males	0.068*** (0.005)	.054*** (.006)
Age	-0.013*** (0.001)	-.015*** (.002)
Age ²	0.00013*** (1.57e-05)	.00013*** (.00002)
Primary Education	-0.031** (0.013)	-.071*** (.018)
Secondary Education	0.017*** (0.006)	.0065 (.007)
Ln Labor earnings	0.051*** (0.005)	.075*** (.006)
Working hours	-0.003*** (0.0002)	-.002*** (.0003)
Low skilled manual	-0.040*** (0.008)	-.093*** (.011)
Low skilled clerical	-0.001 (0.006)	-.017** (.008)
High skilled manual	0.0014 (0.008)	-.034** (.011)
Belgium	-0.023* (0.014)	-.035** (.017)
Bulgaria	0.0223 (0.022)	-.046 (.031)
Czech Republic	-0.071*** (0.017)	-.146*** (.024)
Denmark	0.065*** (0.014)	.059*** (.017)
Germany	0.034** (0.014)	-.006 (.018)
Estonia	-0.064*** (0.019)	-.003 (.023)
Spain	0.086*** (0.015)	.108*** (.019)
France	-0.095*** (0.014)	-.053*** (.017)
Ireland	0.077*** (0.017)	.049** (.021)
Italy	-0.051*** (0.018)	-.119*** (.023)
Cyprus	-0.122*** (0.018)	-.098*** (.027)
Latvia	-0.129*** (0.022)	-.092*** (.024)
Lithuania	-0.089*** (0.019)	-.142*** (.026)
Luxemburg	-0.062*** (0.019)	-.077*** (.024)
Hungary	-0.029* (0.017)	-.081*** (.023)
Malta	0.053*** (0.016)	.063*** (.021)
Netherlands	0.053*** (0.016)	.007 (.022)
Austria	0.048*** (0.016)	-.041 (.023)
Poland	0.038** (0.015)	-.016 (.024)
Portugal	-0.061*** (0.019)	-.039 (.024)
Romania	0.113*** (0.017)	.054** (.025)
Slovenia	-0.049*** (0.017)	-.083*** (.022)
Slovakia	0.009 (0.016)	-.025 (.022)
Finland	-0.023 (0.015)	.028* (.017)
Sweden	0.039** (0.016)	.032* (.018)
UK	-0.013 (0.019)	-.070** (.023)
Croatia	0.041** (0.016)	-.083*** (.022)
FYROM	0.049** (0.020)	.098*** (.026)
Turkey	-0.099*** (0.015)	-.144*** (.023)
Norway	0.0048 (0.016)	.001 (.021)
Albania	-0.019 (0.018)	-.056** (.026)
Kosovo	0.174*** (0.016)	.199*** (.024)
Montenegro	0.055*** (0.016)	.021 (.022)
Constant	1.328*** (0.032)	1.104*** (.044)
Observations	33,633	34,103
R-squared	0.068	0.059

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

As has been mentioned in the empirical methodology section, other equations of interest are:

$$PD_j^{WS} = c_1 + c_2 LE_j + c_3 X_j + \varepsilon_j \quad (3a)$$

$$PD_j^D = d_1 + d_2 LE_j + d_3 X_j + \varepsilon_j \quad (4a)$$

$$PD_j^F = e_1 + e_2 LE_j + e_3 X_j + \varepsilon_j \quad (5a)$$

$$PD_j^I = f_1 + f_2 LE_j + f_3 X_j + \varepsilon_j \quad (6a)$$

The item of psychological distress differs in each equation. For equation (3a) the dependent variable is the working stress, while for equation (4a) is the depression, for equation (5a) is the fatigue and for equation (6a) is insomnia. The reason we did not create an index of psychological distress variable, is because the test for reliability and validity were inadequate. As before, it is assumed that psychological distress variables are determined by a variety of factors: LE is the labor earnings, which is the basic independent variable; X is a vector of other individual socioeconomic variables, such as *age*, *age*², *gender*, *education level*, *type of occupation*, *hours of work*, *country dummy variables*, assumed to influence psychological well-being (Dolan et al., 2008). The c, d, e and f are the associated coefficients, and ε_j is a normally distributed error term.

The results of Logit and Ordered Logit models (with robust standard errors) are not straightforward (see also Greene, 1993). We can identify the significance of the variables but neither the signs nor the magnitude of the coefficients are informative about the results, and this makes the direct interpretation of coefficients fundamentally ambiguous. Therefore, we will report the marginal effects for better interpretation.

The empirical results indicate that labor earnings have a positive statistical significant impact on working stress. In addition, high educated and high skilled

clerical female workers are more prone to working stress. Age and working hours are also positively correlated to working stress. With respect to Greece, working stress level is significantly higher compared to all other countries (Table 6.4).

Moreover, the empirical results indicate that labor earnings have a negative statistical significant impact on depression. High educated females are more prone to depression. In addition, high skilled clerical employees tend to have the lower depression levels. Age and working hours are positively correlated to depression. With reference to Greece, levels of depression are significantly lower compared to most of the central, southeastern European and Baltic countries (Table 6.5).

Furthermore, with respect to fatigue, the empirical results indicate that labor earnings have a negative statistical significant impact on it. Females are more prone to fatigue. In addition, low educated and low skilled manual employees tend to have the highest fatigue levels. Age and working hours are positively correlated to fatigue. With respect to Greece, levels of overall fatigue are significantly higher compared to all other countries (Table 6.6).

Moreover, according to the last empirical results, labor earnings seem to have a negative statistical significant impact on insomnia and sleep difficulties. Females are more prone to insomnia, while high educated and high skilled clerical employees tend to have the highest levels of insomnia and sleep difficulties. Age and working hours are positively correlated to insomnia. Greece being the omitted variable has the lowest levels of insomnia and sleep difficulties compared to all other countries (Table 6.7).

Table 6.4: Ordered Logit Regression model (A) – dependent variable: working stress; Marginal effects (B)

Variables	(A) Ordered Logit: Working stress	(B) Marginal effects: Working stress
Males	-.173*** (.022)	-.014*** (.002)
Age	.054*** (.0062)	.0046*** (.00053)
Age ²	-.00067*** (.000075)	-.000056*** (.00001)
Primary Education	-.218*** (.059)	-.017*** (.004)
Secondary Education	-.195*** (.026)	-.017*** (.002)
Ln Labor earnings	.104*** (.021)	.0087*** (.002)
Working hours	.024*** (.00104)	.002*** (.00009)
Low skilled manual	-.381*** (.037)	-.029*** (.003)
Low skilled clerical	-.132*** (.027)	-.011*** (.003)
High skilled manual	-.392*** (.038)	-.029*** (.003)
Belgium	-.835*** (.082)	-.053*** (.004)
Bulgaria	-1.636*** (.108)	-.075*** (.003)
Czech Republic	-.797*** (.089)	-.049*** (.004)
Denmark	-1.311*** (.087)	-.067*** (.003)
Germany	-.262*** (.081)	-.019*** (.006)
Estonia	-1.204*** (.094)	-.064*** (.003)
Spain	-.848*** (.099)	-.051*** (.004)
France	-.805*** (.085)	-.051*** (.004)
Ireland	-.975*** (.105)	-.056*** (.004)
Italy	-.634*** (.095)	-.042*** (.005)
Cyprus	-.352*** (.106)	-.026*** (.007)
Latvia	-.812*** (.097)	-.049*** (.004)
Lithuania	-1.461*** (.098)	-.071*** (.003)
Luxemburg	-.692*** (.108)	-.044*** (.005)
Hungary	-.355*** (.108)	-.026*** (.007)
Malta	-.654*** (.103)	-.043*** (.005)
Netherlands	-1.170*** (.089)	-.063*** (.003)
Austria	-.195** (.092)	-.015** (.006)
Poland	-.793*** (.094)	-.049*** (.004)
Portugal	-.340*** (.095)	-.025*** (.006)
Romania	-1.263*** (.106)	-.066*** (.003)
Slovenia	-1.016*** (.089)	-.058*** (.003)
Slovakia	-.765*** (.093)	-.048*** (.004)
Finland	-1.035*** (.086)	-.058*** (.003)
Sweden	-.647*** (.089)	-.042*** (.004)
UK	-.895*** (.095)	-.054*** (.004)
Croatia	-.955*** (.094)	-.056*** (.004)
FYROM	-1.097*** (.111)	-.061*** (.004)
Turkey	-.246*** (.091)	-.018*** (.006)
Norway	-.704*** (.089)	-.045*** (.004)
Albania	-.784*** (.099)	-.048*** (.004)
Kosovo	-1.254*** (.114)	-.066*** (.003)
Montenegro	-1.347*** (.102)	-.068*** (.003)
/cut1	-3.695*** (.178)	
/cut2	-.437*** (.169)	
/cut3	.667*** (.169)	
/cut4	2.423*** (.170)	
/cut5	3.573*** (.170)	
Observations	34,620	
Pseudo R ²	0.029	
Log likelihood	-51646.117	
y		0.092

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.

Table 6.5: Logistic Regression model (A) – dependent variable: depression; Marginal effects (B).

