Workplace Risks and Worker Outcomes in Ireland from a Comparative Perspective: An Analysis of the European Working Conditions Survey, 2005 and 2010

Dorothy Watson, Bertrand Maître, Helen Russell

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This report has been peer-reviewed prior to publication. The authors are solely responsible for the content and the views expressed.

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Glossary

EWCS (European Working Conditions Survey)	A comparative European survey focused on employment conditions managed by the European Foundation for the Improvement of Living and Working Conditions. It has been conducted at five-yearly intervals since 1990.
Job characteristics	In this report we examine the association between a number of characteristics of jobs and exposure to risk or outcomes for workers. The job characteristics are sector (public or private sector and industrial sector); job status (employee or self-employed and nature of contract if an employee); size of workplace; occupational category; tenure in job; and hours worked per week.
Multivariate analysis	This is a type of statistical analysis used when we want to look at the impact of one factor (such as exposure to physical risks) on another (such as health problems), after taking account of other differences (such as the age or level of education of those exposed and not exposed to physical risks).
Worker characteristics	In this report we examine the association between a number of characteristics of workers and exposure to risk or outcomes. The characteristics of workers include gender, age group, whether respondent or respondent's parents were born outside the country of residence ('migrants'), and highest level of education completed.
Worker Outcomes	In this report we examine the association between work and three outcomes for workers. The outcomes are self-rated health (distinguishing those who regard their health as fair, bad or very bad); mental distress (measured using the World Health Organisation five-item Mental Health Index and scored to range from 0 for no distress to 10 for high levels of distress) and injury (whether the person has suffered injury in the past 12 months).
Workplace risk	In this report we examine the level of exposure to four different types of workplace risk: • Physical risk involves exposure to vibration from tools or machinery, loud noise and extremes of temperature.

- Chemical/biological risk involves exposure to smoke, fumes, dust, vapours, skin contact with chemicals or contact with potentially infectious materials.
- Physically demanding work is work requiring painful or tiring positions almost all the time, lifting or moving people, carrying or moving heavy loads or constant repetitive hand or arm movements.
- Psycho-social risk involves unwanted sexual attention, physical violence in the last 12 months or bullying or harassment in the last 12 months.

Executive Summary

BACKGROUND

The European Commission recognises that promoting healthier working conditions is important not only to job quality, but also to promoting competitiveness and productivity, enabling workers to work for longer as a key element in addressing the long-term impact of demographic ageing on the sustainability of social security systems (European Commission, 2014, p.2). As well as workplace accidents, work-related illnesses must be taken into account. The International Labour Organization (ILO) (2014) reports that occupational illnesses account for an estimated 85 per cent of all work-related fatalities, a figure which has been hidden because of the relatively long lag between exposure and the emergence of many occupational illnesses.

The European Working Conditions Survey (EWCS) is a key survey on working conditions managed by the European Foundation for the Improvement of Living and Working Conditions. We draw on data with nationally representative samples of about 1,000 workers in each of more than 30 countries in the years 2005 and 2010. The 2010 data is the most recent available at the time of writing. The inclusion of the two time periods is also important. Given the dramatic impact of the Great Recession on employment in the EU, and especially in Ireland, it is timely to examine workplace risks and worker outcomes in Ireland from a comparative European perspective that can take account of the dramatic economic change between 2005 and 2010.

This report is part of a larger programme of research between the Health and Safety Authority (HSA) and the Economic and Social Research Institute (ESRI) and complements other work that focuses specifically on Ireland. Based on the European Working Conditions Survey (EWCS) for 2005 and 2010 we examine workplace risks and worker outcomes in Ireland in a comparative European context and at these two time points. The comparative perspective allows us to examine whether the patterns of workplace risk are similar in Ireland to other countries. If the patterns are similar, then we may be able to learn from policies that have been successfully adopted elsewhere. If the patterns in Ireland are unique, then policy would need to reflect the specific contextual factors in Irish workplaces.

We address the following research questions:

1. How did exposure to workplace risks in Ireland compare to those in other European countries in 2010?
2. How did exposure to these risks change between 2005 and 2010, with the onset of the Great Recession, both in Ireland and elsewhere?
3. How strong is the association between these risks and negative outcomes for the individual worker (such as health problems, reduced wellbeing, injury)? Does the association differ in Ireland compared to other European countries?

EXPOSURE TO WORKPLACE RISKS IN 2010

The report focuses on four different kinds of workplace risks based on workers' own assessment of their work environment. Each of these indicators is measured on a scale that ranges from 0 (no exposure) to 10 (highest level of exposure).

These are:

- Physical risk, which involves exposure to vibration from tools or machinery, loud noise and extremes of temperature.
- Chemical/biological risk, which involves exposure to smoke, fumes, dust, vapours, skin contact with chemicals or contact with potentially infectious materials.
- Physically demanding work, which requires lifting or moving people, carrying or moving heavy loads, painful or tiring positions or constant repetitive hand or arm movements.
- Psycho-social risks, which include unwanted sexual attention, physical violence, bullying or harassment at work in the last 12 months.

The level of exposure to physical, chemical/biological and physical demand risk is quite variable across countries but the level of exposure to psycho-social risk is lower and less variable across countries.

Compared to other European countries, Irish levels of exposure to physical risk, chemical/biological risk and physically demanding work were towards the middle to lower part of the distribution. In 2010, with the composition of jobs and the workforce taken into account, Ireland was 12th lowest out of the 34 European countries in terms of the average exposure to physical risk; 15th lowest in terms of exposure to chemical/biological risk; and 15th lowest in terms of exposure to physically demanding work. In common with many other wealthy Western European countries, the level of exposure to psycho-social risk is high in Ireland

(ranking 6th highest out of the 34 countries). It is possible that higher reported levels of exposure to psycho-social risk in the wealthier countries might be linked to a greater awareness of the right to be treated with dignity in the workplace.

The industry and occupations in which people worked made a difference to their exposure to workplace risks. Across all countries, levels of exposure to physical, chemical/biological and physical demand risk were higher in agriculture, forestry and fishing and in construction. Exposure to both physical and chemical/biological risk tended to be higher in manufacturing and in mining and quarrying. Exposure to chemical/biological risk was also higher in the health sector. There were also differences by occupation, with lower-skilled and manual occupations having a higher level of exposure to physical, chemical/biological risk and physically demanding work. Technicians and associate professionals also had a higher level of exposure to chemical/biological risk.

Characteristics of jobs and of workers were less important in accounting for variation in the level of exposure to psycho-social risk.

In general, Ireland was similar to other European countries in the way in which risk depended on the type of job held, with only a small number of distinctive patterns, as discussed in Chapter 2.

Countries differ in their employment regimes, that is in the way the relationship between workers and management is organised. We anticipated that this might lead to differences between countries in exposure to workplace risks. The level of exposure to risk in Ireland was similar to the UK, the other country typically classified as having a 'liberal' employment regime. However, there were substantial differences between countries within each of the other regimes, even after controlling for the composition of jobs and workers. Contrary to our expectations, then, we found that the classification of countries into employment regimes accounted for very little of the differences between countries, even after taking account of the distribution of industries, occupations and other job and worker characteristics.

CHANGE IN EXPOSURE TO WORKPLACE RISKS BETWEEN 2005 AND 2010

The second research question was concerned with the impact of the recession on exposure to workplace hazards, comparing the situations in 2005 and 2010. The impact of the recession might have gone in two different directions. It might have resulted in a reduction in risk exposure as jobs were lost in high exposure sectors

such as construction and manufacturing. Alternatively, it might have led to an increase in risk exposure in response to increased pressure to cut costs. The overall pattern found was one of a decline in exposure to workplace risks, with some differences by risk type and by country but no clear association between the changes in exposure and the extent to which countries were hit by the recession.

In general, we saw a small fall in exposure to physical risk, which was mainly accounted for by shifts in the composition of jobs and workers. In Ireland there was an increase in exposure to physical risk between 2005 and 2010 but the risk in Ireland in 2010 remained below the average across the 34 European countries.

There was also a general fall in exposure to chemical/biological risk and a more substantial fall in the level of exposure to psycho-social risk. Ireland was similar to other countries in terms of the fall in exposure to both of these types of risk.

About half the countries, including Ireland, experienced no change in the level of exposure to physically demanding work, while most of the remainder experienced a reduction in exposure.

We also examined whether there was a change over time in the link between exposure to workplace risk and characteristics of jobs and the workforce. Most of the associations that were present in 2010 did not differ significantly from those found in 2005, with only a small number of minor exceptions (see Chapter 3).

WORKPLACE RISK AND WORKER OUTCOMES, 2010

We examined the impact of exposure to workplace risks on three worker outcomes: self-rated poor health, mental distress measured on the basis of the World Health Organization (WHO) 5-item scale, and injury experienced in the last year. None of these indicators is linked specifically to work. This avoids the problem of potential biases associated with differences in attribution of physical or mental health problems to aspects of work. Since there may be cultural differences in the way these questions are answered in surveys, we caution against drawing conclusions about the differences between countries in the levels of health, injury or mental distress. Instead, we focus on the associations between these outcomes and characteristics of jobs and workers, especially the relationship with exposure to workplace risks.

Self-rated poor health is more often reported by those exposed to physical risk, physically demanding work and psycho-social risk and is also more frequently reported by older workers. Taking account of worker and job characteristics, the increase in the percentage reporting poor health between those with the lowest and the highest level of exposure to workplace risks was five percentage points for physical risk, 22 percentage points for physically demanding work and 29 percentage points for psycho-social risks. These associations are similar in Ireland to other countries.

Mental distress was associated both with characteristics of the workers (being higher among older workers and women) and characteristics of the job (being a trainee, unskilled occupations and longer working hours). In terms of workplace risks, mental distress was considerably higher where there was greater exposure to psycho-social workplace risks (by 1.2 points on the ten point scale), and was also increased where the worker had a high level of exposure to chemical/biological risk (by 0.3 points) or physically demanding work (by 0.5 points). With a small number of exceptions (such as older Irish workers being less prone to mental distress than their European counterparts), these Europe-wide patterns were also found in Ireland.

The risk of injury was also associated with both characteristics of the worker (higher among younger workers) and characteristics of the job (higher for trainees, casual employees, those in the agriculture, forestry or fishing sector and in craft and trade occupations). The risk of injury was higher among those exposed to all four kinds of workplace risk. With the composition of jobs and workers controlled, the gaps between those with the highest and lowest levels of workplace risk exposure were six percentage points for physical risk, nine percentage points for chemical/biological risk; 12 percentage points for physically demanding work and 27 percentage points for psycho-social risk. The patterns were, for the most part, similar in Ireland to the general European ones.

It is worth noting that for all three outcomes, exposure to psycho-social workplace risk had the most unfavourable consequences. This highlights the need to include consideration of exposure to psycho-social risk in research and policy on health and safety in the workplace.

LIMITATIONS AND FURTHER RESEARCH

In interpreting the results, it is important to be aware of the limitations of the approach taken. These include the fact that the data do not include workers who have left work entirely because of illness or injury and the difficulty in firmly

establishing the direction of causation when risks and outcomes are measured at the same point in time.

The analysis revealed a number of areas where further research could fruitfully be conducted. These included an examination of the extent to which workplace organisation, such as employee representation and consultation, autonomy, flexibility and workplace support may ameliorate the negative impact of risk exposure on physical and mental health; and the significance of equality and anti-bullying policies for the observed reduction between 2005 and 2010 in exposure to psycho-social risk.

The increase in exposure to physical risk in Ireland between 2005 and 2010 is something that warrants further exploration. This does not appear to be due to changes in the composition of jobs or the workforce insofar as we were able to measure them in the present analysis. It would be important to understand whether this increase represents a response to the economic and other pressures associated with the recession or to some other change in workplace practices.

At the time of writing, the 2010 data were the latest available from the European Working Conditions Survey (EWCS). When the data from the 2015 EWCS becomes available, this analysis can be extended to examine how exposure to workplace risks has evolved as Ireland and other countries move from recession to economic recovery.

POLICY IMPLICATIONS

The results indicated that there is a significant social patterning to exposure to workplace risks. Those jobs exposed to the highest risks are often those that are also disadvantaged in other respects, such as pay, job security and working conditions. Controlling for sector, those in lower-skilled and manual occupations had a higher level of exposure to physical, chemical/biological risk and physically demanding work. The sectors where risk was highest were agriculture, forestry and fishing, mining and quarrying and manufacturing. This points to a continuing need to target health and safety policies towards these sectors and occupations.

The findings pointed to a significant association between workplace risks and negative outcomes for workers, even when controlling for other characteristics such as gender, age and level of education. The association between negative outcomes and psycho-social risks were particularly striking. The findings indicate that this form of workplace risk needs to be taken as seriously as the physical

hazards that have been the more traditional focus of health and safety policies. Psycho-social risks are not as strongly differentiated by job and worker characteristics as the other types of risk but they tend to be more prevalent in the public sector and in the health and social work sector.

Even with exposure to these workplace risks controlled, a number of groups emerged as having an increased risk of negative outcomes. Many of these were the same groups that had higher levels of exposure to risk in the first instance, including the agriculture/forestry/fishing sector (injury), in craft and related trades (injury), and unskilled work in elementary occupations (mental distress). Again, these point to the need for a continuing focus on sectors such as agriculture and construction as well as on unskilled occupations.

An encouraging finding was the significant reduction over time in the level of exposure to psycho-social risk. This suggests that improvement in health and safety is possible, even in the context of recession.

Finally, the comparison between Ireland and other countries indicated more similarities than differences. This suggests that Ireland could learn from the experience of other countries in terms of policies and interventions that have been successful in improving health and safety in the workplace.

Chapter 1

Introduction

1.1 BACKGROUND AND RESEARCH QUESTIONS

The European Commission recognises that promoting healthier working conditions is important not only to job quality, but also to promoting competitiveness and productivity. It enables workers to work for longer, thereby becoming a key element in addressing the long-term impact of demographic ageing on the sustainability of social security systems (European Commission, 2014, p.2).

It is taken for granted that health and safety policy must pay attention to data on fatalities and injuries that occur in the workplace. What may be less obvious, however, is the more insidious way in which the physical and mental health of even larger numbers of people may be affected by the conditions in which they work over a prolonged period.

There is increasing recognition of this fact. For example, the European Commission cites International Labour Organisation (ILO) statistics indicating that there were 159,500 fatal work-related diseases in 2008 for the EU27 (2014 p. 6). The European Commission has adopted a new *Strategic Framework on Health and Safety at Work 2014-2020* which aims to promote high standards for working conditions, generally. While the enforcement of minimum health and safety standards is an important component of this strategy, it also pays attention to the prevention of work-related diseases by tackling new and emerging risks, such as work-related stress, repetitive movements, risks associated with lifting and carrying, and the needs of an ageing workforce (European Commission, 2014, p. 6).

In this report, we draw on the European Working Conditions Survey (EWCS) for a key period: before and during the Great Recession (2005 and 2010). The 2010 EWCS data was the most recent available at the time of writing. The inclusion of two time periods is important. Given the dramatic impact of the Great Recession on employment in the EU, and especially in Ireland, it is timely to examine workplace risks and worker outcomes in Ireland from a comparative European perspective that can take account of any change between 2005 and 2010.

The analysis presented here is part of a larger programme of research between the Health and Safety Authority (HSA) and the Economic and Social Research Institute (ESRI) and complements other work that focuses on Ireland. The comparative perspective in the present report allows us to examine whether the patterns of workplace risk are similar in Ireland to other countries. If the patterns are similar, then we can learn from policies that have been successfully adopted elsewhere. If the patterns in Ireland are unique, then policy would need to reflect the specific contextual factors in Irish workplaces.