Variables	(A) Logit model: Depression	(B) Marginal effects: Depression
Males	-.305*** (.039)	-.028*** (.004)
Age	.071*** (.011)	.006*** (.001)
Age ²	-.0007*** (.0001)	-.00007*** (.00001)
Primary Education	-.009 (.088)	-.0009 (.008)
Secondary Education	-.219*** (.046)	-.021*** (.004)
Ln Labor earnings	-.301*** (.034)	-.027*** (.003)
Working hours	.009*** (.002)	.0008*** (.0002)
Low skilled manual	.089 (.063)	.008*** (.006)
Low skilled clerical	.00005 (.049)	4.14e-06 (.005)
High skilled manual	-.063 (.068)	-.006 (.006)
Belgium	.506*** (.149)	.055 (.019)
Bulgaria	.346** (.174)	.036*** (.021)
Czech Republic	.644*** (.169)	.075* (.024)
Denmark	.323* (.184)	.034*** (.021)
Germany	-.500*** (.181)	-.038 (.012)
Estonia	1.404*** (.157)	.212*** (.033)
Spain	.435*** (.179)	.047*** (.022)
France	1.029*** (.146)	.133** (.025)
Ireland	.112 (.198)	.011*** (.019)
Italy	.595*** (.170)	.068 (.023)
Cyprus	1.762*** (.155)	.292*** (.036)
Latvia	1.060*** (.161)	.143*** (.029)
Lithuania	.323* (.175)	.034*** (.020)
Luxemburg	.918*** (.181)	.118* (.031)
Hungary	-.032 (.181)	-.003*** (.016)
Malta	.199 (.188)	.019 (.020)
Netherlands	-.305 (.212)	-.025 (.015)
Austria	-.271 (.220)	-.022 (.016)
Poland	-.353* (.186)	-.028 (.013)
Portugal	.655*** (.172)	.077** (.025)
Romania	-.862*** (.216)	-.057*** (.009)
Slovenia	.538*** (.159)	.061*** (.021)
Slovakia	.124 (.179)	.012*** (.018)
Finland	.865*** (.168)	.109 (.027)
Sweden	1.227*** (.164)	.175*** (.032)
UK	.644*** (.168)	.075*** (.024)
Croatia	.463 (.167)	.051*** (.021)
FYROM	-.075 (.182)	-.006** (.016)
Turkey	.200 (.160)	.019 (.017)
Norway	1.655*** (.159)	.265 (.036)
Albania	.161 (.178)	.015*** (.018)
Kosovo	-.581*** (.209)	-.043 (.012)
Montenegro	-.335* (.197)	-.027*** (.014)
Constant	-2.565*** (.297)	
Observations	34,487	
Pseudo R ²	0.056	
Log likelihood	-11803.633	
y		0.103

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

Table 6.6: Logistic Regression model (A) – dependent variable: fatigue; Marginal effects (B).

Variables	(A)		(B)	
	Logit model: Fatigue		Marginal effects: Fatigue	
Males	-.383***	(.026)	-.093***	(.006)
Age	.040***	(.007)	.009***	(.002)
Age ²	-.0004***	(.00008)	-.0001***	(.00002)
Primary Education	.155**	(.062)	.038**	(.015)
Secondary Education	-.018	(.032)	-.005	(.007)
Ln Labor earnings	-.136***	(.022)	-.033***	(.005)
Working hours	.015***	(.001)	.004***	(.0002)
Low skilled manual	.131***	(.042)	.032***	(.011)
Low skilled clerical	-.050	(.034)	-.012	(.008)
High skilled manual	.057	(.044)	.014	(.011)
Belgium	-.649***	(.081)	-.147***	(.016)
Bulgaria	-.516***	(.105)	-.118***	(.022)
Czech Republic	-.572***	(.101)	-.130***	(.021)
Denmark	-1.296***	(.105)	-.258***	(.015)
Germany	-1.385***	(.090)	-.274***	(.013)
Estonia	.049	(.103)	.012	(.025)
Spain	-.657***	(.102)	-.147***	(.021)
France	.031	(.081)	.008	(.020)
Ireland	-1.556***	(.115)	-.292***	(.014)
Italy	-.671***	(.098)	-.151***	(.019)
Cyprus	.547***	(.103)	.135***	(.025)
Latvia	.144	(.105)	.035	(.026)
Lithuania	.478***	(.109)	.118***	(.027)
Luxemburg	-.386***	(.107)	-.090***	(.023)
Hungary	-.415***	(.101)	-.096***	(.022)
Malta	-.327***	(.101)	-.077***	(.022)
Netherlands	-1.041***	(.104)	-.218***	(.017)
Austria	-2.353***	(.141)	-.364***	(.009)
Poland	-.458***	(.096)	-.106***	(.021)
Portugal	-.282***	(.103)	-.067***	(.024)
Romania	-.900***	(.106)	-.194***	(.019)
Slovenia	-.452***	(.091)	-.105***	(.019)
Slovakia	-.464***	(.099)	-.107***	(.022)
Finland	-.257***	(.098)	-.061***	(.023)
Sweden	-1.849***	(.119)	-.324***	(.012)
UK	-1.274***	(.102)	-.255***	(.015)
Croatia	-2.311***	(.121)	-.364***	(.008)
FYROM	.006	(.103)	.002	(.025)
Turkey	-.078	(.088)	-.019	(.021)
Norway	-1.158***	(.105)	-.237***	(.016)
Albania	-.316***	(.105)	-.074***	(.023)
Kosovo	-.503***	(.105)	-.115***	(.022)
Montenegro	-.360***	(.103)	-.084***	(.023)
Constant	-.298	(.191)		
Observations	34,503			
Pseudo R ²	0.087			
Log likelihood	-21541.375			
y			0.419	

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

Table 6.7: Logistic Regression model (A) – dependent variable: insomnia; Marginal effects (B)

Variables	(A)		(B)	
	Logit model: Insomnia		Marginal effects: Insomnia	
Males	-.290***	(.030)	-.047***	(.005)
Age	.028***	(.008)	.005***	(.001)
Age ²	-.0001	(.0001)	-.00002	(.00002)
Primary Education	-.005	(.071)	-.0007	(.011)
Secondary Education	-.065*	(.036)	-.011*	(.006)
Ln Labor earnings	-.186***	(.026)	-.030***	(.004)
Working hours	.013***	(.001)	.002***	(.0002)
Low skilled manual	-.013	(.049)	-.002	(.008)
Low skilled clerical	-.068*	(.039)	-.011*	(.006)
High skilled manual	-.191***	(.053)	-.029***	(.008)
Belgium	.981***	(.118)	.194***	(.027)
Bulgaria	.344**	(.144)	.061**	(.027)
Czech Republic	.611***	(.138)	.115***	(.029)
Denmark	1.086***	(.134)	.224***	(.032)
Germany	.597***	(.125)	.111***	(.026)
Estonia	.844***	(.136)	.167***	(.031)
Spain	.162	(.155)	.027	(.027)
France	1.484***	(.117)	.315***	(.028)
Ireland	.323**	(.153)	.056*	(.029)
Italy	.531***	(.139)	.098***	(.029)
Cyprus	.407***	(.145)	.073**	(.028)
Latvia	.962***	(.135)	.194***	(.032)
Lithuania	.709***	(.139)	.136***	(.031)
Luxemburg	1.043***	(.145)	.214***	(.035)
Hungary	.398***	(.141)	.071***	(.027)
Malta	-.1595	(.165)	-.024	(.024)
Netherlands	.648***	(.141)	.123***	(.031)
Austria	.291*	(.154)	.051*	(.028)
Poland	.039	(.143)	.006	(.023)
Portugal	.932***	(.139)	.187***	(.032)
Romania	-.165	(.155)	-.025	(.022)
Slovenia	.879***	(.127)	.174***	(.029)
Slovakia	.185	(.145)	.031	(.025)
Finland	1.432***	(.131)	.309***	(.032)
Sweden	.883***	(.137)	.176***	(.032)
UK	.609***	(.137)	.115***	(.029)
Croatia	.311**	(.140)	.054**	(.026)
FYROM	.732***	(.138)	.142***	(.031)
Turkey	1.228***	(.122)	.256***	(.029)
Norway	.277*	(.149)	.048*	(.027)
Albania	.451***	(.142)	.082***	(.028)
Kosovo	.556***	(.143)	.104***	(.030)
Montenegro	.521***	(.142)	.096***	(.029)
Constant	-2.274***	(.232)		
Observations	34,505			
Pseudo R ²	0.395			
Log likelihood	-17211.952			
y			0.202	

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

As was mentioned earlier, there might be an issue of endogeneity in the labor earnings psychological well-being relationship, which can be resolved by adopting the following equation:

$$LE_j = \gamma_1 + \gamma_2 Z_j + \gamma_3 X_j + \varepsilon_j \quad (7)$$

Z is a vector of individual characteristics that influences LE and contains one variable that is not in X above. The X variables that are used are the same as before: *age, age², gender, education level, type of occupation, hours of work, country dummy variables*. The Z variable has to be highly correlated to labor earnings but it should not affect psychological well-being directly. The previous occupational status was used as Z variable. Several studies have found a significant effect of work experience on workers earnings (Mincer, 1974; Heckman & Robb, 1985). The results from the OLS models (Table 6.10; 6.11; 6.12; 6.13, column A), with robust standard errors, reveal a significant correlation between labor earnings and Z variable (previous occupational status). Employees who were unemployed before their current job reported the lowest labor earnings. In addition, all the independent variables exhibit significant relationship to labor earnings. Consequently, we apply instrumental variables (IV) estimations:

$$PWBD_j = \alpha_1 + \alpha_2 LE_j + \alpha_3 X_j + \varepsilon_j \quad (1b)$$

$$PWB_j = b_1 + b_2 LE_j + b_3 X_j + \varepsilon_j \quad (2b)$$

Comparing the instrumental variables regression models with the OLS regressions considering the issue of the endogeneity in the labor earnings – psychological well-being relationship, we found very similar results. There is a statistical significant positive impact of labor earnings on psychological well-being. In addition, southeastern European countries have higher psychological well-being than Greece (Table 6.8).