We address the following research questions in this report:

1. How did risk factors in Ireland compare to those in other European countries in 2010 and to what extent are differences due to the composition of the workforce, the composition of jobs and country characteristics?
2. How did exposure to these risks change between 2005 and 2010, with the onset of the Great Recession, both in Ireland and elsewhere?
3. How strong is the association between these risks and negative outcomes (such as health problems, mental distress, injury) for the individual worker? Does the association differ in Ireland compared to other European countries?

In this chapter, we begin by reviewing theoretical approaches to understanding differences among countries in working conditions and welfare provision. We then examine the economic and labour market context in 2005 and 2010. There were dramatic differences between countries in the severity of the impact of the Great Recession and it is important to keep this in mind in examining workplace change between 2005 and 2010. In Section 1.4 we discuss the data sources and methods used, including a description of the EWCS, measurement of the key concepts, the specific analysis methodology used and some of the strengths and limitations of the approach taken. In the final section we outline the contents of the report chapters.

1.2 UNDERSTANDING NATIONAL VARIATIONS IN HEALTH AND SAFETY

In comparing risks and outcomes across a large number of countries, as we do here, it is useful to have as a background some information on how the countries differ in terms of the organisation of work. Researchers have developed a number of classifications or typologies that are relevant. These typologies are conceptual frameworks which group countries according to their similarity to

certain 'ideal types'' with respect to institutional or structural features. Here we outline relevant typologies and use them to develop hypotheses about patterns of workers' exposure to risks and outcomes for workers' physical and psychological wellbeing. The analysis in this report still distinguishes individual countries but we assess whether there are any commonalities in the results within the clusters developed by the theories.

These employment regimes may seem to be very far removed from the specific concerns of Health and Safety professionals. However, the way work is organised to a large extent reflects the balance of power and priorities of employers and workers. This is an important context for understanding the extent to which legislation to protect workers is enacted, enforced and resourced.

1.2.1 'Varieties of Capitalism' and 'Employment Regimes'

There are several different ways of grouping countries, depending on the structural features emphasised. One example is the 'varieties of capitalism' (VoC) approach, developed by Hall and Soskice (2001). They distinguished between two constellations of 'capitalisms': 'liberal market economy' (LME) and 'co-ordinated market economy' (CME). Co-ordinated market economies, such as Germany and the Nordic countries, rely on non-market forms of co-ordination including negotiation and bargaining between unions and employers, well-developed internal labour markets[1] with strong investment in skills, higher levels of worker control, and capital markets that emphasise longer-term considerations (Hall and Gingerich 2004; Howell, 2003).

In contrast, in liberal market economies such as the United States, the UK and Ireland, relationships are governed by the competitive market. The associated institutional arrangements include a high level of managerial control, limited collective bargaining, higher work pressure and capital markets that emphasise maximizing share price in the short term. The Southern European countries (Spain, Portugal, Italy plus France) are seen to fall between these two ideal types; they are characterised by greater state co-ordination than the LMEs, particularly in relation to labour supply but less than the CMEs (Hall and Gingerich, 2004).

Another example of a country grouping system is employment regime theory. This approach classifies societies into three categories: Inclusive, Dualist and Market regimes, based on involvement of organised labour in decision/policy

[1] Internal labour markets involve recruiting workers in relatively low-level positions and filling higher level positions through training and promotion. They typically entail a greater degree of on-the-job training and longer tenure with the employer (Lazear and Oyer, 2004).

making, and the level of integration of marginalised groups through employment regulation (Gallie, 2007b). Inclusive systems of employment regulation, such as those found in the Scandinavian countries, protect vulnerable sectors of the workforce. The dualist systems on Continental Europe, on the other hand, create a sharp contrast between core and peripheral workers. In the Market regimes found in Ireland and the UK, working conditions will depend primarily on market power (Gallie, 2013). While Gallie's original employment regime did not include any Eastern European country, more recent work (Gallie, 2013) suggests that with the exception of Slovenia, the level of bargaining co-ordination is uniformly low in the East European countries so that they had much in common with the Market regimes. The Southern European countries were similar to the Continental Dualist regimes with high bargaining coverage and low union density.

Bukodi and Róbert (2007) propose another typology which focuses on the strictness of employment protection legislation including the regulations governing recruitment and termination of employment. Combining these criteria with those relating to the welfare state, Bukodi and Róbert distinguish six regimes. The Social Democratic regime includes Sweden, Denmark, Iceland, Finland, Norway and the Netherlands. The Corporatist regime includes Germany, Austria, Belgium, France and Luxembourg. The Liberal regime comprises the UK and Ireland. The Southern European regime is distinguished by low levels of state support and welfare coverage combined with strong employment protection for insiders. This constellation of countries consists of Cyprus, Greece, Italy, Portugal, and Spain. The Eastern European countries are divided into two groups. The Post-Socialist Corporatist regime, which comprises of the Czech Republic, Hungary, Poland, Slovenia and Slovakia, have a moderate degree of employment protection. The post-socialist liberal cluster comprises the Baltic countries, Estonia, Latvia, Lithuania, which are characterised by a more flexible labour market (Bukodi and Robert, 2007).

Differences between the Eastern/Post-Communist countries are also identified in the developing comparative literature on policies in this group of countries (e.g. Inglot, 2003, 2008). This literature emphasises the Bismarkian traditions of social policy in East Central Europe (Hungary, the Czech Republic, Slovakia, Poland), vestiges of which could be seen in policy during the Communist era and post-transition which means these countries share some characteristics with the Corporatist group of countries (Szikra & Tomka 2009; Inglot, 2008). In contrast, the Baltic states, Latvia, Lithuania and Estonia, are seen to have followed a more Liberal model post-transition. Other authors, however, argue that Communist rule had a transformative impact leading to commonalities, so that Eastern

European countries should be grouped together for comparative analyses (Haggard and Kaufman, 2009).

While Eastern European countries are excluded from many classifications, there may also be some countries that are difficult to classify in existing schemes. Thelen (2004) notes that many of the alternative clustering schemes have trouble classifying certain countries, with Ireland, Greece and Portugal often appearing among the countries which could not be readily classified.

1.2.2 Implications for Health and Safety

While the 'varieties of capitalism' approach does not include occupational health and safety as a dimension in formulating the typology,[2] it nevertheless forms a useful basis for predicting country differences. Economies with greater co-ordination and worker representation in decision making are likely to promote greater protection for workers in terms of occupational health and safety than in the liberal market economies.

Workers' health and safety is more directly addressed in Gallie's work (2007b, p28). He argues that policies to improve working conditions such as worker control and occupational health (including workers' psychological wellbeing) are a key aspect of integration distinguishing the 'Inclusive' Nordic regimes. This would lead to an expectation of significantly lower exposure to occupational hazards and work-related illness and injury in the inclusive regimes. In the Dualist/Corporatist regimes and the Southern regimes we would expect a much greater variation in the risks across groups of workers, with peripheral workers (those on temporary or other non-standard contracts, young people, migrants, women) having higher levels of risk exposure compared to workers in the 'core'. In the Liberal grouping, including Ireland, we might also expect significant differences between workers based on market power, while comparatively low levels of state regulation of employment could lead to higher risk exposure overall. Our expectations regarding former-Communist countries are less well formulated given the disagreement over commonalities and differences in employment and welfare trajectories.

Gal (2004) compares work injury programmes across ten countries along a range of dimensions such as coverage, replacement rates, taxation of benefits, waiting periods, minimum disability levels for eligibility, spending on work injury

[2] See, however Mares' (2001) arguments on the role of firms in promoting the introduction of disability insurance for workers during the formation of the German welfare state.

insurance and on rehabilitation programmes. An index is created on the basis of the first five indicators. The results broadly fit with Esping Andersen's classification of the level of decommodification of welfare systems, i.e. the extent to which individuals and families are enabled to 'uphold a socially acceptable standard of living independent of the labour market'. The highest index score was received by Sweden and Australia (4) followed France, Spain, Israel, Germany and Denmark (4); the US scored 1 and the UK and Greece scored 0. While the Social Democratic states score highly and the Liberal states and Greece have low scores consistent with other welfare state research, the relatively high scores received by Spain, Australia and Israel were not expected. However, when the authors consider the additional dimension on the extent to which those experiencing work injuries are rehabilitated, which the authors call a 'self-development index', the welfare regime differences become clearer and more coherent with Denmark and Sweden at the top (Social Democratic), Germany, France, (Conservative/ Corporatist) in the middle and Spain and the UK at the bottom (Southern/ Liberal).[3]

Previous cross-national research has explored the relationship between employment characteristics and 'health-related outcomes' (job satisfaction, health-related absenteeism and stress) and three self-reported health problems (overall fatigue, backache and muscular pains) across the EU15 (Benavides et al., 2000). The study was based on the Second European Working Conditions Survey carried out in 1995/1996. It found that those in precarious employment (fixed-term and temporary) had higher levels of job dissatisfaction, fatigue, backache and muscular pain while they were less likely to report stress and absenteeism. The authors note that for most of the 'health-related outcomes' the scores are favourable in Ireland, Belgium and the Netherlands.

Apart from differences at the level of the workplace, there are important differences between groups of countries in the social protection systems which influence the context of workplace illness and injury. The comparative literature on welfare regimes leads to a general expectation that the welfare safety net for those injured at work or experiencing a work-related illness will be more generous in countries within the Social Democratic/Nordic regimes, in the Corporatist regimes (for insured workers) and the Post-Socialist Corporatist grouping. While, this will not influence exposure to risks, it may influence the connection between risks and outcomes (due to better access to health care).

[3] Ireland was not among the ten countries included in this analysis.

Benavides et al. (2000) also investigated the potential buffering effect of country level factors such as level of social protection, GDP per capita, unemployment rate and percentage of temporary contracts. However, while there were significant differences in the 'health-related outcomes' across countries, these were not systematically related to the four macro-level indicators (level of social protection, GDP per capita, unemployment rate and per cent of temporary contracts).

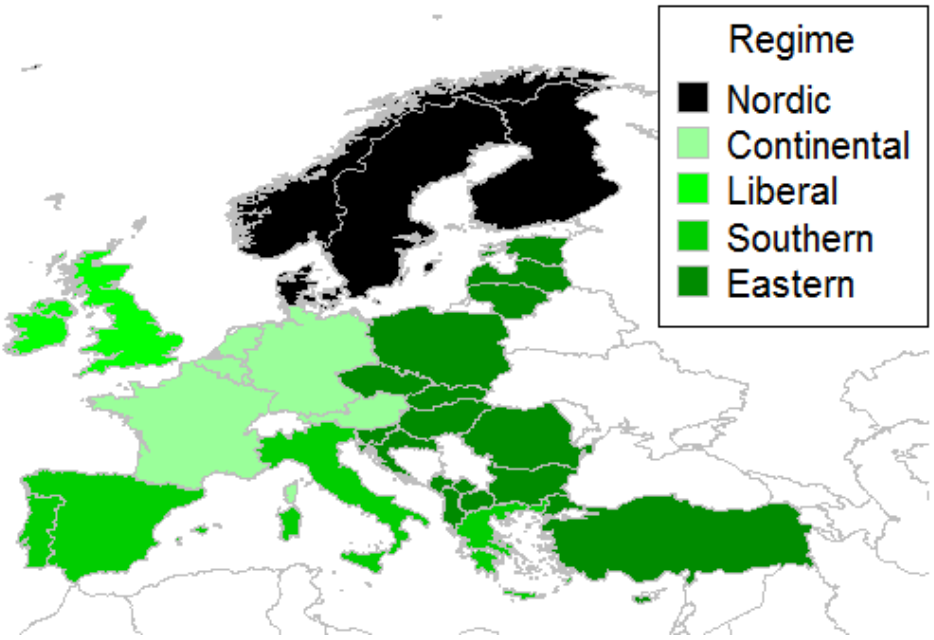
Overall, then, the classification of Ireland as a 'liberal market economy' or 'Market regime' would lead us to expect lower levels of state regulation of employment conditions leading to an expectation of relatively lower levels of protection for worker health and safety than in the Scandinavian countries. The dominance of the market would also lead us to expect that workers in a weaker market position (particularly those with lower levels of skill and younger workers) may be exposed to higher levels of workplace risk than workers with a stronger market position.

Both the welfare state and employment regimes are likely to be relevant to an understanding of country differences in workplace health and safety. Figure 1.1 shows the regimes adopted in this report. The alternative schemes often diverge in terms of how countries are classified, but there is a general tendency to converge on the five 'regimes' shown in Figure 1.1 (see also Watson et al., 2014, on country regimes and quality of life).

The Nordic regime includes Norway, Sweden, Finland and Denmark. The Continental regime includes France, Germany, the Netherlands, Austria, Belgium and Luxembourg. Ireland and the United Kingdom are in the Liberal regime. Spain, Portugal, Italy, Greece and Malta are in the Southern regime. The countries of Central, Eastern and South-Eastern Europe are included in the Eastern regime (Poland, Hungary, the Czech Republic, Slovakia, Slovenia, Estonia, Lithuania, Latvia, Romania, Bulgaria, Macedonia, Kosovo, Albania, Croatia, Montenegro, Cyprus and Turkey).

The links between welfare regime and outcomes for workers are likely to be complex and the results might not always be seen in improvements to the circumstances of workers in survey data. This is because a good system of protection for workers is likely to be associated with a greater awareness of workplace risk; the capacity to take longer sick or injury leave, where needed, and encouragement to return to work when this is possible rather than leaving employment entirely.

FIGURE 1.1 Grouping Countries into Employment/Welfare Regimes



Source: Map created in rworldmap (South, 2015).

Note: Countries are grouped as follows: Nordic (Norway, Sweden, Finland and Denmark); Continental (France, Germany, the Netherlands, Austria, Belgium and Luxembourg); Liberal (Ireland and the United Kingdom); Southern (Spain, Portugal, Italy, Greece and Malta) and Eastern (Poland, Hungary, the Czech Republic, Slovakia, Slovenia, Estonia, Lithuania, Latvia, Romania, Bulgaria, Macedonia, Kosovo, Albania, Croatia, Montenegro, Cyprus and Turkey).

A well-developed health and safety system is likely to heighten awareness of workplace risk. This could lead to a higher level of reporting of exposure to workplace hazards in the course of application for benefits and in surveys. As a result, the level of exposure to workplace risk is likely to be understated in contexts where there is less protection of workers.

Another factor is that where the incomes of workers are protected while they are out of work due to illness or injury, they will be under less pressure to return to work before they have fully recovered. If length of absence is taken as an indicator of severity of injury, we may see a paradoxical pattern whereby injury levels appear to worsen as protection for workers improves.

This could also be associated with a 'healthy worker effect' (McMichael, 1976). If workers who have become ill or injured remain on sick leave, the average health level of those remaining in employment will be better. We might expect the 'healthy worker effect' to be greater in the Nordic and Corporatist countries.

On the other hand, to the degree that the emphasis is on supporting workers to return to employment through progressive 'return to work' policies, a well-developed system of protection for workers may be associated with a higher proportion of the current workforce having experienced illness or injury in the past. This could result in a higher proportion of those who have developed an occupational illness remaining in employment, counteracting a 'healthy worker' effect.

Although it will not be possible to control for all of these factors in the present report, it is important to be aware of them in interpreting the results.