Table 6.8: IV Estimates – dependent variables: LnPWBD (A); LnPWB (B)

VARIABLES	(A)	(B)
	IVReg: LnPWBD	IVReg: LnPWB
Ln Labor earnings	0.166*** (0.047)	0.269*** (0.061)
Males	0.039*** (0.012)	0.007 (0.016)
Age	-0.019*** (0.003)	-0.0241*** (0.003)
Age ²	0.0002*** (2.93e-05)	0.0002*** (3.80e-05)
Primary Education	0.029 (0.027)	0.029 (0.034)
Secondary Education	0.046*** (0.013)	0.056*** (0.017)
Working hours	-0.005*** (0.0008)	-0.005*** (0.0009)
Low skilled manual	-0.002 (0.017)	-0.032 (0.022)
Low skilled clerical	0.021* (0.011)	0.019 (0.014)
High skilled manual	0.033** (0.015)	0.018 (0.020)
Belgium	-0.076*** (0.027)	-0.126*** (0.035)
Bulgaria	0.184*** (0.070)	0.229** (0.091)
Czech Republic	-0.026 (0.026)	-0.076** (0.034)
Denmark	-0.031 (0.043)	-0.102* (0.056)
Germany	-0.0005 (0.022)	-0.064** (0.029)
Estonia	0.014 (0.037)	0.126** (0.049)
Spain	0.059*** (0.023)	0.062** (0.029)
France	-0.139*** (0.024)	-0.128*** (0.031)
Ireland	0.004 (0.035)	-0.071 (0.045)
Italy	-0.085*** (0.023)	-0.177*** (0.030)
Cyprus	-0.161*** (0.025)	-0.163*** (0.033)
Latvia	-0.005 (0.054)	0.116 (0.070)
Lithuania	0.032 (0.054)	0.062 (0.070)
Luxemburg	-0.162*** (0.046)	-0.245*** (0.058)
Hungary	0.080 (0.049)	0.102 (0.063)
Malta	0.052*** (0.019)	0.061** (0.026)
Netherlands	-0.003 (0.029)	-0.087** (0.039)
Austria	0.0003 (0.029)	-0.123*** (0.037)
Poland	0.121*** (0.039)	0.127** (0.051)
Portugal	-0.044** (0.021)	-0.013 (0.028)
Romania	0.282*** (0.073)	0.339*** (0.094)
Slovenia	-0.023 (0.021)	-0.041 (0.027)
Slovakia	0.078** (0.034)	0.089** (0.044)
Finland	-0.0885*** (0.032)	-0.081* (0.042)
Sweden	-0.034 (0.035)	-0.092** (0.046)
UK	-0.047** (0.023)	-0.128*** (0.030)
Croatia	0.089*** (0.028)	-0.003 (0.036)
FYROM	0.220*** (0.073)	0.383*** (0.095)
Turkey	0.0004 (0.044)	0.022 (0.057)
Norway	-0.106** (0.049)	-0.184*** (0.063)
Albania	0.148** (0.072)	0.226** (0.093)
Kosovo	0.342*** (0.072)	0.478*** (0.092)
Montenegro	0.167*** (0.050)	0.212*** (0.065)
Constant	0.866*** (0.195)	0.327 (0.25)
Observations	33,443	33,908
	0.046	0.023
R-squared		

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

In order to check the requirement of instrumental variables techniques, an overidentification test and two alternative tests for endogeneity have been used. The Sargan over-identification test is employed in the cases where there are more instruments than endogenous regressors. A rejection of the null hypothesis in this test means that the instruments are not exclusively affecting the outcome of interest through the endogenous variable. On the other hand, Durbin – Wu - Hausman and Wu – Hausman tests examine whether OLS is inconsistent and IV estimator is needed (Wooldridge, 2000). The results indicate that the instruments are valid and endogenous regressors' effects on the estimates are meaningful, thus instrumental variables techniques are required (Tables 6.9a; 6.9b).

Table 6.9a: Overidentification Tests

	LnPWBD	LnPWB
Sargan test	25.491	12.157
Chi-sq (5)	(0.0001)	(0.033)

Table 6.9b: Endogeneity Tests

	LnPWBD	LnPWB
Wu-Hausman	6.101	10.542
	(0.014)	(0.001)
Durbin – Wu-Hausman	6.108	10.553
Chi-sq (1)	(0.013)	(0.001)

From Equation (7), labor earnings are predicted from each individual. Then, these predictions LE_{prj} are placed in the estimations below:

$$PD_j^{WS} = c_1 + c_2 LE_{prj} + c_3 X_j + \varepsilon_j \quad (3b)$$

$$PD_j^D = d_1 + d_2 LE_{prj} + d_3 X_j + \varepsilon_j \quad (4b)$$

$$PD_j^F = e_1 + e_2 LE_{prj} + e_3 X_j + \varepsilon_j \quad (5b)$$

$$PD_j^I = f_1 + f_2 LE_{prj} + f_3 X_j + \varepsilon_j \quad (6b)$$

Table 6.10: OLS model – dependent variable: Ln Labor earnings (A); Ordered Logit model considering endogeneity (B) – dependent variable: working stress; Marginal effects (C)

Variables	(A) OLS model: Ln Labor earnings	(B) Ordered Logit: Working stress	(C) Marginal effects: Working stress
Employed with an indefinite contract	0.138*** (0.009)		
Employed with a fixed term contract	0.099*** (0.011)		
Employed with a temporary contract	0.099*** (0.018)		
Self-employed	0.098*** (0.017)		
Employed in education or training	0.123*** (0.011)		
Other	0.013 (0.016)		
Males	0.239*** (0.006)	-.341*** (.057)	-.028*** (.005)
Age	0.048*** (0.002)	.022* (.012)	.002* (.001)
Age ²	-0.0005*** (2.34e-05)	-.0003** (.0001)	-.00003** (.00001)
Primary Education	-0.486*** (0.018)	.128 (.126)	.011 (.012)
Secondary Education	-0.246*** (0.007)	-.023 (.061)	-.002 (.005)
Ln Labor earning predictors		.786*** (.219)	.066*** (.018)
Working hours	0.015*** (0.0004)	.014*** (.003)	.001*** (.0003)
Low skilled manual	-0.313*** (0.011)	-.156* (.080)	-.012** (.006)
Low skilled clerical	-0.185*** (0.008)	-.0009 (.049)	-.00008 (.004)
High skilled manual	-0.270*** (0.012)	-.207*** (.071)	-.016*** (.005)
Belgium	0.447*** (0.018)	-1.15*** (.130)	-.066*** (.005)
Bulgaria	-1.439*** (0.026)	-.649** (.328)	-.042*** (.016)
Czech Republic	-0.394*** (0.022)	-.543*** (.121)	-.036*** (.007)
Denmark	0.793*** (0.022)	-1.872*** (.201)	-.081*** (.004)
Germany	0.280*** (0.021)	-.472*** (.105)	-.033*** (.006)
Estonia	-0.706*** (0.023)	-.744*** (.174)	-.047*** (.008)
Spain	0.214*** (0.023)	-1.00*** (.111)	-.057*** (.004)
France	0.359*** (0.020)	-1.056*** (.117)	-.062*** (.005)
Ireland	0.592*** (0.027)	-1.392*** (.171)	-.069*** (.004)
Italy	0.274*** (0.022)	-.816*** (.112)	-.050*** (.005)
Cyprus	0.330*** (0.022)	-.613*** (.131)	-.041*** (.007)
Latvia	-1.103*** (0.025)	-.076 (.254)	-.006 (.020)
Lithuania	-1.085*** (0.024)	-.739*** (.251)	-.046*** (.011)
Luxemburg	0.825*** (0.026)	-1.271*** (.215)	-.066*** (.006)
Hungary	-0.982*** (0.023)	.3002 (.234)	.028 (.024)
Malta	-0.011 (0.022)	-.657*** (.103)	-.042*** (.005)
Netherlands	0.454*** (0.024)	-1.496*** (.138)	-.072*** (.004)
Austria	0.384*** (0.024)	-.479*** (.130)	-.033*** (.007)
Poland	-0.750*** (0.024)	-.296 (.185)	-.022* (.012)
Portugal	-0.167*** (0.023)	-.234** (.101)	-.018** (.007)
Romania	-1.514*** (0.028)	-.228 (.341)	-.017 (.023)
Slovenia	-0.244*** (0.021)	-.864*** (.101)	-.052*** (.004)
Slovakia	-0.620*** (0.022)	-.356** (.160)	-.026** (.010)
Finland	0.535*** (0.022)	-1.411*** (.149)	-.070*** (.004)
Sweden	0.607*** (0.021)	-1.077*** (.164)	-.060*** (.005)
UK	0.263*** (0.025)	-1.088*** (.114)	-.061*** (.004)
Croatia	-0.448*** (0.021)	-.660*** (.134)	-.043*** (.006)
FYROM	-1.474*** (0.028)	-.097 (.344)	-.007 (.026)
Turkey	-0.861*** (0.021)	.343 (.209)	.032 (.022)
Norway	0.918*** (0.019)	-1.347*** (.225)	-.068*** (.006)
Albania	-1.465*** (0.030)	.228 (.337)	.021 (.033)

Kosovo	-1.430*** (0.024)	-0.264 (.335)	-0.020 (.022)
Montenegro	-0.967*** (0.027)	-0.673*** (.234)	-0.043*** (.011)
Constant	3.964*** (0.047)		
/cut1		-0.927 (.902)	
/cut2		2.333 (.899)	
/cut3		3.438 (.899)	
/cut4		5.193 (.900)	
/cut5		6.343 (.900)	
Observations	34,413	34,413	
Pseudo R ²		0.028	
R ²	0.708		
Log likelihood		-51348.479	
y			0.092

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

An Ordered Logit model (working stress as dependent variable), which controls for the endogeneity problem, has also been estimated. Compared to the Ordered Logit model, the Ordered Logit estimation considering endogeneity supplies very similar results (6.10). In addition, three Logit models considering endogeneity, with depression, fatigue and insomnia, as dependent variables respectively, have also been estimated (Tables 6.11; 6.12; 6.13). The results are almost the same as the results of Logit models without endogeneity consideration. However, the effect of labor earnings on depression and insomnia is marginally non-significant. The marginal effects for logit and ordered logit models, considering endogeneity, were computed. According to the results, they did not differ from the level effects in terms of significance.