1.3 ECONOMIC AND LABOUR MARKET CONTEXT

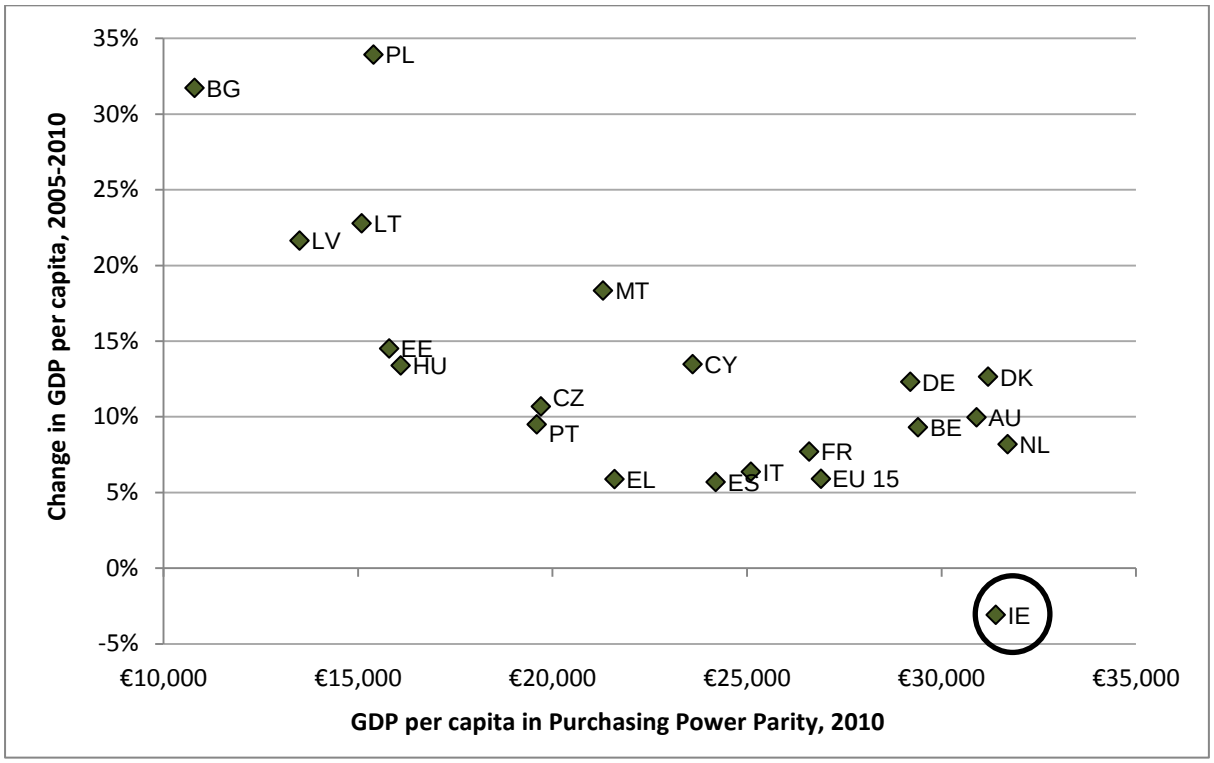
This section provides an overview of the sectoral and size composition of employment across European countries, as well as background information on changes in levels of employment and economic growth between 2005 and 2010. The recession is likely to have had an impact on work practices such as temporary and part-time employment. Since these are both correlated with occupational health, safety and wellbeing (Ardito et al., 2012; Davies et al., 2013; Gash et al., 2007), changes in these arrangements are described.

We know that employment in certain sectors has been particularly badly affected by the recession in Ireland, notably the construction sector but also retail and hotels and restaurants. We will examine the extent to which this had an impact on the sectoral composition of employment in Ireland and also in other countries.

The Great Recession struck the European economies from mid-2008 onwards. This resulted in dramatic falls in GDP, rising levels of unemployment, a financial crisis, rising government debt and increasing personal debt. The causes and effects of the Great Recession have been extensively documented (Keeley and Love 2010; Grusky et al., 2011; Jenkins et al., 2013). In Europe as a whole, GDP decreased by 5.7 per cent between the first quarter of 2008 and the first quarter of 2009. However, there was substantial variation across countries in the impact of the crisis (Arpaia and Curci, 2010). Indeed, while in the EU28 the employment rate only fell from 67 per cent to 65 per cent between 2008 and 2010, the fall was more pronounced in some countries such as in Ireland and Spain for example, where it fell from 68 per cent to 60 per cent and 65 per cent to 59 per cent, respectively.

We can illustrate the variation in the impact of the recession in terms of GDP (Figure 1.2) and level of employment (Figure 1.3) over the period covered by the EWCS data analysed here, that is 2005 and 2010.

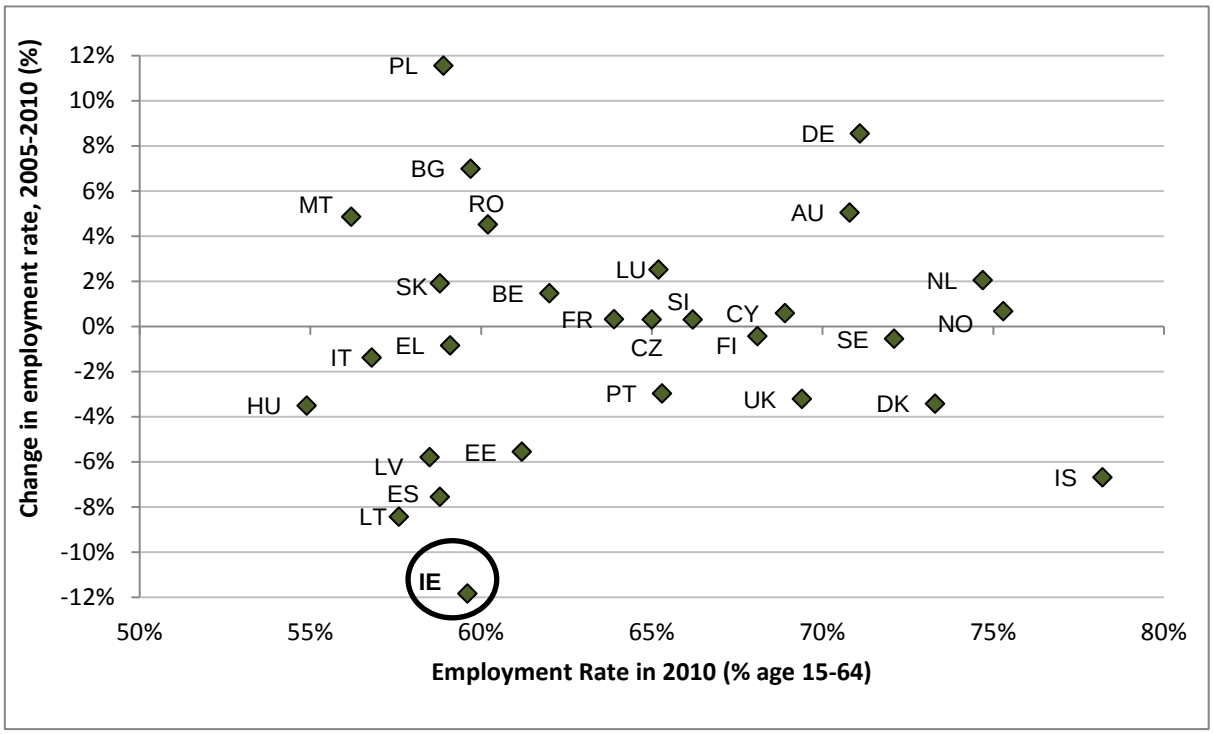
FIGURE 1.2 Country Differences in GDP in 2010 and % Change in GDP from 2005 to 2010 (GDP per capita in Purchasing Power Standard Units)



Source: Eurostat GDP and main components - volumes [nama_gdp_c] (Gross domestic product per capita in purchasing power standard, downloaded October 29 2014), and authors' own calculations. Luxembourg and Romania not shown. AL Albania, AT Austria, BG Bulgaria, BE Belgium, CZ Czech Republic, CY Cyprus, DE Germany, DK Denmark, EE Estonia, EL Greece, ES Spain, FI Finland, FR France, HR Hungary, HR Croatia, IE Ireland, IT Italy, LV Latvia, LT Lithuania, LU Luxembourg, MT Malta, MK Macedonia, ME Montenegro, NO Norway, NL Netherlands, PT Portugal, PL Poland, RO Romania, SK Slovakia, SE Sweden, SI Slovenia, TY Turkey, UK United Kingdom, XK Kosovo.

Figure 1.2 shows the GDP per capita in 2010 expressed in purchasing power standard units, and the change in GDP per capita since 2005. We can see that there is very wide variation across countries in the percentage change in GDP between 2005 and 2010. GDP increased by 6 per cent on average across the EU15 countries. It fell by 3 per cent in Ireland in the period and rose by 13 per cent in Denmark and 12 per cent in Germany. The increases were even more dramatic in several Eastern European countries (such as Bulgaria, Poland, Latvia and Lithuania with figures over 20 per cent), but these were from a very low base in 2005. There is clearly a strong division in the experience of the economic recession over the period 2005 to 2010.

FIGURE 1.3 Country Differences in Employment Rate in 2010 and Change Since 2005



Source: Eurostat (Employment (main characteristics and rates) - annual averages [lfsi_emp_a] and authors own calculation. See Figure 1.2 for country legend.

In Figure 1.3 we present the employment rate and the change over time since 2005 across European countries. On the horizontal axis we report the employment rate of the population aged 15 to 64 in 2010 and on the vertical axis we report the difference in the employment rates between 2005 and 2010. Looking at first to the 2010 employment rate there is a wide variation in the rates, from a low 55 per cent in Hungary to a high of 78 per cent in Iceland. Overall, Northern European countries are characterised by relatively high employment rate and most of them have also experienced either relatively little change or an increase in the employment rate between 2005 and 2010. The largest increases were in Germany and Poland where the employment rate increased by 9 and 12 per cent respectively, while we observe a reduction in the employment rate of more than 5 per cent in Ireland, Spain, Latvia, Lithuania, and Iceland. The countries that have experienced the largest reduction in employment rate are the Baltic countries as well as Spain and Ireland, bringing these countries to a lower level of employment than the EU28 average. While many of the Eastern European countries have lower levels of employment than the EU28 they have, however, generally experienced a large increase in the employment rate, especially in Poland, Macedonia and Bulgaria.

Ireland was particularly badly affected by the recession, as is clear from Figures 1.2 and 1.3, showing a fall in employment and in GDP. Research on workplace

change in Ireland found that between 2004 and 2009 the amount of pressure experienced by workers in Ireland had increased. Work pressure was measured, with responses to a number of items dealing with the feeling of not having enough time to get the work done and having to work extra hours to get the work finished. Russell et al. (2014) found that work pressure had increased significantly for women in particular and this was due to a relatively bigger rise in pressure within the public sector, which experienced a recruitment embargo combined with an increased demand for services.

1.4 DATA AND METHODS

1.4.1 The European Working Conditions Survey (EWCS)

The data used in this report come from the European Working Conditions Survey (EWCS), which is managed by the European Foundation for the Improvement of Living and Working Conditions. The EWCS is the ideal data source for this analysis since it provides information at a number of time points that is harmonised across countries and includes measures highly relevant to health and safety in the workplace.[4]

TABLE 1.1 Sample Size in Each Country, 2005 and 2010

Country	2005	2010		Country	2005	2010
BE Belgium	1,003	4,001		AT Austria	1,009	1,003
BG Bulgaria	1,135	1,014		PL Poland	1,000	1,500
CZ Czech Republic	1,027	1,000		PT Portugal	1,000	1,000
DK Denmark	1,006	1,069		RO Romania	1,053	1,017
DE Germany	1,018	2,133		SI Slovenia	600	1,404
EE Estonia	602	1,000		SK Slovakia	1,024	1,002
EL Greece	1,001	1,037		FI Finland	1,059	1,028
ES Spain	1,017	1,008		SE Sweden	1,059	1,004
FR France	1,083	3,046		UK United Kingdom	1,058	1,575
IE Ireland	1,009	1,003		HR Croatia	1,011	1,100
IT Italy	1,005	1,500		TY Turkey	1,015	2,100
CY Cyprus	600	1,000		NO Norway	1,000	1,085
LV Latvia	1,003	1,001				
LT Lithuania	1,017	1,004		AL Albania		1,000
LU Luxembourg	600	1,000		XK Kosovo		1,018
HR Hungary	1,001	1,006		MK Macedonia		1,100
MT Malta	600	1,000		ME Montenegro		1,041
NL Netherlands	1,025	1,017				

Source: EWCS, 2005 and 2010 (Base is adults in employment); analysis by authors.

[4] Questionnaires and methodological documents are available on the website of the European Foundation: http://eurofound.europa.eu/european-working-conditions-surveys-ewcs.

The EWCS was launched in 1990 as a face-to-face survey of a random sample of people in employment in European countries. The survey has been conducted every five years, beginning with 12 countries in 1990 and including 34 countries by 2010.[5] Our analysis of the situation in 2010 includes 34 countries. For the comparison of 2005 and 2010 we include 30 countries; the EU27 as well as Norway, Croatia and Turkey. The countries included in the EWCS surveys for 2005 and 2010, and the number of interviews in each country, are shown in Table 1.1.

The topics covered in the survey have changed over time. Themes covered by 2010 include employment status, working time duration and organisation, work organisation, learning and training, physical and psycho-social risk factors, health and safety, work-life balance, worker participation, earnings and financial security, as well as work and health. In this analysis we focus on workplace risks (physical and psycho-social) and on three outcomes: self-rated health, mental distress and injury.

We note that the EWCS does not include people who may have left work because of illness or injury. This means that any patterns we observe among those currently in employment may understate the differences between economic sectors and groups.

1.4.2 Measurement of Key Concepts

Among the key indicators available for the present analysis are workplace risks, outcomes for workers and the independent variables used in the analysis. The measurement of each of these key concepts is discussed in turn.

Workplace Risks

There are a large number of indicators of potential workplace risks in the EWCS. Most of these are measured as intensity of exposure, for instance, on a scale ranging from 'never' to 'all the time'. In deciding which items to include in this analysis, we adopted a novel approach by making use of the respondents' perception of risk. Respondents were asked: 'Do you think your health or safety is at risk because of your work?' with response categories 'yes' or 'no'. On average, 25 per cent of the 2010 EWCS respondents agreed that their health or safety was at risk. We examined the percentage of people across the EU who reported that their health and safety was at risk by intensity of exposure to each of the

[5] The EU27 and also Norway, Croatia, the former Yugoslav Republic of Macedonia, Turkey, Albania, Montenegro and Kosovo.

potential indicators we considered. This was done in order to identify an intensity of exposure that would indicate a high level of risk. We adopted a threshold of 40 per cent: counting an exposure as a potential risk if more than 40 per cent of respondents with that intensity of exposure considered that their health or safety was at risk because of their job.[6] For instance, in the case of 'Vibration from hand tools, machinery, etc.', 37 per cent of workers who were exposed 'around half of the time' reported that their health was at risk. This rose to 40 per cent among workers exposed 'around three quarters of the time', so this level of exposure ('around three quarters of the time') was taken as the threshold for regarding this as 'risk'.

There is a certain element of arbitrariness in the choice of a threshold, but its main function was to ensure that indicators were included as 'risks' only if they had a strong association with self-assessed health and safety impact. If a lower threshold had been adopted, the indicator would capture aspects of working conditions that were less distinctive in terms of their impact on health.