Table 6.11: OLS model – dependent variable: Ln Labor earnings (A); Logit model considering endogeneity (B) – dependent variable: Depression; Marginal effects (C)

Variables	(A) OLS model: Ln Labor earnings	(B) Logit: Depression	(C) Marginal effects: Depression
Employed with an indefinite contract	0.138*** (0.009)		
Employed with a fixed term contract	0.100*** (0.011)		
Employed with a temporary contract	0.102*** (0.018)		
Self-employed	0.1000*** (0.017)		
Employed in education or training	0.124*** (0.012)		
Other	0.0156 (0.016)		
Males	0.239*** (0.006)	-.254*** (.097)	-.023*** (.009)
Age	0.0478*** (0.002)	.084*** (.021)	.007*** (.002)
Age ²	-0.0005*** (2.35e-05)	-.0009*** (.0002)	-.00008*** (.00002)
Primary Education	-0.487*** (0.018)	-.092 (.207)	-.008 (.018)
Secondary Education	-0.246*** (0.007)	-.262** (.103)	-.025** (.010)
Ln Labor earning predictors		-.489 (.364)	-.045 (.033)
Working hours	0.015*** (0.0004)	.011* (.005)	.001* (.0005)
Low skilled manual	-0.312*** (0.011)	.015 (.133)	.001 (.012)
Low skilled clerical	-0.184*** (0.008)	-.044 (.084)	-.004 (.007)
High skilled manual	-0.271*** (0.011)	-.126 (.120)	-.011 (.010)
Belgium	0.447*** (0.018)	.583** (.225)	.065** (.030)
Bulgaria	-1.440*** (0.026)	.093 (.543)	.009 (.054)
Czech Republic	-0.394*** (0.021)	.556** (.216)	.063** (.029)
Denmark	0.794*** (0.022)	.469 (.351)	.051 (.045)
Germany	0.281*** (0.021)	-.463** (.212)	-.036*** (.014)
Estonia	-0.706*** (0.023)	1.266*** (.292)	.183*** (.058)
Spain	0.215*** (0.023)	.473** (.198)	.052** (.025)
France	0.358*** (0.020)	1.092 (.197)	.145*** (.034)
Ireland	0.593*** (0.026)	.246 (.293)	.025 (.032)
Italy	0.275*** (0.022)	.644*** (.196)	.075*** (.028)
Cyprus	0.331*** (0.022)	1.815*** (.199)	.305*** (.047)
Latvia	-1.099*** (0.025)	.851** (.421)	.108 (.069)
Lithuania	-1.084*** (0.024)	.121 (.424)	.011 (.043)
Luxemburg	0.826*** (0.026)	1.081*** (.357)	.148** (.066)
Hungary	-0.981*** (0.022)	-.217 (.391)	-.018 (.031)
Malta	-0.0103 (0.022)	.179 (.189)	.017 (.020)
Netherlands	0.454*** (0.024)	-.214 (.274)	-.018 (.021)
Austria	0.386*** (0.024)	-.235 (.271)	-.020 (.021)
Poland	-0.749*** (0.023)	-.476 (.324)	-.037* (.021)
Portugal	-0.166*** (0.023)	.613*** (.181)	.071*** (.025)
Romania	-1.515*** (0.028)	-1.143** (.581)	-.069*** (.021)
Slovenia	-0.245*** (0.021)	.489*** (.178)	.054** (.023)
Slovakia	-0.620*** (0.022)	.009 (.282)	.0008 (.026)
Finland	0.535*** (0.022)	.968*** (.263)	.127*** (.045)
Sweden	0.607*** (0.021)	1.340*** (.282)	.198*** (.058)
UK	0.263*** (0.025)	.712*** (.196)	.085*** (.029)
Croatia	-0.448*** (0.021)	.392* (.231)	.042 (.028)
FYROM	-1.473*** (0.028)	-.348 (.570)	-.028 (.040)
Turkey	-0.860*** (0.021)	.038 (.353)	.003 (.033)
Norway	0.918*** (0.019)	1.825*** (.378)	.306*** (.089)
Albania	-1.465*** (0.031)	-.1077 (.567)	-.009 (.048)

Kosovo	-1.429*** (0.025)	-0.864 (.573)	-0.058** (.026)
Montenegro	-0.966*** (0.027)	-0.507 (.410)	-0.038 (.025)
Constant	3.963*** (0.047)	-1.870 (1.497)	
Observations	34,280	34,280	
Pseudo R ²		0.053	
R ²	0.707		
Log likelihood		-11765.594	
y			0.104

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

Table 6.12: OLS model – dependent variable: Ln Labor earnings (A); Logit model considering endogeneity (B) – dependent variable: Fatigue; Marginal effects (C)

Variables	(A) OLS model: Ln Labor earnings	(B) Logit: Fatigue	(C) Marginal effects: Fatigue
Employed with an indefinite contract	0.138*** (0.00958)		
Employed with a fixed term contract	0.0999*** (0.0110)		
Employed with a temporary contract	0.0998*** (0.0180)		
Self-employed	0.0981*** (0.0171)		
Employed in education or training	0.125*** (0.0109)		
Other	0.0147 (0.0161)		
Males	0.239*** (0.00632)	-.208*** (.065)	-.051*** (.015)
Age	0.0479*** (0.00196)	.074*** (.013)	.018*** (.003)
Age ²	-0.0005*** (2.35e-05)	-.0008*** (.0002)	-.0002*** (.00004)
Primary Education	-0.487*** (0.0182)	-.209 (.139)	-.050 (.032)
Secondary Education	-0.246*** (0.00765)	-.196*** (.069)	-.048*** (.017)
Ln Labor earning predictors		-.844*** (.245)	-.2058*** (.059)
Working hours	0.0150*** (0.000364)	.025*** (.004)	.006*** (.0009)
Low skilled manual	-0.311*** (0.0106)	-.097 (.091)	-.023 (.021)
Low skilled clerical	-0.184*** (0.00823)	-.182*** (.057)	-.044*** (.013)
High skilled manual	-0.270*** (0.0116)	-.133* (.081)	-.032* (.019)
Belgium	0.447*** (0.0180)	-.319** (.139)	-.075** (.032)
Bulgaria	-1.439*** (0.0261)	-1.509*** (.363)	-.286*** (.045)
Czech Republic	-0.394*** (0.0217)	-.843*** (.136)	-.183*** (.025)
Denmark	0.794*** (0.0221)	-.712*** (.227)	-.158*** (.044)
Germany	0.281*** (0.0213)	-1.170*** (.117)	-.242*** (.018)
Estonia	-0.707*** (0.0235)	-.429** (.195)	-.099** (.042)
Spain	0.213*** (0.0237)	-.493*** (.116)	-.113*** (.024)
France	0.358*** (0.0200)	.297** (.123)	.073** (.031)
Ireland	0.594*** (0.0269)	-1.101*** (.187)	-.228*** (.030)
Italy	0.276*** (0.0220)	-.474*** (.119)	-.109*** (.025)
Cyprus	0.331*** (0.0221)	.776*** (.133)	.191*** (.032)
Latvia	-1.102*** (0.0250)	-.617** (.284)	-.139** (.057)
Lithuania	-1.086*** (0.0246)	-.280 (.282)	-.066 (.064)
Luxemburg	0.827*** (0.0262)	.225 (.235)	.055 (.058)
Hungary	-0.982*** (0.0227)	-1.094*** (.254)	-.227*** (.041)
Malta	-0.0106 (0.0221)	-.324*** (.101)	-.076*** (.022)
Netherlands	0.455*** (0.0246)	-.699*** (.157)	-.156*** (.031)
Austria	0.384*** (0.0243)	-2.082*** (.175)	-.344*** (.014)
Poland	-0.749*** (0.0239)	-.968*** (.203)	-.206*** (.035)
Portugal	-0.167*** (0.0230)	-.386*** (.111)	-.090*** (.024)
Romania	-1.514*** (0.0289)	-1.945*** (.379)	-.333*** (.034)
Slovenia	-0.246*** (0.0212)	-.609*** (.106)	-.138*** (.021)
Slovakia	-0.620*** (0.0227)	-.888*** (.177)	-.191*** (.032)
Finland	0.536*** (0.0222)	.142 (.168)	.034 (.041)
Sweden	0.606*** (0.0210)	-1.399*** (.194)	-.272*** (.026)
UK	0.263*** (0.0259)	-1.069*** (.123)	-.223*** (.020)
Croatia	-0.448*** (0.0215)	-2.628*** (.161)	-.383*** (.009)
FYROM	-1.473*** (0.0284)	-1.049*** (.378)	-.219*** (.062)
Turkey	-0.861*** (0.0215)	-.693*** (.231)	-.155*** (.046)
Norway	0.918*** (0.0198)	-.486* (.254)	-.112** (.054)
Albania	-1.465*** (0.0307)	-1.372*** (.377)	-.268*** (.051)