The 40 per cent threshold also meant that different levels of exposure were included for the different items, as shown in Table 1.2. For instance, a threshold of 'around ¾ of the time' is used for 'vibration' and a threshold of 'around ¼ of the time is used for 'breathing in vapours such as solvents and thinners'. Some items are not included as risks at all because the percentage who report that their health or safety is affected is under 40 per cent even at the highest intensity of exposure. These include standing, dealing directly with angry clients, working with computers, and work-life balance items (such as having to work during free time to meet demands).

Table 1.2 shows the threshold for each item and the percentage of workers in the 34 European countries studied who are exposed at or above this threshold. In the case of 'Vibration from hand tools or machinery', for instance, the threshold is 'around ¾ of the time' or more frequently. Across the 34 countries, 12.4 per cent of workers had this intensity of exposure to 'vibration' in 2010 with a figure of 7.7 per cent in Ireland.

Four groups of risk are identified:

- **Physical risk** involves exposure to vibration from tools or machinery, loud noise and extremes of temperature.

[6] This is based on the data for all countries in the 2010 EWCS sample, weighted according to the population of the countries (e.g. giving a higher weight to Germany than Ireland or Luxembourg).

- **Chemical/biological risk** involves exposure to smoke, fumes, dust, vapours, skin contact with chemicals or contact with potentially infectious materials.
- **Physically demanding work** requires painful or tiring positions almost all the time; lifting or moving people; carrying or moving heavy loads or constant repetitive hand or arm movements.
- **Psycho-social risk** includes unwanted sexual attention, physical violence in the last 12 months or bullying or harassment in the last 12 months.

TABLE 1.2 Indicators of Exposure to Workplace Risk and Prevalence in 2010

	Item	Threshold (how much of time)	Overall % in 2010	IE % in 2010
Physical Risk	Vibration from hand tools, machinery, etc.	Around 3/4	12.4	7.7
	Noise so loud - have to raise voice to talk to people	Almost all	9.3	6.1
	High temperatures - perspire even when not working	Around half	14.6	8.8
	Low temperatures whether indoors or outdoors	Around half	14.6	13.8
Chemical/ Biological risk	Breathing in smoke, fumes, powder or dust etc.	Around half	17.2	11.0
	Breathing vapours such as solvents and thinners	Around 1/4	10.3	9.0
	Handling /skin contact with chemical substances	Around half	9.3	10.3
	Handling/direct contact with materials which can be infectious	Around 3/4	5.5	6.0
Physical demand	Tiring or painful positions	Almost all	17.4	8.7
	Lifting or moving people	Almost all	3.3	5.9
	Carrying or moving heavy loads	Around 3/4	13.8	11.3
	Repetitive hand or arm movements	All	18.7	21.9
Psycho-social Risks	Unwanted sexual attention (last month)	Yes	1.7	2.3
	Physical violence (last 12 months)	Yes	1.8	3.2
	Bullying harassment (last 12 months)	Yes	3.8	5.5

Summary Scales - Mean values on scales ranging from 0 to 10		Overall mean	IE mean
	Physical risk scale from (four items)	1.27	0.92
	Chemical/biological risk scale (4 items)	1.06	0.91
	Physical demand scale (4 items)	1.33	1.20
	Psycho-social risks scale (3 items)	0.22	0.33

Source: EWCS, 2005 and 2010, integrated data file (Base is adults in employment); analysis by authors. IE = Ireland.

Note that the indicator of psycho-social risks here is more specific than some other definitions, which also include verbal abuse, unwanted sexual attention, threats and humiliating behaviour, physical violence, bullying and harassment,

and sexual harassment (Eurofound and OSHA, 2014). Some approaches also include time pressure, monotonous work, social reciprocity, job control and autonomy, fairness, work demands and job security, as well as social contact with co-workers and supervisors (Cox and Griffiths, 2005). We adopt a narrower approach here to ensure that the concept has a clear meaning, distinct from social support in the workplace, and basing it on items that are measured in both the 2005 and 2010 waves of the EWCS.

In general, looking at the prevalence for 2010, exposure to physical, chemical/ biological and physical demand risks is lower in Ireland than in the EU as a whole. There are some subgroups of risk where the level of exposure is higher in Ireland, such as handling or skin contact with chemical substances, potentially infectious material, lifting people and repetitive hand or arm movement. Exposure to psycho-social risk is higher in Ireland than the average across the countries. As we shall see in the next chapter, Ireland is similar to other countries in Northern and Western Europe in this respect.

We did not include stress among the psycho-social risks for a number of reasons. We excluded it primarily because mental wellbeing is one of our key health outcomes and we want to keep the 'risks' and the 'outcomes' analytically distinct. A further issue is that the measure of work stress has changed over the period of the survey. In 2010 respondents were asked whether they experienced stress in their work, but in previous EWCS questionnaires, only respondents who said that their health and safety was affected by work were then asked if this was due to stress (which also positions stress as an outcome). As noted above, the items on work-life balance and on meeting tight deadlines did not meet our threshold in terms of 40 per cent of workers reporting that their health was negatively affected. One item that might have been included was 'working at very high speed'. However, it is only at the highest level of exposure ('all the time') that we find over 40 per cent of workers reporting that their health was negatively affected. In addition, the impact of work speed on outcomes for workers is likely to be strongly conditioned by the extent to which the worker is in control of the speed. Since an analysis of the possible mediating or buffering effects of autonomy and control are beyond the scope of the present analysis, we defer consideration of work pressure for a future research project.

Outcomes for Workers

We examine three outcomes for workers: self-rated health, mental distress and injury. Measurement of these constructs is shown in Table 1.3.

Self-rated health is a widely-used indicator in sociological and epidemiological studies. It has been shown to be a good indicator of health status and to predict health service usage and to predict mortality in prospective studies (Bowling, 2001; Miilunpalo et al., 1997). It is available on the EWCS dataset for the 2010 round. It is based on a question put to all respondents, as shown in Table 1.3. We focus on those who regard their health as fair, bad or very bad. This threshold is adopted because in some countries, the proportion of people in the workforce who report their health as bad or very bad is low. Note that this item refers to general health and does not seek to attribute health problems to work. Connecting health problems to aspects of the work is in fact difficult, as there may be multiple causes of any given health problem and people are likely to differ in their understanding of the contribution of work to health.

We know that there are national differences in self-rated health which are partly the result of cultural differences in response style, rather than differences in the underlying health conditions (Zimmer at al., 2000; Jürges, 2007). For instance, Jürges found that Germans tend to under-rate their health while Scandinavians tend to over-rate it. Given the particularly favourable score on self-rated health items in Ireland (e.g. Figure 1.10.1 in OECD, 2012), it is likely that Irish respondents also over-rate their health. Therefore, in interpreting the results from the analysis of self-rated health we focus on how the determinants of differences in this outcome differ between Ireland and other countries, rather than on the difference in level of self-rated health.

TABLE 1.3 Worker Outcomes: Self-rated Health, Mental Distress and Injury

Outcome	Measurement	Values
Self-rated poor health	How is your health in general? Would you say it is … [Very good, good, fair, bad, very bad]	0 = very good or good; 1 = fair, bad or very bad
Mental Distress	EF4 Please indicate for each of the five statements which is the closest to how you have been feeling over the last two weeks. A - I have felt cheerful and in good spirits B - I have felt calm and relaxed C - I have felt active and vigorous D - I woke up feeling fresh and rested E - My daily life has been filled with things that interest me [6 categories, 'all of the time' to 'at no time']	Scored to range from 0 (no distress) to 10 (high distress)
Injury	Q69 Over the last 12 months, did you suffer from any of the following health problems?.... injuries?	0 = 'No' 1 = 'yes'.

The second outcome is **mental distress**. This is measured using the World Health Organisation five-item Mental Health Index (MHI-5), which captures how often in the last two weeks the person felt cheerful, relaxed, full of vigour, rested and interested in life. The MHI-5 is part of the 36-item Short Form health survey (SF-36) (Ware et al., 2000) and has been used widely in a range of international surveys with different population groups. The items are scored from 1 ('at no time') to 6 ('all of the time'). For ease of interpretation, we recode the scale to range from 0, indicating no distress, to 10, indicating a high level of distress.

The third outcome is **injury**. Like the other two, injury is not specifically linked to the workplace; the injury may have occurred at home or during leisure activities. The item is based on whether or not the person experienced injury in the previous 12 months. This form of question about injury in the past 12 months is used in surveys such as the European Health Interview Survey (EHIS).[7]

Independent Variables

An important element of the analysis in this report is ascertaining the extent to which country differences in exposure to risk and in outcomes for workers are due to differences in the composition of jobs and of the workforce. The aspects of jobs and workers we consider are shown in Table 1.4. The aspects of the job considered include the sector (whether public/private and industrial sector), occupation, tenure in the job, hours worked, size of organisation and job status (whether self-employed or an employee and, if an employee, type of contract).

The characteristics of the worker we consider are gender, age, migration and level of education. Whether or not the person is a migrant is based on being a 'second-generation' migrant. Either the respondent or the respondent's parent(s) were born outside the country of residence.

Because the analysis entailed an exploration of interactions to investigate whether these job and individual characteristics had different associations with risks and outcomes in Ireland, we limited the number of indicators. Further, since we included the self-employed as well as employees, certain aspects of workplaces that were more specifically relevant to employees (such as employee representation, consultation, autonomy and supportiveness of management) were not included, although these may be important mediators of outcomes for employees.

[7] See http://ec.europa.eu/eurostat/web/microdata/european-health-interview-survey.

TABLE 1.4 Measuring Characteristics of Jobs and of Workers

Indicator	Detail/ coding	
Public/Private sector	Categories: Private sector (Reference) Public sector Joint/other sector (includes NGOs and semi-states)	
Job status	Categories: Self-employed, Employee - indefinite/permanent (Reference); Employee – fixed-term contract; Employee -agency temp.; Trainee; Employee-no contract; other and unknown	
Size of workplace	How many people in total work at your workplace (at the local site)? Categories: One person; 2-4; 5-9; 10-49 (Reference); 50-99; 100-249; 250-499; 500+; variable/unknown.	
Sector Categorical variable - NACE Rev 1.1 coding of industrial sector of work	1 Agriculture/forestry /fishing 2 Mining and quarrying 3 Manufacturing 4 Electricity, gas and water supply 5 Construction 6 Wholesale/Retail (Reference) 7 Hotels and restaurants 8 Transport, storage and communic.	9 Financial/Real estate/business 10 Public administration/defence/ social security 11 Education 12 Health and social work 13 Other Services 14 Unknown
Occupation (ISCO 88 coding of occupation, one digit)	Legislators, Senior Officials, managers (Reference) Professionals Technicians and associate professionals Clerks Service workers, shop and market sales workers	Skilled agricultural and fishery workers Craft and related trades workers Plant and machine op. / assemblers Elementary occupations Armed forces Unknown
Tenure in Job	1 year or less; 2-3 years; 4-5 years; 6-10 years; 11 or more years; Unknown	
Hours per week	How many hours do you usually work per week in your main paid job? (Excluding lunch break and commute) Categories: Up to 20; 21-30; 31-40 (Reference); 41-50; 51+; Unknown/variable	
Gender	Male or female	
Age group	Categories: 15-24; 25-34; 35-44 (Reference); 45-54; 55+	
Migrant	Were you and both of your parents born in this country? Yes (Native born); No (Migrant)	
Education	What is the highest level of education or training that you have successfully completed? Categories: Up to lower 2nd level (ISCED 0, 1, 2) Upper Secondary to post-secondary non-tertiary (ISCED 3, 4) Third level (ISCED 5,6)	

1.4.3 Analysis Methodology

The analysis in the report involved the presentation of descriptive results as well as multivariate analysis designed to isolate the significant associations with workplace risk and outcomes for workers. The multivariate analyses were conducted on the weighted data, with controls for the impact of weights on the

standard errors.[8] In analysing continuous variables (such as the indicators of exposure to workplace risks measured on a 0 to 10 scale), ordinary least squares regression was used.[9] In analysing dichotomous indicators (such as presence of poor health or injury), logistic regression analysis was used.

For clarity of presentation, the regression models were used to estimate the rates or averages we would expect for each group if all other characteristics in the model were held constant.[10]

In conducting the analysis, the categorical variables (such as sector) enter the model as factors rather than as a series of dummy variables to ensure that when predicting, for instance, the level of exposure to physical risk, the other sectors do not apply (i.e. analogous to setting a dummy variable to zero rather than to its 'average' sample value) (Williams, 2012). Taking sector as an example, this involves estimating the expected average level of exposure to physical risk, for instance, for those in each sector, assuming the sectors were the same in terms of the other characteristics in the model (other aspects of the job and of the workers). In reality, these characteristics of jobs and workers were associated. For instance, craft and related trades workers tend to be employed in construction and manufacturing rather than in the education sector. The model-estimated rates and averages were a way to try to isolate (statistically) the impact of these different factors so as to enhance our understanding of the processes involved.

We checked the number of cases available for subgroups and indicators in the analysis and do not report results which would rely on fewer than 50 cases. This is most likely to arise in examining the exposure to risk or the outcomes for specific occupational groups or sectors in Ireland. For instance, there are fewer than 50 cases in the Irish sample working in the agricultural sector in 2010. Because the number of cases is small, any findings seeking to compare the agricultural sector in Ireland to that in Europe generally would not be robust. The interactions that could not be examined due to a small sample size in 2010 were the employment statuses of 'trainee' and 'agency temporary worker'; the industrial sectors of

8 This was accomplished using the 'svy' routine in Stata (StataCorp, 2013a and b; Cochran, 1977; Heeringa et al., 2010; Kish, 1965; Levy and Lemeshow, 2008; Skinner et al., 1989; Stuart, 1984; Thompson, 2012; and Williams, 1978).

9 Since OLS may produce predicted results which are not bounded by 0 and 10, we replicated all of the analyses in Chapter 2 using fractional logit (Papke and Wooldridge, 1996) of outcomes rescaled to range from 0 to 1 to check whether the OLS-based conclusions were robust. There were some very minor differences (where coefficients of borderline statistical significance in one method were non-significant in the other) but the substantive findings were not affected.

10 This was done using the Stata 'margins' command after the regression command. The method is distinct from computing the predicted risk for a person who had average values on all the independent variables, though the results are often similar in practice.

agriculture, forestry and fishing; mining and quarrying; electricity, gas and water supply and public administration and defence; and the occupational group 'armed forces'. Given the high level of workplace fatalities found in the agriculture sector in Ireland (Russell et al., 2015), it is unfortunate that the sample size for this sector was too small to permit a test of whether the pattern for agriculture differed between Ireland and other countries. We are, however, able to test whether the agriculture, forestry and fishing sector across all countries differs significantly from other sectors.

In any analysis based on data collected by surveys taken at a particular point in time, it can be difficult to establish the direction of causation. Let's say, for instance, that we are interested in the link between having a temporary contract and poorer health outcomes. Endogeneity could be a problem (a) if there is an omitted variable explaining both having a temporary contract and poor health, (b) if there is measurement error in the indicator of temporary contracts (causing attenuation bias) or (c) simultaneity, where poor health in itself causes people to be more likely to have temporary contracts.[11]

While it is sometimes possible for researchers to use specific statistical techniques (such as instrumental variable analysis) to control for simultaneity, that is not possible here because of the lack of suitable instrumental variables. Instead, we adopt a two-pronged strategy: we include controls for as many as possible of the potential omitted variables and we note the need for caution in the interpretation of the results since endogeneity may influence the observed patterns.

1.5 REPORT OUTLINE

In Chapter 2 we explore the pattern across countries in exposure to different types of workplace risk, including physical risk, chemical/biological risks, physically demanding work and psycho-social risks. We focus on the situation in 2010 and ask which groups – in terms of characteristics of jobs and of workers – are most likely to be exposed to these risks and whether Ireland differs from other European countries in this respect.

In Chapter 3 we examine change in exposure to different types of workplace risk between 2005 and 2010. As well as asking whether the level of exposure to risks changes in the period, we ask whether there was a change in the association

[11] More formally, this is the risk of 'endogeneity': where the error term in the regression equation (broadly, the unmeasured aspects of the dependent variable) is correlated with one or more betas.

between job characteristics and worker characteristics and exposure to risk. For instance, given the impact of the recession, did the association between physical risk and economic sectors such as manufacturing and construction increase, decrease or remain the same? We also ask whether any change over time was different for Ireland than for Europe in general.

In Chapter 4 we turn to outcomes for workers, including general health, psychological wellbeing and injury and we ask to what extent these are associated with different types of workplace risks. We focus on 2010 in this analysis and we also ask whether the outcomes are related to workplace risks in a similar manner in Ireland as for Europe in general.

Finally, in Chapter 5, we draw together the results from the earlier chapters to throw light on the research questions and to note the implications of the findings for health and safety policy in Ireland.

Chapter 2

Workplace Risks across Europe in 2010

2.1 INTRODUCTION

This chapter examines whether exposure to environmental or psycho-social risks and physically demanding work differ across countries and the extent to which these differences are explained by the composition of jobs and of the workforce. This allows us to examine which groups are most at risk of exposure to these hazards in terms of their work-related characteristics (self-employment, size of organisation, nature of job contract, occupation, job tenure, hours worked) and personal characteristics (age, gender, level of education, migration of respondent or respondent's parents to the country of residence).

The analysis involves a multivariate analysis to identify country differences in exposure to risks both before and after statistically taking account of country differences in the composition of jobs and of the workforce. The country differences that remain when we control for composition may reflect differences in health and safety legislation and in the systems for monitoring and enforcing this legislation.

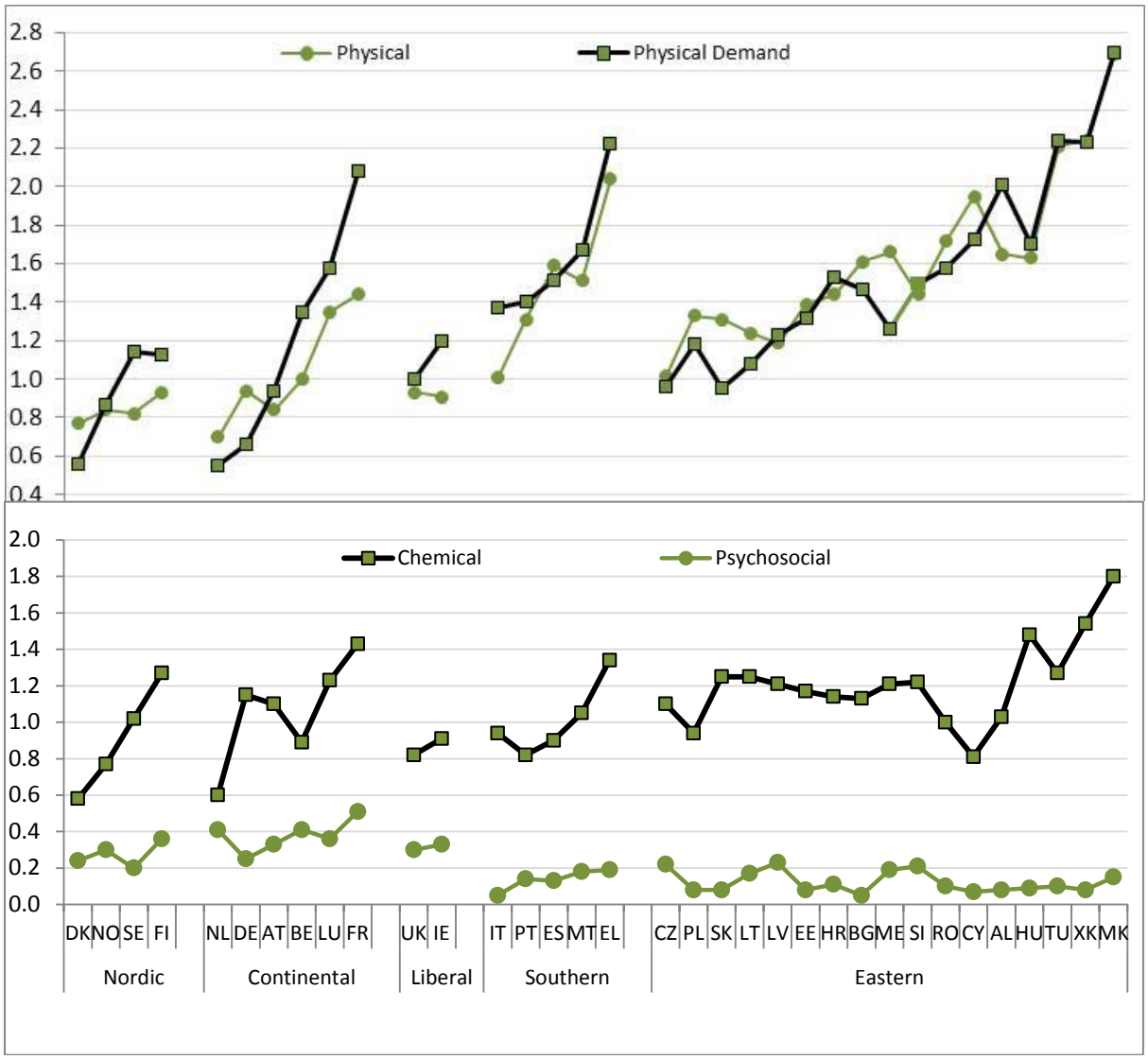
We begin with an overview of country and regime differences in the overall level of exposure to the different types of risk. We then focus, in turn, on exposure to physical risks, chemical/biological risks, physically demanding work and psycho-social risks.

2.2 OVERVIEW OF RISKS BY COUNTRY AND REGIME

As described in the last chapter, four groups of risk are identified and each is measured on a scale ranging from 0 (for no exposure) to 10 (maximum exposure). Also, the threshold for 'risk' on each component item of the scales is set based on more than 40 per cent of respondents at that threshold reporting that their health or safety was at risk because of their job. Physical risk involves exposure to vibration from tools or machinery, loud noise and extremes of temperature. Chemical/biological risk involves exposure to smoke, fumes, dust, vapours, skin contact with chemicals or contact with potentially infectious materials. Physically demanding work is work requiring painful or tiring positions almost all the time, lifting or moving people, carrying or moving heavy loads or constant repetitive

hand or arm movements. Psycho-social risks include unwanted sexual attention, physical violence in the last 12 months or bullying or harassment in the last 12 months.

FIGURE 2.1 Risks (0-10) by Country and Regime (Gross, No Controls)



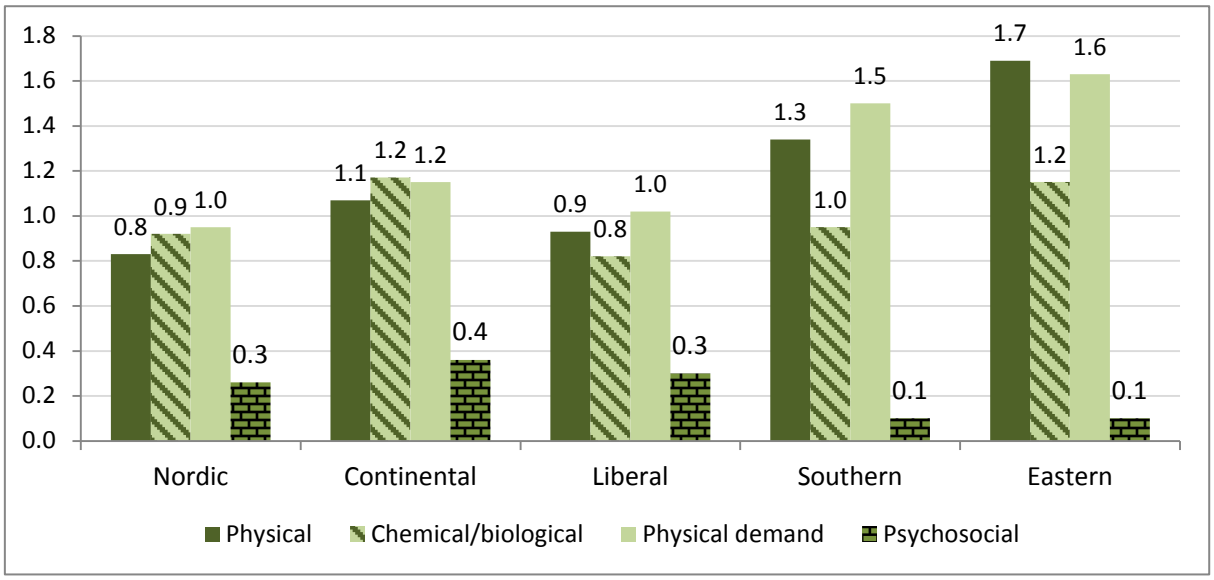
Source: European Working Conditions Survey, 2010, analysis by authors.

Note: Luxembourg and Romania not shown. AL Albania, AT Austria, BG Bulgaria, BE Belgium, CZ Czech Republic, CY Cyprus, DE Germany, DK Denmark, EE Estonia, EL Greece, ES Spain, FI Finland, FR France, HR Hungary, HR Croatia, IE Ireland, IT Italy, LV Latvia, LT Lithuania, LU Luxembourg, MT Malta, MK Macedonia, ME Montenegro, NO Norway, NL Netherlands, PT Portugal, PL Poland, RO Romania, SK Slovakia, SE Sweden, SI Slovenia, TY Turkey, UK United Kingdom, XK Kosovo.

Figure 2.1 shows the country average level of exposure to each type of risk. The countries are grouped according to the regime types identified in the last chapter and Figure 2.2 shows the average by regime. We can see that exposure to physical, chemical/biological and physical demand risk are quite variable across countries but the levels of exposure to psycho-social risk are lower and less variable across countries. While there is some tendency for regimes to differ,

with the lowest levels of exposure in the Nordic regime and the highest level in the Eastern regime, there are large country differences in exposure within most of the regimes. An exception is the Liberal regime, which includes Ireland and the UK. These two countries are very similar in levels of exposure to the different risks. Within the Nordic regime, levels of exposure tend to be lowest in Denmark and highest in Finland. In the Continental regime, France is an outlier with much higher levels of exposure to risks, especially physical risks. Greece is an outlier in the Southern regime and has more in common with countries such as Turkey in terms of exposure to physical and chemical/biological risks. There is huge variation within the Eastern countries, with much lower levels of exposure in countries such as the Czech Republic, Poland, Slovakia, Lithuania, Latvia and Estonia than in Macedonia, Kosovo, Turkey and Hungary. In fact, the first group of countries have more in common with the Continental or Southern groups, apart from France and Greece, than with the highest-risk countries in the Eastern group.

FIGURE 2.2 Mean Risk (0-10) by Regime (Gross, No Controls)



Source: European Working Conditions Survey, 2010, analysis by authors.

In general, exposure to physical risk and to physically demanding work is lower in the Nordic countries than elsewhere, but there is no particular pattern for these two types of risk across the other employment regimes. The Continental group has a high average score in terms of exposure to psycho-social risk and this group is joint highest (together with the Eastern countries) in terms of exposure to chemical/biological risks. The continental countries are towards the middle of the distribution in terms of exposure to physical risks and to physically demanding work.

The Liberal group, which includes Ireland and the UK, fall between the Nordic and Continental countries in terms of the level of exposure to different types of workplace risks. In general, the level of exposure is relatively low in these two countries.

The Southern and Eastern groups have the lowest scores on exposure to psycho-social risks, but the highest scores in terms of exposure to physical risks and physically demanding work.

These figures represent the overall differences between the countries and country groups. No adjustment is made for differences in the composition of jobs or of the workforce. We might expect, for instance, that the level of exposure to physical risk would vary depending on the proportion of the workforce that is engaged in agriculture, construction and manufacturing. On the other hand, exposure to psycho-social risk might be higher where the workforce is diverse or where there are few protections in the form of anti-bullying or equality policies. In subsequent analyses, we will control for differences in the composition of jobs and workers to see to what extent the differences between countries and regimes are affected by these compositional characteristics.

2.3 PHYSICAL RISKS

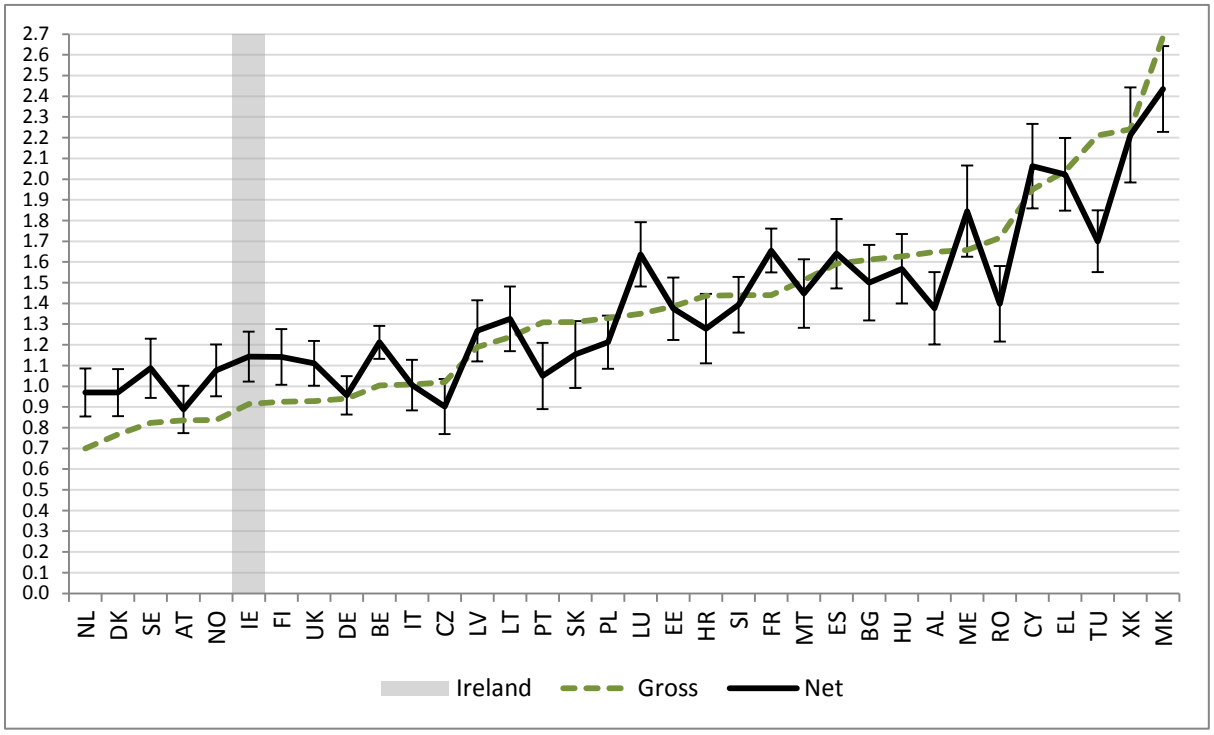
This section presents the results of the model for physical risks. This includes vibration from machinery, noise and extremes of temperature. We begin by looking at overall country differences and the differences due to the composition of the workforce. Workforce composition includes consideration of job characteristics, such as sector, employment status, size of organisation, occupation, tenure and hours worked. Composition also takes account of individual characteristics of the workforce, such as gender, age group, nationality and level of education. We examine the impact of job and individual characteristics on exposure to physical hazards and ask whether the impact differs in Ireland from that in other countries.