Kosovo	-1.432*** (0.0250)	-1.538*** (.373)	-0.290*** (.045)
Montenegro	-0.966*** (0.0274)	-1.038*** (.260)	-0.217*** (.043)
Constant	3.961*** (0.0470)	2.559** (1.012)	
Observations	34,297	34,297	
Pseudo R ²		0.086	
R ²	0.708		
Log likelihood		-21432.172	
y			0.419

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

Table 6.13: OLS model – dependent variable: Ln Labor earnings (A); Logit model considering endogeneity (B) – dependent variable: Insomnia; Marginal effects (C)

Variables	(A) OLS model: Ln Labor earnings	(B) Logit: Insomnia	(C) Marginal effects: Insomnia
Employed with an indefinite contract	0.138*** (0.00958)		
Employed with a fixed term contract	0.0993*** (0.0109)		
Employed with a temporary contract	0.0996*** (0.0180)		
Self-employed	0.0974*** (0.0171)		
Employed in education or training	0.124*** (0.0109)		
Other	0.0137 (0.0161)		
Males	0.239*** (0.00632)	-.321*** (.0760)	-.052*** (.013)
Age	0.0480*** (0.00196)	.023 (.016)	.003 (.003)
Age ²	-0.0005*** (2.35e-05)	-.00007 (.0002)	-.00001 (.00003)
Primary Education	-0.487*** (0.0182)	.057 (.162)	.009 (.027)
Secondary Education	-0.246*** (0.00765)	-.029 (.081)	-.005 (.013)
Ln Labor earning predictors		-.051 (.285)	-.008 (.046)
Working hours	0.0150*** (0.000364)	.011** (.004)	.002** (.0007)
Low skilled manual	-0.311*** (0.0106)	.031 (.104)	.005 (.017)
Low skilled clerical	-0.184*** (0.00823)	-.043 (.065)	-.007 (.011)
High skilled manual	-0.268*** (0.0116)	-.153 (.094)	-.024* (.014)
Belgium	0.447*** (0.0180)	.914*** (.177)	.179** (.040)
Bulgaria	-1.438*** (0.0261)	.518 (.429)	.096 (.089)
Czech Republic	-0.394*** (0.0217)	.635*** (.174)	.121*** (.037)
Denmark	0.794*** (0.0221)	.967*** (.271)	.196*** (.063)
Germany	0.281*** (0.0213)	.554*** (.152)	.103*** (.031)
Estonia	-0.707*** (0.0236)	.933*** (.235)	.188*** (.055)
Spain	0.214*** (0.0237)	.127 (.169)	.021 (.029)
France	0.358*** (0.0201)	1.429*** (.158)	.302*** (.038)
Ireland	0.593*** (0.0269)	.246 (.231)	.042 (.042)
Italy	0.274*** (0.0220)	.504*** (.158)	.093*** (.032)
Cyprus	0.331*** (0.0221)	.362** (.175)	.064* (.034)
Latvia	-1.102*** (0.0250)	1.101*** (.334)	.228*** (.081)
Lithuania	-1.085*** (0.0246)	.858*** (.332)	.171** (.077)
Luxemburg	0.826*** (0.0262)	.913*** (.283)	.184*** (.066)
Hungary	-0.982*** (0.0227)	.522* (.306)	.096 (.063)
Malta	-0.0109 (0.0221)	-.161 (.164)	-.024 (.024)
Netherlands	0.455*** (0.0246)	.580*** (.197)	.108*** (.041)
Austria	0.384*** (0.0244)	.236 (.195)	.041 (.035)
Poland	-0.750*** (0.0239)	.149 (.253)	.025 (.044)
Portugal	-0.166*** (0.0230)	.950*** (.146)	.192*** (.034)
Romania	-1.515*** (0.0289)	.043 (.452)	.007 (.075)
Slovenia	-0.245*** (0.0212)	.902*** (.141)	.180*** (.032)
Slovakia	-0.620*** (0.0227)	.261 (.224)	.045 (.041)
Finland	0.536*** (0.0222)	1.355*** (.205)	.290*** (.050)
Sweden	0.607*** (0.0210)	.793*** (.226)	.155*** (.051)
UK	0.263*** (0.0259)	.573*** (.159)	.107*** (.033)
Croatia	-0.449*** (0.0214)	.367* (.187)	.065* (.036)
FYROM	-1.476*** (0.0284)	.945** (.447)	.191* (.105)
Turkey	-0.860*** (0.0216)	1.340*** (.275)	.283*** (.067)
Norway	0.918*** (0.0198)	.146 (.307)	.024 (.053)
Albania	-1.457*** (0.0305)	.643 (.441)	.122 (.095)

Kosovo	-1.431*** (0.0250)	.744* (.440)	.144 (.098)
Montenegro	-0.967*** (0.0274)	.657** (.312)	.125* (.068)
Constant	3.960*** (0.0469)	-2.861** (1.176)	
Observations	34,299	34,299	
Pseudo R ²		0.038	
R ²	0.708		
Log likelihood		-17152.139	
y			0.203

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

6.6 Discussion and Concluding Comments

This chapter utilized a large sample to test the issue of labor earnings and psychological well-being and distress relationship by using data from thirty three European countries and Turkey. In particular, the results indicated a positive, but rather weak, statistically significant relationship between the individuals' labor earnings and their psychological well-being. In addition, a positive effect of labor earnings on work-related stress was revealed. On the other hand, it was observed that labor earnings have a negative impact on psychological distress dimensions such as depression, fatigue and insomnia.

Prior empirical research on psychological well-being and distress in general provides some insights regarding the main variables. Our results are consistent with the theoretical predictions found in related research. In particular, males demonstrated higher levels of psychological well-being than females. Previous evidence on gender differences in their associations with psychological well-being has been inconsistent. Available literature implies that women tend to report higher happiness (for instance, Dolan et al., 2008; Huppert, 2009) but worse scores on mental health assessment scales (Alesina et al, 2004), although a few studies report no gender differences (for instance, Louis & Zhao, 2002). On the other hand, Stevenson and Wolfers (2009) study showed that measures of subjective well-being indicate that women's happiness

has declined both absolutely and relative to men. One of the main explanations for these results might be that women may simply find the complexity and increased pressure in their modern lives to have come at the cost of happiness.

Furthermore, our findings indicated a negative relationship between age and psychological well-being, which is consistent with other studies such as Van Praag et al. (2003). Many studies on the determinants of happiness and wellbeing, suggest a U-shaped relationship between age and well-being where the youngest and the oldest are happiest while the middle age groups are the least happy. One explanation here has to do with the higher expectations of the younger age group compared to older individuals (Clark and Oswald, 1994). In addition, middle level education was related to the highest psychological well-being, which is consistent with other empirical research such as Stutzer (2004). Clark and Oswald (1996) suggested that education has a negative impact on job satisfaction because increased education is associated with higher expectations. A negative relationship was also found between working hours and psychological well-being, implying that individuals who have longer work hours report lower psychological well-being. The evidence is consistent with other empirical work such as Galay (2007). Finally, psychological well-being is higher for Malta, Kosovo and Former Yugoslav Republic of Macedonia and lower for Baltic countries compared to Greece. According to Veenhoven (2000), political factors and personal freedom are important drivers of happiness. Thus, an explanation of their very high score may be connected to the recent declaration of independence after decades of conflict.

With regards to work-related stress, females were more likely than men to experience the negative effects of stress. There are several factors such as workload, family responsibilities, lower levels of control in their jobs, prejudice and

discrimination issues, which magnify the effect of workplace stress on females (Bickford, 2005). Age and working hours were positively correlated to work-related stress. Age seemed to influence workplace stress especially under specific circumstances such as too many demands, many working hours, work intensification, new knowledge acquisition (Bickford, 2005). Furthermore, high educated employees and high skilled clericals seemed to be more prone to work-related stress. It is important to mention that despite some studies indicating that stress is associated with low income, we found the opposite results. An explanation might have to do with stress of higher status hypothesis. The well-educated tend to have higher-status occupations with more decision-making authority, more demands, hours and pay, excessive work pressure, time strain and thus higher levels of stress (Moen et al., 2013; Schieman et al., 2006). With reference to Greece, work-related stress is higher compared to all other countries, which is consistent with Eurofound (2012) report.

With respect to psychological distress dimensions such as fatigue, depression and insomnia, we found a positive relationship with age and working hours. Rosa (1995) found excess fatigue, sleepiness and significant loss of sleep for workers on extended work shift schedules. In addition, females were more prone to psychological distress (e.g. Piccinelli & Wilkinson, 2000). Greece, being the omitted variable, seemed to have the lowest levels of insomnia and sleep difficulties and the highest levels of overall fatigue compared to all other countries.

In spite of ample evidence linking psychological distress issues to financial loss, companies have nonetheless been slow to adopt innovative mental health management practices in the workplace (Williams, 2003). It needs to be recognized that psychological distress is a serious crisis for employees, and it demands a serious response from employers. Rising psychological well-being not only benefits the

employees themselves, but it can also save companies substantial costs, since employees will show up for work and be more efficient and productive on the job.

Chapter 7

Conclusions and General Discussion

7.1 Theoretical and Empirical Findings

The previous chapters described explicitly several issues of occupational health and safety, highlighting cross country differences, knowledge gaps and methodological shortcomings, as well as causal relationships between particular OSH indicators – variables. This chapter summarizes the most important theoretical and empirical findings.