Figure 2.3 shows the gross and adjusted rate of exposure to physical risks by country. The gross or overall rate is shown as a green dashed line in the chart while the adjusted rate, controlling for composition of jobs and workers, is shown in black. The 95 per cent confidence interval for net risk is shown by the vertical lines.

The adjusted risk is the risk if the countries were similar in respect of all other characteristics in the model. Many of the country differences remain when we control for these characteristics. Appendix Table A2.1 shows that when we add the composition of the workforce and of jobs, the explained variation in risk increases from 0.034 (with only country differences taken into account) to 0.209. Therefore, the composition of jobs and of the workforce accounts for a substantial proportion of the variation in exposure to physical risk.

In general, those working in the countries of Northern and Western Europe have a lower exposure to physical risk than those living in countries of Eastern Europe. In Ireland, exposure to physical risk is relatively low. Ireland ranks 6th lowest out of the 34 European countries examined before controlling for the composition of jobs and workers.

FIGURE 2.3 Physical Risk (0-10) by Country Before and After Controls for Individual and Job Characteristics



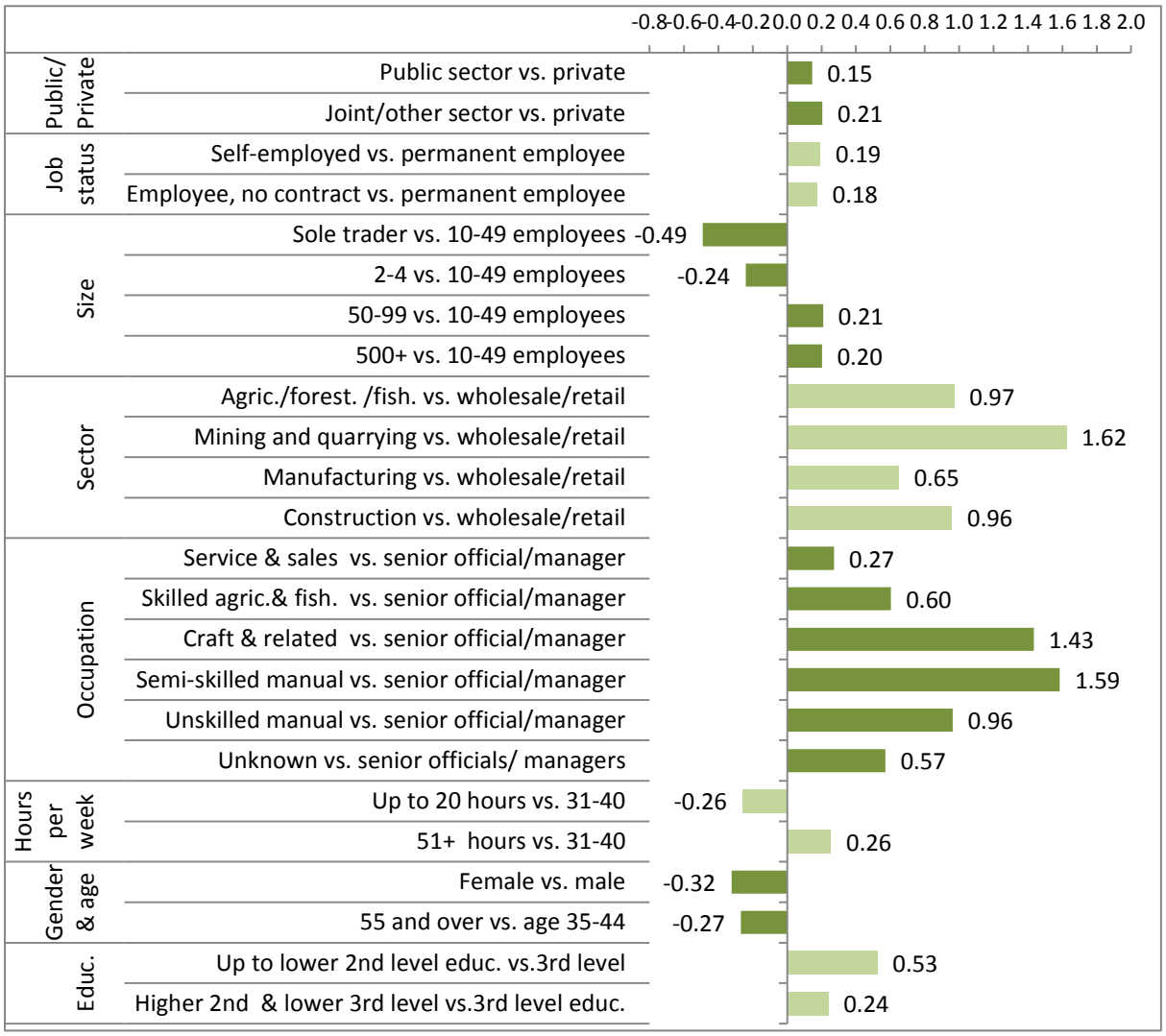
Source: European Working Conditions Survey, 2010, analysis by authors. Net figures based on model in Appendix Table A2.1. Controls include gender, age, nationality, education; job characteristics include sector, occupation, organisation size.

The adjusted or net risk would be higher than the gross risk in Ireland because aspects of Ireland's industrial structure are associated with lower risk of exposure to physical risks. The net figures show the estimated level of exposure if the countries were similar in terms of the composition of their jobs and workforces. If Ireland was similar to other countries in terms of factors such as industry, job

status of workers, size of workplace, occupational structure and tenure of workforce, it would have a higher risk of exposure to physical risks than we actually observe. When we control for characteristics of jobs and workers, Ireland's level of exposure to physical workplace risks would be 12th lowest of the 34 countries (compared to 6th lowest before these controls).

Figure 2.4 shows the impact of job and worker characteristics on the risk of exposure to physical risk in the workplace across all countries (we comment below on where Ireland is different from the general pattern). Only the statistically significant differences are shown in the figure.

FIGURE 2.4 Impact of Job and Individual Characteristics on Exposure to Physical Risks



Source: European Working Conditions Survey, 2010, analysis by authors; based on model in Appendix Table A2.1. Only the statistically significant differences are shown.

The biggest differences are by industrial sector and occupation. In terms of sector, we take the retail and wholesale sector as the reference category. Compared to this reference sector, exposure to physical risk is higher in agriculture, forestry and fishing, mining and quarrying, manufacturing and construction.

In terms of occupation, the reference occupational category consists of managers and senior officials. The estimated level of exposure to physical risks is significantly higher among manual worker (semi-skilled machine operatives, unskilled employees and skilled manual craft workers and skilled workers in forestry and fishing). The level is also somewhat higher in lower service and sales occupations. The risk of exposure to physical risks is higher in the public than in the private sector, but this is not a large difference.

The size of the organisation also makes a difference, with higher estimated exposure in larger organisations. The estimated level of exposure is also higher among those working a greater number of hours in the typical week.

Characteristics of the worker also matter. The estimated level of exposure to physical risk is higher among males, younger workers and those with less education.

2.3.1 Correlates of Physical Risk in Ireland

The analysis went on to ask whether these aspects of the job and worker were associated with differences in exposure to physical risk in Ireland in the same way as in European countries overall. This was tested by checking for interactions between all of the job and individual characteristics and Ireland. As noted in the previous chapter, we were unable to check for interactions for certain categories because of a relatively small number of cases in the sample. These included the employment statuses of ‘trainee’ and ‘agency temporary worker’; the industrial sectors of agriculture, forestry and fishing; mining and quarrying; electricity, gas and water supply and public administration and defence; and the occupational group ‘armed forces’.

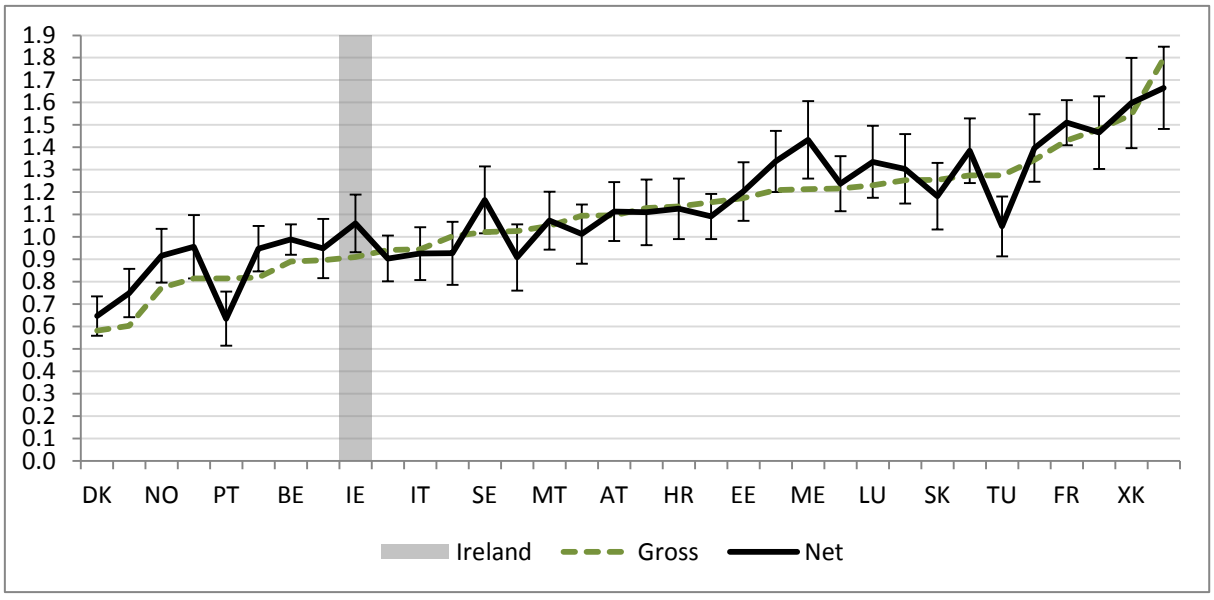
We were able to test whether Ireland differed by examining the interactions for 50 coefficients. Only one of 50 coefficients tested was statistically significant. This indicates that the association between characteristics of the job and worker, on the one hand, and exposure to physical risk, on the other, is very similar in Ireland to elsewhere in Europe. The only difference that was statistically significant was

for craft and related trades workers: the exposure to physical risk in this occupation was higher in Ireland as compared to the reference occupation of senior officials and managers, than elsewhere by about 0.721 on the ten point scale. While the gap between craft workers and the reference group of officials and managers was about 1.43 points in Europe generally, as shown in Figure 2.4, the gap in Ireland was about 2.16 points (see Appendix Table A2.1).

2.4 CHEMICAL/BIOLOGICAL RISKS

This section presents the results of the model for exposure to chemical and biological risks. This includes smoke, fumes, vapours from solvents, skin contact with chemicals and contact with potentially infectious material. Figure 2.5 shows the overall pattern by country before (gross) and after (net) controlling for the composition of jobs and of the workforce. The overall or gross risk is shown as a green dashed line while the adjusted net risk (controlling for all other factors) is shown in black. The adjusted risk is the risk if the countries were similar in respect of all other characteristics in the model. The 95 per cent confidence interval for net risk is shown by the vertical lines.

FIGURE 2.5 Chemical and Biological Risks (0-10) by Country Before and After Controlling for Individual and Job Characteristics



Source: European Working Conditions Survey, 2010, analysis by authors. Net figures based on Model in Appendix Table A2.1. Worker characteristics include gender, age, nationality, education; job characteristics include sector, occupation, organisation size.

In general, countries in Northern and Western Europe have lower exposure to chemical/biological risk than countries in Eastern Europe. This is similar to the pattern we saw for exposure to physical risks. Most of the country differences

remain when we control for differences in the composition of jobs and the workforce.

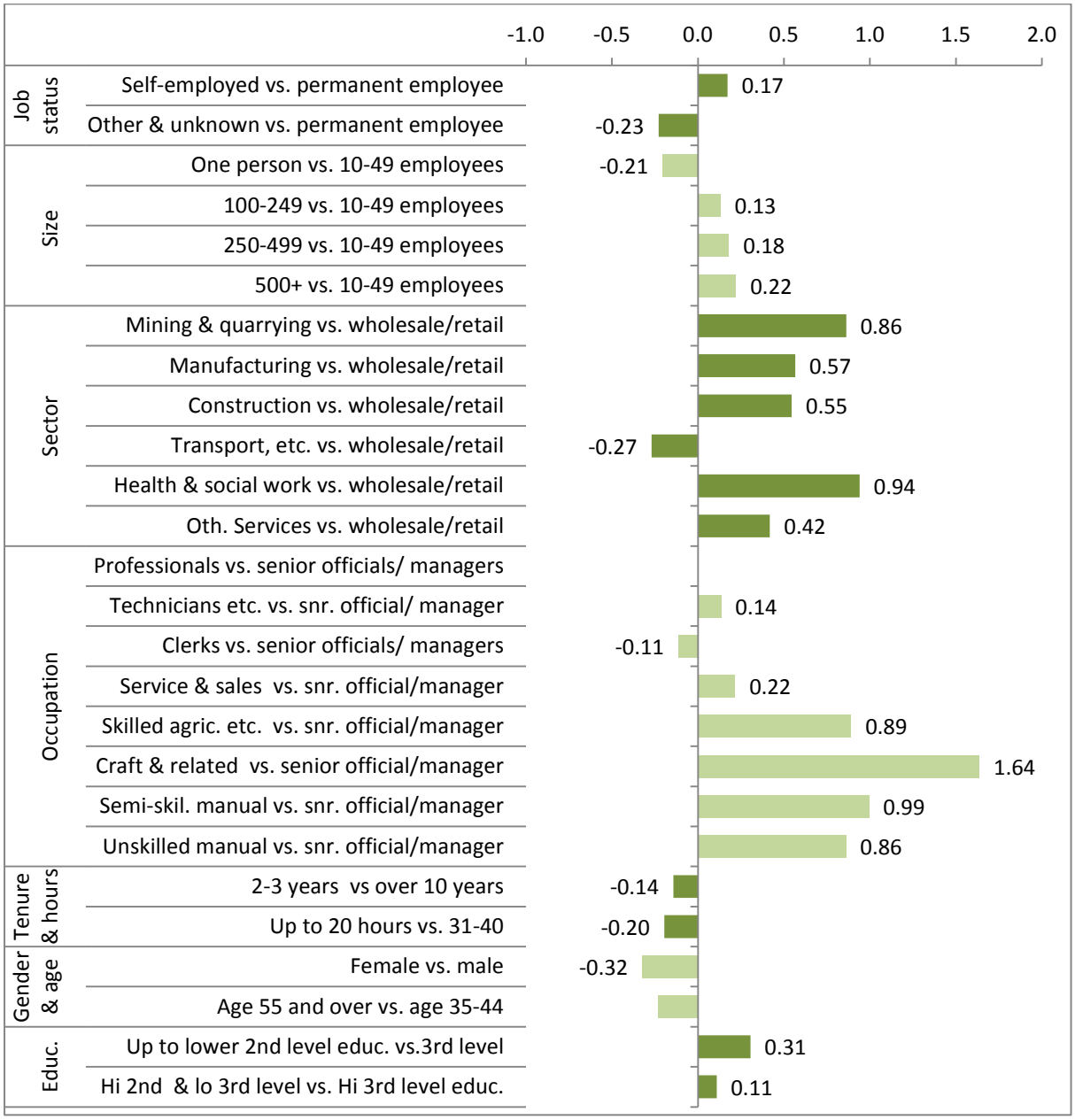
Exposure to chemical/biological risk is relatively low in Ireland, which ranks ninth lowest out of 34 countries before taking account of composition of jobs and of workforce. As with exposure to physical risk factors, adjusted (net) risk would be higher than gross risk in Ireland because aspects of Ireland's industrial structure are associated with less risk: e.g. NACE, job status, size of workplace, tenure, occupation. With characteristics of jobs and of workers taken into account, Ireland would rank 15th lowest of the 34 countries.

Figure 2.6 shows the association between characteristics of jobs and of the workforce and exposure to chemical/biological risk across all countries. The chart shows how much of a difference is made, on the scale of 0 to 10, by each characteristic with all others held constant. As for physical risk, the characteristics of the job and workers were more important than differences between countries in accounting for variation in chemical/biological risks. The r-squared, which can be interpreted as the percentage of variation explained, was 1.2 per cent, when only the countries were included in the model, but increased to 15.7 per cent, when we took account of characteristics of the job and of workers (Appendix Table A2.1).

Again, as we saw in the case of exposure to physical risks, the biggest differences are by sector and occupation. Compared to the retail and wholesale sector, exposure to chemical/biological risk is higher in mining and quarrying, manufacturing, construction, health and social work and other services. Exposure is lower in the transport, storage and communication sector.

The reference occupational group consists of senior officials and managers. Compared to this group, exposure to chemical/biological risk is higher among manual workers (semi-skilled machine operatives, unskilled employees, skilled workers in forestry and fishing and, especially, skilled manual craft workers). Exposure is also somewhat higher in service and sales work and among technicians/associate professionals. Exposure is lower among women, older workers and among those with shorter job tenure and shorter hours. Exposure is higher among the self-employed, but the difference is not a large one and it is counter-balanced by a lower exposure to risk among those working alone. Exposure is somewhat higher in larger than in smaller organisations.

FIGURE 2.6 Impact of Job and Individual Characteristics Exposure to Chemical/Biological Risks



Source: European Working Conditions Survey, 2010, analysis by authors, based on model in Appendix Table A2.1. Only the statistically significant differences are shown.

2.4.1 Correlates of Chemical/Biological Risk in Ireland

To what extent do we find these patterns in Ireland? Again, we tested whether the association between exposure to chemical/biological risk and characteristics of jobs and workers was similar in Ireland to that in other European countries, where the number of cases was large enough to produce robust results.[12] This was done by testing the interaction between Ireland and each of the individual

[12] The number of cases was too small to permit this test for 'trainee' and 'agency temporary workers'; for the industrial sectors of agriculture, forestry and fishing; mining and quarrying; electricity, gas and water supply and public administration and defence; and the occupational group 'armed forces'.

and job characteristics. Ireland was slightly more distinctive when it came to exposure to chemical/biological risk than in the case of physical risk (Appendix Table A2.1).

Nevertheless, only seven of the 50 interactions tested proved statistically significant at conventional levels (p<=0.05). The gap in exposure to chemical/biological risk between the reference group of legislators, senior officials and managers and certain other occupations was significantly larger in Ireland: among craft and related trades workers (1.66 higher on the ten point scale), professionals (by 0.54 points), clerks (0.37 points) and lower service and sales workers (0.58 points). Compared to the reference group working 31 to 40 hours, the gap in exposure was greater for those working 41 to 50 hours per week (by 0.56 points). Exposure was lower in Ireland than elsewhere in large organisations (-0.60 compared to those with ten to 49 employees) and in construction (-0.81).

TABLE 2.1 Differences between Ireland and Elsewhere in Association between Exposure to Chemical/Biological Risk and Characteristics of Job or Worker (Interactions)

		Chemical/Biological Risk
Size of workplace	500+ vs. 10-49	-0.600**
Sector	Construction vs. retail etc.	-0.809*
Occupation	Professionals vs. senior official/manager	0.544**
	Clerks	0.369*
	Service and sales workers	0.575*
	Craft and related trades workers	1.662***
Hours per week	41-50 vs. 31-40	0.557*

Source: European Working Conditions Survey, 2010, analysis by authors, based on Appendix Table A2.1. Only the statistically significant interactions are shown.

Note: * p<0.05, ** p<0.01, *** p<0.001.

The findings by occupation are unexpected and are worth exploring in more detail. What are the chemical or biological risks to which professionals and service workers have a higher than expected level of exposure? Figure 2.7 shows the percentage of workers with a 'high' level of exposure to each of the components of the chemical/biological risk indicator. Note that these are the overall levels of exposure, not controlling for any other characteristics of the jobs or workers. A 'high' level of risk is the level of exposure at which 40 per cent or more of those exposed state that their work affects their health, as discussed in the last chapter. The items and levels of exposure are as follows:

- Breathing in smoke, fumes, powder or dust etc. (around half the time or more frequently)

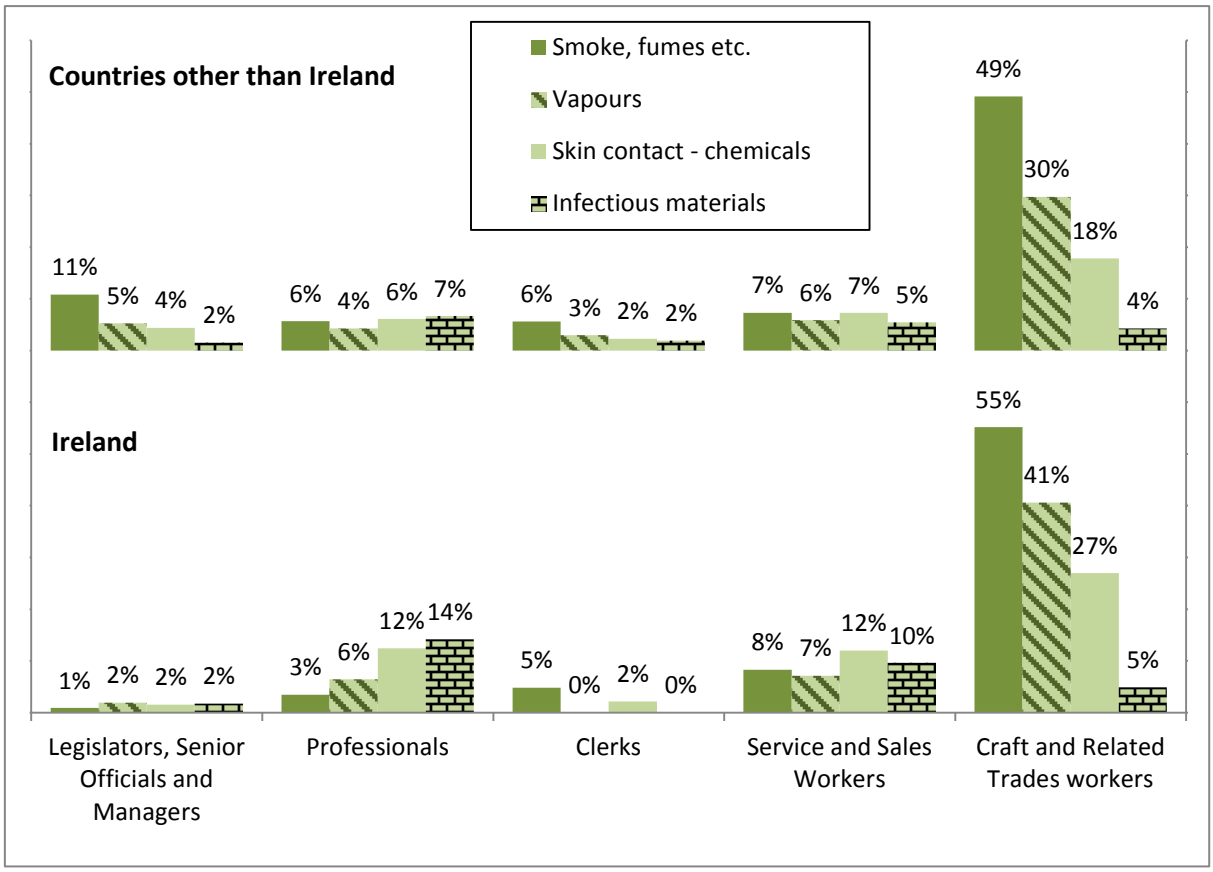
- Breathing vapours such as solvents and thinners (around ¼ of the time or more frequently)
- Handling /skin contact with chemical substances (around half the time or more frequently)
- Handling/direct contact with materials which can be infectious (around ¾ of the time or more frequently).

Figure 2.7 shows that the higher levels of exposure to certain risks in Ireland among professionals, clerks and service or sales workers is dwarfed compared to the levels of exposure among the manual craft and trades workers. The figure also shows that, particularly in the case of clerical workers, it is not that Irish workers in this occupation are distinctive but rather that the gap between their level of exposure and that of the reference group (legislators, senior officials and managers) is distinctive. In other words, the gap is bigger in Ireland not because the level of exposure is higher than elsewhere among Irish clerical workers, but because the level is lower than in other countries among Irish legislators, senior officials and managers.

We can see from Figure 2.7 that the level of exposure to three of the component risks is much higher, both in Ireland and elsewhere, for those in craft and related trades workers. In Ireland, over half of these workers are exposed to breathing in smoke or fumes (compared to 29 per cent in other countries). The level of exposure to vapours is 41 per cent (compared to 30 per cent elsewhere) while 27 per cent of these workers have skin contact with chemicals (compared to 18 per cent elsewhere). Exposure to infectious materials is 5 per cent among Irish craft and related trades workers, compared to 4 per cent among workers in this occupation in other countries.

These generally high levels of exposure among the skilled craft workers puts in context the finding that Irish professional workers have a higher than expected level of exposure. It is worth keeping in mind also that it is compared to the reference occupation (legislators, senior officials and managers) that the levels are higher than expected for professionals, clerks and service/sales workers in Ireland. The level of exposure among this reference occupation is particularly low in Ireland at about 1 to 2 per cent for each type of risk, compared to 2 to 11 per cent elsewhere. This accounts for the significant finding for Irish clerical workers: they do not have a higher level of exposure to the individual risks than clerical workers elsewhere but their levels are higher than for Irish senior officials, legislators and managers while the reverse is true elsewhere (with clerical workers having a lower level of exposure).

FIGURE 2.7 Differences between Ireland and Elsewhere in Exposure to Types of Chemical or Biological Risks



Source: European Working Conditions Survey, 2010, analysis by authors. (Bivariate table).

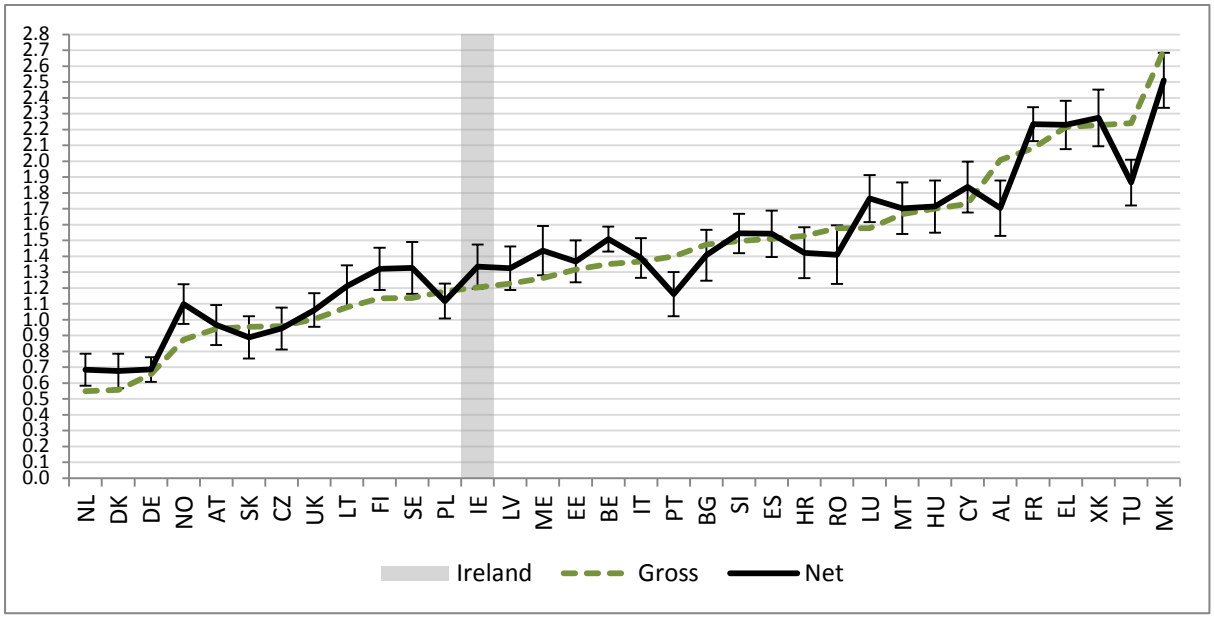
When it comes to professionals, levels of skin contact with chemicals (12 per cent) and exposure to infectious materials (14 per cent) are higher in Ireland than elsewhere (6 and 7 per cent, respectively) and exposure to vapours is slightly higher but exposure to smoke or fumes is lower. Among service and sales workers, it is also skin contact with chemicals and exposure to infectious materials that is higher in Ireland than elsewhere.

2.5 PHYSICALLY DEMANDING WORK

This section presents the results of the model for exposure to physically demanding work. This includes tiring or painful positions, lifting or moving people, carrying or moving heavy loads and repetitive hand or arm movements. As before, the overall or gross risk is shown as a green dashed line in Figure 2.8 while the adjusted net risk (controlling for all other factors) is shown in black. The estimated risk is the risk if the countries were similar in respect of all other characteristics in the model. The 95 per cent confidence interval for net risk is shown by the vertical lines.

Similar to the findings for exposure to physical risk and chemical/biological risk, most of the country differences remain when we control for the composition of jobs and workers. Also, as we saw in the case of physical and chemical/biological risk, countries in Northern and Western Europe have lower exposure to physically demanding work than countries in Eastern Europe. Physically demanding work is common in Greece and Spain, however, and less common in the Czech Republic and Austria.

FIGURE 2.8 Physical Demands of Work scale (0-10) by Country Before and After Controlling for Individual and Job Characteristics.