In particular, after the literature review, it seems that the neoclassical model offers a powerful tool that can be used to analyze employment and wage outcomes in the labor market. However, the labor markets of most industrialized countries have undergone several changes in recent years without proper attention concerning the occupational health and safety consequences of these changes. In addition, most of the discussed accident causation theories focused on work environment, potential hazards at work, changing workers' unsafe behavior, the social relations to work, compensating wage differentials and other demographic and psychosocial factors and job characteristics. Furthermore, the research literature on OSH has been enriched by ideas and concepts from psychology, sociology, industrial relations and management studies.

Moreover, there has been an increase in workplace hazards and occupational diseases, implying rising costs for social protection systems. Thus, EU countries have implemented several health and safety policies in order to improve working

conditions. The findings also suggest that empirical up to date research in Greece is rather inadequate, mainly because of the absence of econometric methods to validate the findings. Therefore, more systematic research is needed on the determinants of injuries and illnesses and on their effects on job participation and productivity. Although the legal framework is quite adequate, there is a need for both prevention strategies and enforcement of the existing safety regulations.

Regarding the empirical findings, the results of the first - set of econometric analysis indicated a statistically significant inverse relationship between the number of days employees stay absent due to occupational injury, and their job satisfaction levels. This implies that a low level of employee job satisfaction is associated with an increase in the number and frequency of injury absences.

The empirical results of the second – set of econometric analysis indicated a positive, but rather weak, statistically significant relationship between the employees' labor earnings and their psychological well-being. A positive effect of labor earnings on work-related stress was also revealed, highlighting the stress of higher status hypothesis. In addition, a negative impact of labor earnings on psychological distress aspects, such as depression, fatigue and insomnia, was observed. It is important to mention that the results, regarding the main variables, were consistent with the theoretical predictions found in related research.

7.2 The Contribution of the Study

The study disserted occupational health and safety issues, highlighting specific research insights. Although there is ample literature focusing on OSH aspects, this study presented a detailed review of the current state of research regarding OSH issues in European Union countries, given that the subject is increasingly gaining the interest of policy makers and researchers in European countries. However, there is

limited knowledge of this subject concerning the Greek labor market. Under this light, the dissertation presented an overview of the Greek legislation framework regarding OSH issues and the current status of empirical research on the subject in Greece. Hence, the study identified the knowledge gaps and methodological shortcomings of the existing literature in order to contribute towards future research in the OSH field in Greece.

Furthermore, the issue of the effect of job satisfaction on absenteeism has been the subject of substantial research but with no conclusive findings. Nevertheless, there is a lack of attention regarding the effect of job satisfaction on a specific type of absenteeism: injury-related absenteeism. This study attempted to fill this literature gap by concentrating on relevant data from Greece and the UK. The empirical results indicated that a specific type of absenteeism might offer more empirical information to the complex absenteeism–job satisfaction relationship. A more detailed investigation of this issue might also increase the understanding concerning appropriate policy recommendations for reducing injury-related absenteeism. Apart from the obvious benefits to workers, this reduction will in turn lead to lower levels of general absenteeism costs and increased labor productivity.

Finally, the study examined an additional issue concerning the socio-economic determinants of employees' psychological well-being. Improving the psychological well-being of a workforce has important social and economic effects, since it brings benefits for both the employees and the companies and influences workers' social behavior, employment relations and productive performance in the workplace. The empirical results strengthen the existent findings, which indicate a positive, but rather weak, impact of labor earnings on psychological well-being. Moreover, the results

highlighted the “stress of higher status” hypothesis, since a positive effect of labor earnings on work-related stress was revealed.

To conclude, the present study attempted to provide some additional, important insights regarding occupational health and safety aspects. Thus, it sought to make a substantial and significant contribution to the body of knowledge in the research field.

7.3 Suggestions for Further Research

Although there is a great availability of data sources and studies on health and safety at work, a number of relevant topics on OSH require further research. The international comparability of appropriately designed OSH indicators, in terms of comparable definitions, data collection methodologies and quality, remains one of the major challenges of future research. The implications of modern labor markets for OSH are not adequately researched. OSH inquiry should take further account of the changing demographic evolution of the workforce, which involves an increasing proportion of female and older-aged employees. It is important for future studies to investigate closely the presumably different implications of job hazards and harmful working conditions for the health of the latter population groups.

While OSH is an issue of interest in current research at the international level, a substantial research gap is observed in Greece. In addition, there is limited knowledge of the extent, the causes and the costs of the occupational health and safety indicators concerning the Greek labor market. Therefore, more systematic research is needed on the determinants of injuries and on their effects on job participation and productivity. Priority should also be given to the population groups that report systematically higher incidence of work-related injuries (e.g. migrants, males, middle-aged employees) and to the blue-collar jobs which seem to record the higher incidence of work-related injuries and diseases. Furthermore, the existing research results should

be treated with caution given that the majority of the studies draw information from small samples.

There is also a lack of attention regarding rehabilitation and reintegration of workers in the labor market after a period of absence due to occupational accidents or work related health problems. The issues of the adequate OSH prevention and reintegration policies require further concern.

Another important issue relates to the determinants of absenteeism. Although there is ample literature focusing on the effect of job satisfaction on absenteeism, there is a lack of attention regarding the effect of job satisfaction on a specific type of absenteeism: injury-related absenteeism. Thus, further research and more inter-country comparisons of absenteeism similarities and differences are clearly needed for the greater understanding of this important issue.

7.4 Conclusion comments

Through the conduct of the present study, some substantial insights have been highlighted. Overall, efforts in occupational health and safety aim to prevent industrial fatal and non-fatal accidents and illnesses, while recognizing the connection between employees' health and safety, the workplace, and the environment outside the workplace. It is essential that the work environment supports safety and health, since work plays a central role in individuals' lives and occupies at least eight hours a day of their time. Unfortunately, some employers assume little moral or legal responsibility to protect employees' health and safety. Furthermore, the costs of most OSH indicators (such as occupational diseases and fatal or non-fatal accidents, labor turnover, sickness absenteeism etc.) to employees and their families and to employers are estimated to be enormous. In reality, it is difficult to estimate the total costs of

OSH hazards, because of the multitude of indirect costs which are difficult to measure.

Although there are several effective legal and technical tools and measures to prevent and tackle occupational hazards, national efforts are often fragmented and as a result have less impact. The traditional preventive and control strategies and methods need radical updating to respond effectively to the continuous changes in the workplace. In addition, dynamic management strategies need to be developed and implemented to ensure the fundamental requirement for achieving and sustaining decent working conditions.

To conclude, there is ample literature and numerous empirical findings concerning the multidimensional discipline of occupational health and safety, however, there is a continuously need for further research.

Annex A

Descriptive statistics – Frequencies

The descriptive statistics below refer to European Survey data (SOCIOLD) which have been used in the study of chapter 5 above.

Table: Gender – Country

Gender / Country	Greece	UK	Total Frequency	Percent
<i>Male</i>	217	237	454	45.35
<i>Female</i>	210	337	547	54.65
Total Frequency	427	574	1001	100.00
Percent	42.66	57.34		
Cumulative Percent	42.66	100.00		

Table: Employment contract

Contract	Frequency	Percent
<i>Temporary</i>	34	3.40
<i>Fixed term</i>	33	3.30
<i>Permanent</i>	595	59.44
<i>n.a.</i>	339	33.86
Total	1001	100.00

Table: Education

Education	Frequency	Percent
<i>Low</i>	300	29.96
<i>Middle</i>	356	35.56
<i>High</i>	304	30.37
<i>n.a.</i>	41	4.1
Total	1001	100.00

Table: Career path

Career path	Frequency	Percent
<i>No</i>	756	75.52
<i>Yes</i>	245	24.48
Total	1001	100.00

Table: Age

Age	Frequency	Percent
45	78	7.79
46	67	6.69
47	66	6.59
48	60	5.99
49	67	6.69
50	56	5.59
51	66	6.59
52	51	5.09
53	59	5.89
54	55	5.49
55	52	5.19
56	53	5.29
57	62	6.19
58	53	5.29
59	35	3.50
60	29	2.90
61	22	2.20
62	21	2.10
63	17	1.70
64	21	2.10
65	11	1.10
Total	1001	100.00

Table: Industrial Classification

Industry	Frequency	Percent
<i>Agriculture, forestry, fishing</i>	26	2.60
<i>Construction</i>	81	8.09
<i>Manufacturing</i>	168	16.78
<i>Hotels & catering</i>	35	3.50
<i>Transport & communication</i>	60	5.99
<i>Banking, finance, insurance</i>	62	6.19
<i>Other services</i>	396	39.56
<i>Other</i>	164	16.38
<i>n.a.</i>	9	0.90
Total	1001	100.00

Figure: Injury Absence by Gender and Country

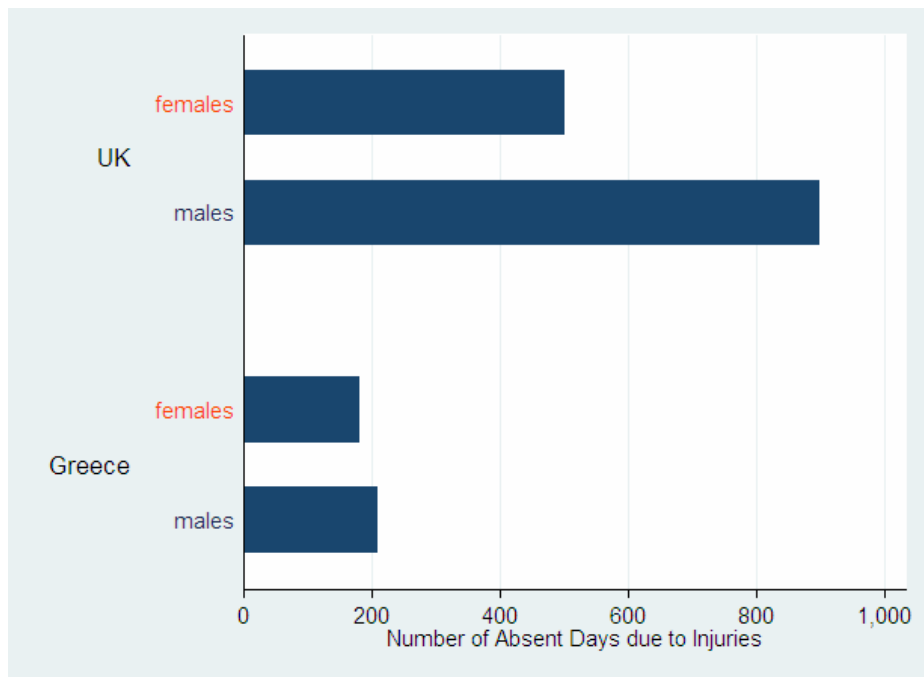


Figure: Injury Absence by Age and Country

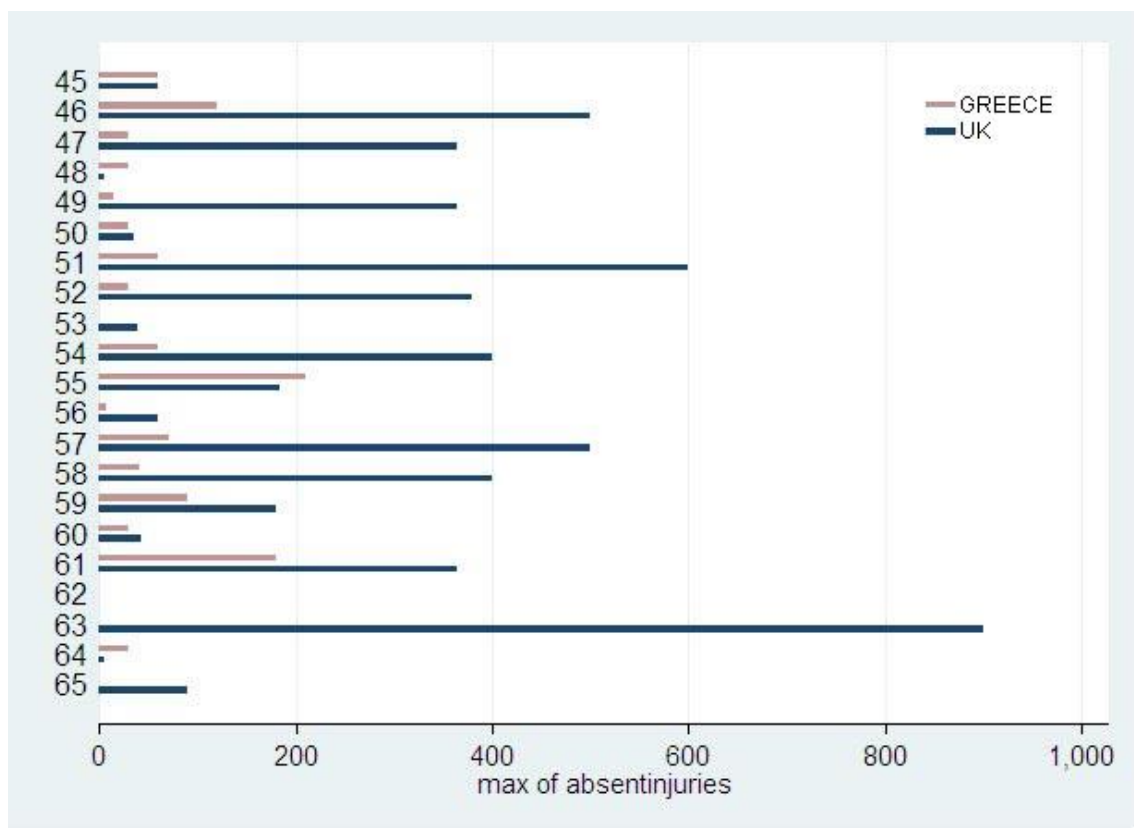
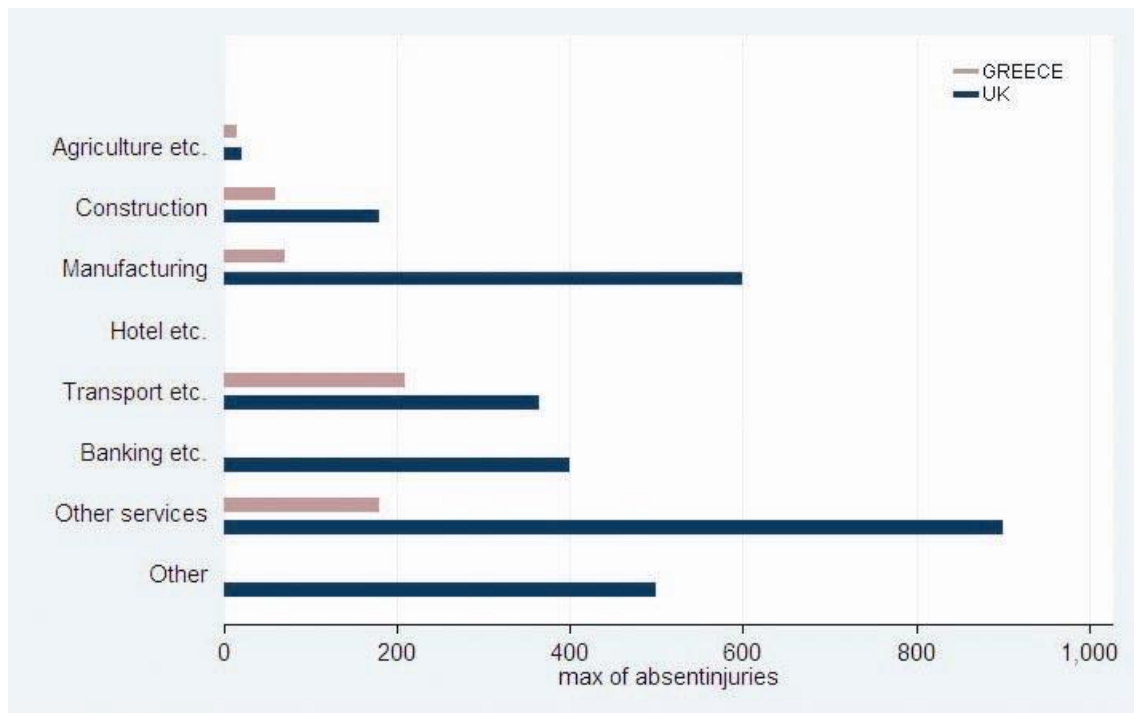


Figure: Injury Absence by industrial Classification & Country



Annex B

Table 4.2: Work-related Accidents and Insured Employees in the SSI, 1947-2007

Year	Work-related Accidents	Insured	Year	Work-related Accidents	Insured	Year	Work-related Accidents	Insured
1947	4,581	309,000	1968	63,132	924,000	1989	29,847	1,795,000
1948	5,905	326,000	1969	57,670	952,000	1990	27,846	1,812,000
1949	7,996	340,000	1970	61,530	964,000	1991	25,185	1,831,000
1950	11,316	357,000	1971	59,117	974,000	1992	25,063	1,849,000
1951	14,223	393,000	1972	63,107	1,020,000	1993	23,959	1,861,000
1952	21,099	415,000	1973	56,721	1,057,000	1994	22,608	1,874,000
1953	22,335	470,000	1974	48,794	1,104,000	1995	21,540	1,884,000
1954	24,982	515,000	1975	44,952	1,141,000	1996	21,224	1,889,000
1955	30,693	584,000	1976	44,987	1,176,000	1997	20,046	1,902,000
1956	37,406	590,000	1977	46,594	1,222,000	1998	18,615	1,908,000
1957	40,881	610,000	1978	47,115	1,280,000	1999	17,658	1,935,246
1958	41,406	630,000	1979	46,976	1,356,000	2000	16,822	1,941,265
1959	39,920	657,000	1980	44,950	1,431,000	2001	16,483	1,949,495
1960	44,174	718,000	1981	45,493	1,506,000	2002	16,031	1,952,232
1961	52,555	726,000	1982	41,327	1,546,000	2003	15,310	1,956,878
1962	56,392	732,000	1983	38,828	1,589,000	2004	14,490	1,961,815
1963	60,050	748,000	1984	38,658	1,646,000	2005	13,755	1,965,274
1964	64,731	783,000	1985	38,836	1,683,000	2006	12,845	2,031,446
1965	63,849	795,000	1986	36,913	1,719,000	2007	11,812	2,112,727
1966	67,595	839,000	1987	36,590	1,744,000	-	-	-
1967	62,205	874,000	1988	32,192	1,766,000	-	-	-

Source: Glavinis et al. (2007) & own calculations

Table 4.3: Work – related accidents and gender from 1974 until 2007

Gender	Number of Work-Related Accidents, 1974-2007								
	1974	1975	1976	1977	1978	1979	1980	1981	1982
Males	39767	39365	39266	40746	40856	41174	39390	40009	36439
Females	5216	5587	5721	5848	6259	5802	5560	5484	4888
Total Accidents	44983	44952	44987	46594	47115	46976	44950	45493	41327
	1983	1984	1985	1986	1987	1988	1989	1990	1991
Males	33925	33,863	33763	32509	31808	28330	26056	24361	21894
Females	4903	4795	5073	4404	4782	3862	3791	3485	3291
Total Accidents	32828	38658	38836	36913	36590	32192	29847	27846	25185
	1992	1993	1994	1995	1996	1997	1998	1999	2000
Males	21658	n.a	19526	18628	18395	17362	16002	15060	14554
Females	3405		3082	2912	2860	2684	2613	2598	2268
Total Accidents	25063	23959	22608	21540	21255	20046	18615	17658	16822
	2001	2002	2003	2004	2005	2006	2007		
Males	14062	13668	12963	12122	11403	10674	9710		
Females	2421	2363	2347	2368	2352	2171	2102		
Total Accidents	16483	16031	15310	14490	13755	12845	11812		

Source: IKA, 2007 & own calculations

Table 4.4: Reported answers of employees regarding their exposure to undesired situations at work

<i>Sex</i>	<i>Harassment</i>	<i>Violence</i>	<i>Heavy Work-load or Time Constraints</i>
<i>Male</i>	17.828 (0,6%)	22.225 (0,8%)	377.517 (13,7%)
<i>Female</i>	16.028 (0,9%)	6.935 (0,4%)	209.349 (11,9%)
<i>Total</i>	33.856 (0,7%)	29.160 (0,6%)	586.866 (13%)

Source: EL.STAT., 2008

Table 4.5: Reported answers of employees regarding their exposure to undesired situations at work (Greece)

	Verbal Abuse	Physical Violence	Bullying / Harassment	Threats	Discrimination
Male	8,4%	1,5%	3,7%	5,3%	7,3%
Female	5,0%	,3%	2,8%	3,2%	9,9%
Total	7,1%	1,0%	3,4%	4,5%	8,3%

Source: European Foundation for the Improvement of Living and Working Conditions, 5th European Working Conditions Survey, 2010

Table 4.6: Job Satisfaction by gender, age, occupation, Employment status, Activity of Organization and Nationality

Categories of workers reporting Job Satisfaction		1995				2000			
		Very satisfied	Satisfied	Not very satisfied	Not at all satisfied	Very satisfied	Satisfied	Not very satisfied	Not at all satisfied
Gender	Male	11,9%	50,8%	27,5%	9,9%	14,0%	49,6%	28,3%	8,1%
	Female	11,2%	49,0%	30,8%	9,0%	15,7%	52,5%	24,3%	7,4%
Age group	under 30	12,2%	57,6%	22,9%	7,4%	15,6%	53,9%	26,0%	4,5%
	30 to 49	13,5%	51,8%	28,6%	6,1%	16,2%	52,8%	24,8%	6,2%
	50+	7,5%	41,1%	33,2%	18,1%	10,2%	42,9%	32,2%	14,7%
Occupation	High-skilled clerical	18,2%	53,6%	21,7%	6,5%	28,0%	52,9%	14,7%	4,3%
	Low-skilled clerical	13,1%	59,5%	21,8%	5,6%	14,5%	58,8%	21,6%	5,1%
	High-skilled manual	4,7%	42,7%	38,4%	14,2%	8,5%	43,0%	36,7%	11,8%
	Low-skilled manual	16,0%	45,6%	28,0%	10,4%	9,4%	48,4%	32,7%	9,5%
Employment status	Employee: permanent contract	13,6%	58,2%	22,4%	5,7%	16,3%	56,1%	23,7%	4,0%
	Employee: other arrangement	14,1%	44,4%	31,3%	10,2%	13,0%	54,7%	24,4%	7,9%
	Self-employed	9,8%	44,3%	33,5%	12,4%	14,4%	44,7%	30,3%	10,6%
Activity of Org	Industry	7,6%	43,8%	35,8%	12,8%	8,9%	45,8%	35,1%	10,2%
	Services	14,7%	55,0%	23,2%	7,2%	18,5%	54,0%	21,3%	6,2%
Nationality	Greece	11,6%	50,1%	28,7%	9,6%	14,7%	50,7%	26,8%	7,8%
	EU27					26,7%	55,6%	13,8%	3,9%

Categories of workers reporting Job Satisfaction		2005				2010			
		Very satisfied	Satisfied	Not very satisfied	Not at all satisfied	Very satisfied	Satisfied	Not very satisfied	Not at all satisfied
Gender	Male	17,7%	42,1%	26,6%	13,7%	18,1%	43,7%	29,5%	8,7%
	Female	23,3%	36,7%	29,8%	10,3%	14,9%	50,4%	27,1%	7,6%
Age group	under 30	21,7%	44,9%	21,8%	11,6%	14,5%	51,2%	29,0%	5,3%
	30 to 49	19,5%	40,5%	27,7%	12,3%	18,1%	48,0%	27,5%	6,4%
	50+	19,0%	34,6%	33,2%	13,2%	15,7%	40,0%	30,4%	13,9%
Occupation	High-skilled clerical	31,4%	44,0%	18,2%	6,3%	27,0%	53,0%	15,3%	4,7%
	Low-skilled clerical	24,3%	43,5%	22,1%	10,1%	19,1%	51,4%	24,3%	5,2%
	High-skilled manual	8,3%	33,8%	37,0%	21,0%	8,2%	35,8%	40,2%	15,9%
	Low-skilled manual	12,1%	37,2%	39,4%	11,3%	9,4%	41,6%	40,3%	8,7%
Employment status	Employee: permanent contract	23,2%	45,4%	22,7%	8,8%	22,3%	48,9%	24,1%	4,6%
	Employee: other arrangement	19,7%	40,2%	30,2%	10,0%	13,4%	48,6%	31,1%	6,8%
	Self-employed	16,6%	35,0%	31,8%	16,5%	13,6%	41,4%	32,0%	13,0%
Activity of Org	Industry	13,2%	32,8%	34,3%	19,6%	13,3%	36,9%	37,0%	12,8%
	Services	23,4%	43,9%	24,3%	8,4%	18,5%	50,9%	24,5%	6,1%
Nationality	Greece	19,8%	40,0%	27,8%	12,4%	16,8%	46,4%	28,6%	8,3%
	EU27	25,1%	57,3%	14,0%	3,6%	25,0%	59,3%	13,0%	2,7%

Source: European Working Conditions Survey, 2010 & own calculations

Table 4.7: Absent Days over the past 12 months

Categories of workers reporting absent days from work for health problems over the past 12 months		2000		2005		2010	
		1 to 15	More than 15	1 to 15	More than 15	1 to 15	More than 15
Gender	Male	19,3%	4,4%	11,1%	3,3%	23,6%	1,4%
	Female	20,8%	3,1%	10,3%	3,2%	21,4%	2,9%
Age group	under 30	22,0%	4,2%	12,1%	2,7%	22,8%	2,5%
	30 to 49	20,2%	2,8%	12,2%	4,4%	22,9%	1,0%
	50+	16,8%	6,1%	6,3%	1,3%	22,4%	3,8%
Occupation	High-skilled clerical	17,0%	2,8%	9,8%	1,9%	28,0%	,9%
	Low-skilled clerical	21,7%	2,4%	13,5%	4,6%	21,6%	1,4%
	High-skilled manual	18,2%	6,2%	10,5%	4,2%	21,6%	2,6%
	Low-skilled manual	24,3%	3,2%	6,9%	,8%	18,7%	4,1%
Employment status	Employee: permanent contract	24,7%	3,4%	14,1%	4,2%	26,5%	2,0%
	Employee: other arrangement	23,5%	3,1%	11,6%	2,6%	23,2%	1,5%
	Self-employed	13,9%	4,8%	6,9%	2,9%	18,5%	2,3%
Activity of Org	Industry	20,1%	6,6%	10,4%	4,5%	21,1%	2,8%
	Services	19,6%	2,1%	11,0%	2,7%	23,5%	1,7%
Nationality	Greece	19,8%	3,9%	10,8%	3,3%	22,7%	2,0%
	EU27	28,0%	9,4%	16,6%	5,9%	35,7%	7,6%

Source: European Working Conditions Survey, 2010 & own calculations

Table 4.8: Financial costs of work-related accidents in DEI (1994 & 1995)

Cost factors	Costs (€) 1994	Costs (€) 1995
Subsidy cost	257.473	374.487
Compensation cost	24.980	50.595
Retirement cost	79.712	172.926
Health care cost	47.897	37.007
Worker replacement cost	257.473	374.487
Working hours lost cost	6.261	9.132
Direct cost	410.062	635.013
Total Expenditures	673.796	1.018.633

Source: ELINYAE, 2007

Table 4.9: Cost Estimation according to prevalence approach

Permanent Disability - Fatality	
<i>Pensions</i>	96.183.821,78
<i>Lost Contributions</i>	24.764.779,31
<i>Total</i>	120.948.601,09
Impermanent Disability	
<i>Subsidies</i>	12.338.448,29
<i>Lost Contributions</i>	4.475.976,39
<i>Total</i>	16.814.424,68
Total Expenditures	
<i>Total Pensions - Subsidies</i>	108.522.270,07
<i>Lost Contributions</i>	29.240.755,69
<i>Total</i>	137.763.025,76

Source: ELINYAE, 2007

Table 4.10: Cost Estimation according to incidence approach

Permanent Disability - Fatality	
<i>Pensions</i>	36.867.274,38
<i>Lost Contributions</i>	11.009.495,89
<i>Total</i>	47.876.770,27
Impermanent Disability	
<i>Subsidies</i>	12.338.448,29
<i>Lost Contributions</i>	4.475.976,39
<i>Total</i>	16.814.424,68
Total Expenditures	
<i>Total Pensions - Subsidies</i>	49.205.722,67
<i>Lost Contributions</i>	15.485.472,27
<i>Total</i>	64.691.194,95

Source: ELINYAE, 2007

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