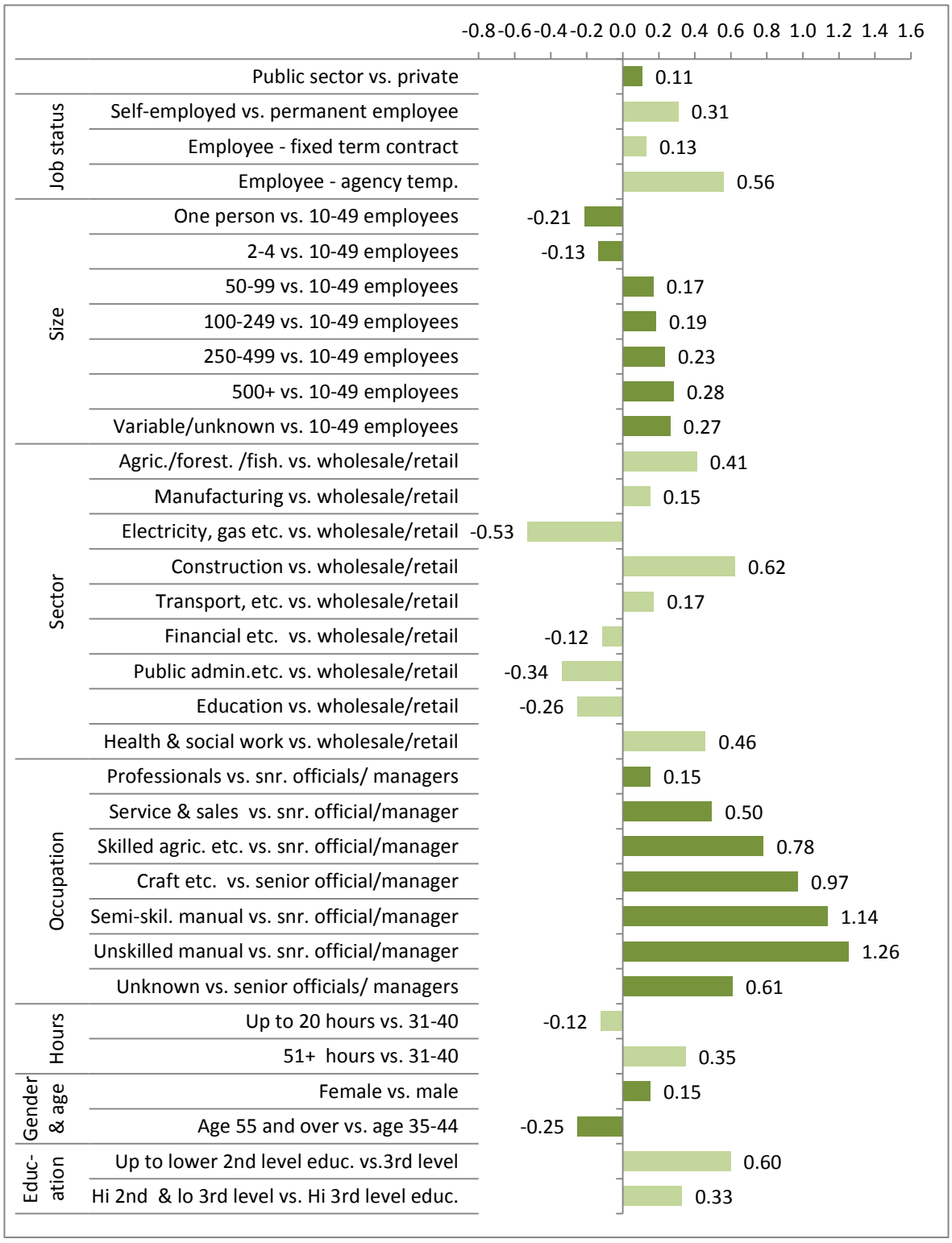


Source: European Working Conditions Survey, 2010, analysis by authors. Net figures based on model in Appendix Table A2.1. Worker characteristics include gender, age, nationality, education; job characteristics include sector, occupation, organisation size.

Exposure to physically demanding work in Ireland is towards the middle of the range: Ireland ranks 13th lowest of 34 countries. As with exposure to physical and chemical/biological risk factors, estimated net exposure to physically demanding work would be higher than gross risk in Ireland if it had the same composition of jobs and workforce as in Europe as a whole (i.e. estimated net is higher than gross). With job and worker characteristics controlled, Ireland would rank 15th lowest of 34 countries.

Figure 2.9 shows the association between physically demanding work and characteristics of the job and of workers. These characteristics are important in accounting for variation in the physical demands of work. The r-squared indicates that only 5.9 per cent of the variation in physically demanding work is accounted for by country differences, but this increases to 16.4 per cent when we include characteristics of the job and of workers (Appendix Table A2.1).

FIGURE 2.9 Impact of Job and Individual Characteristics on Exposure to Physically Demanding Work



Source: European Working Conditions Survey, 2010, analysis by authors, model Appendix Table A2.1. Only the statistically significant differences are shown.

The largest differences are by occupation and industrial sector. Compared to the reference occupation of senior officials and managers, exposure to physically demanding work is higher for manual workers, especially unskilled manual

workers. The risk is 1.26 points higher on the ten point scale for unskilled manual workers than for senior officials and managers.

There are also substantial differences by industrial sector. Compared to the wholesale/retail sector, physically demanding work is more common in construction (0.62), in health and social work (0.46), in agriculture forestry and fishing (0.41) and is less common in electricity, gas and water supply (-0.53) and also in public administration and defence, and in education.

There is a lower risk of exposure to physically demanding work among older workers and among those with shorter working hours. Exposure is slightly higher among women than among men, however, when we control for occupation, sector and other characteristics. Physically demanding work is more common among the self-employed and agency workers and for those working in larger organisations.

2.5.1 Correlates of Physically Demanding Work in Ireland

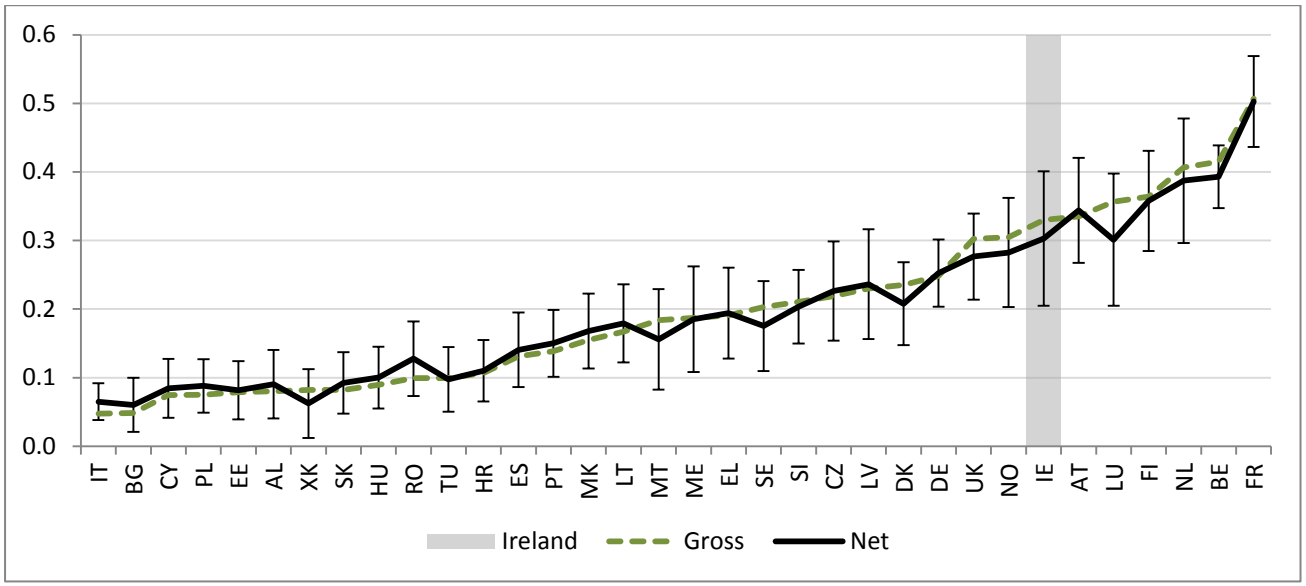
We tested a model with interactions to investigate whether the pattern by characteristics of jobs and workers was similar in Ireland to Europe in general (see Appendix Table A2.1). Only three of the 50 interactions we tested were statistically significant at conventional levels.[13] This indicates that the pattern by occupation, industry and other characteristics of the job and of the workforce is broadly similar in Ireland to that in other countries. The differences that reached statistical significance were by sector, job tenure, age and education. Physically demanding work was more common in Ireland among those in the health and social work sector (0.741). It was less common in Ireland among those with less than one year in the job (-0.96), and among older workers. While those with higher third-level education tend to have less exposure to physically demanding work overall, this is not true in Ireland when compared to those with higher second level/lower third-level education. The coefficient for the interaction (-0.341) is opposite in sign and similar in magnitude to the main effect (0.334) indicating that in Ireland there is essentially no difference in exposure to physically demanding work among those with lower third/higher second level education compared to those with higher third-level education. This might reflect the experience of migrant workers in Ireland, who often have high levels of education but are over-represented in lower-skilled manual jobs.

[13] Unfortunately, there were too few cases to conduct this test for certain groups: trainees; agency temporary workers; agriculture, forestry and fishing; mining and quarrying; electricity, gas and water supply; public administration and defence; and armed forces.

2.6 PSYCHO-SOCIAL RISKS IN THE WORKPLACE

This section presents the results of the models for exposure to psycho-social workplace risks. These include unwanted sexual attention, physical violence, bullying and harassment. Figure 2.10 shows the level of exposure to these risks in European countries before (gross) and after (net) controlling for differences in the composition of jobs and of the workforce. The gross risk (before controls) is shown as a green dashed line while the adjusted or net risk is shown in black. The 95 per cent confidence interval for net risk is shown by the vertical lines. In general, compared to the other types of risk, the levels of exposure to psycho-social risks are lower and the differences between the countries are smaller, ranging from 0.047 to 0.507 on the ten point scale.

FIGURE 2.10 Psycho-social Risk scale (0-10) by Country Before and After Controlling for Individual and Job Characteristics



Source: European Working Conditions Survey, 2010, analysis by authors. Net figures based on model in Appendix Table A2.1. Worker characteristics include gender, age, nationality, education; job characteristics include sector, occupation, organisation size.

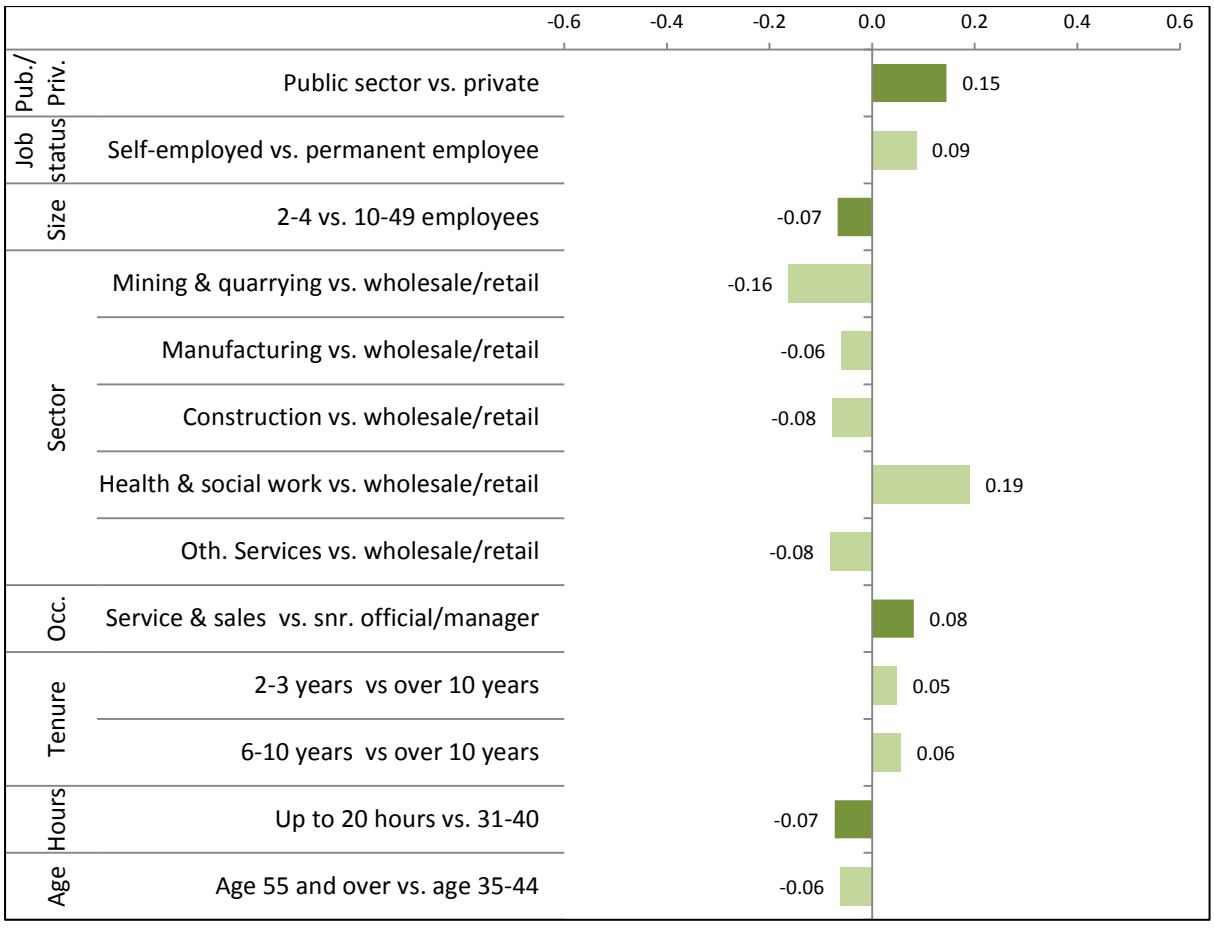
Unlike the other risks (physical, chemical/biological and physical demand), exposure is highest in Northern and Western countries (the Netherlands, Belgium and France) than in Eastern countries (Bulgaria, Cyprus and Poland are among the lowest). Ireland ranks 29th lowest (or 7th highest) of the 34 countries. With job and worker characteristics taken into account, Ireland's rank would change only very slightly to 6th highest.

This pattern of a higher exposure to psycho-social risk in the wealthier countries might be linked to a heightened awareness of the right to be treated with dignity at work. Eurofound and OSHA, 2014 also find high levels of adverse social

behaviour (which includes a broader range of items such as verbal abuse, threats and humiliating behaviour) in 2010 in many Western European countries such as Austria, Finland, the UK and Belgium.

As shown in Figure 2.11, the job and worker characteristics make less of a difference to the risk of exposure to psycho-social risk than was true of physical, chemical/biological and physical demand risks. We see the biggest differences by sector, with higher exposure in the health and social work sector (0.19 higher than wholesale/retail sector) and public sector (0.15 higher than private sector). Exposure to psycho-social risks is lower in mining and quarrying (-0.16).

FIGURE 2.11 Impact of Job and Individual Characteristics on Exposure to Psycho-social Risks



Source: European Working Conditions Survey, 2010, analysis by authors, model in Appendix Table A2.1. Only the statistically significant differences are shown.

2.6.1 Correlates of Psycho-social Risk in Ireland

We examined interactions to test whether the pattern was different in Ireland for those categories with a sufficiently large number of cases.[14] Only four effects are different in Ireland (Appendix Table A2.1). The public-private sector gap is larger in Ireland (by 0.378) and, compared to legislators, senior officials and managers, the risk is significantly higher in certain Irish occupations: technicians and associate professionals (0.36), clerical workers (0.55) and service and sales workers (0.46).

2.7 COUNTRY AND REGIME DIFFERENCES IN RISK CONTROLLING FOR COMPOSITION

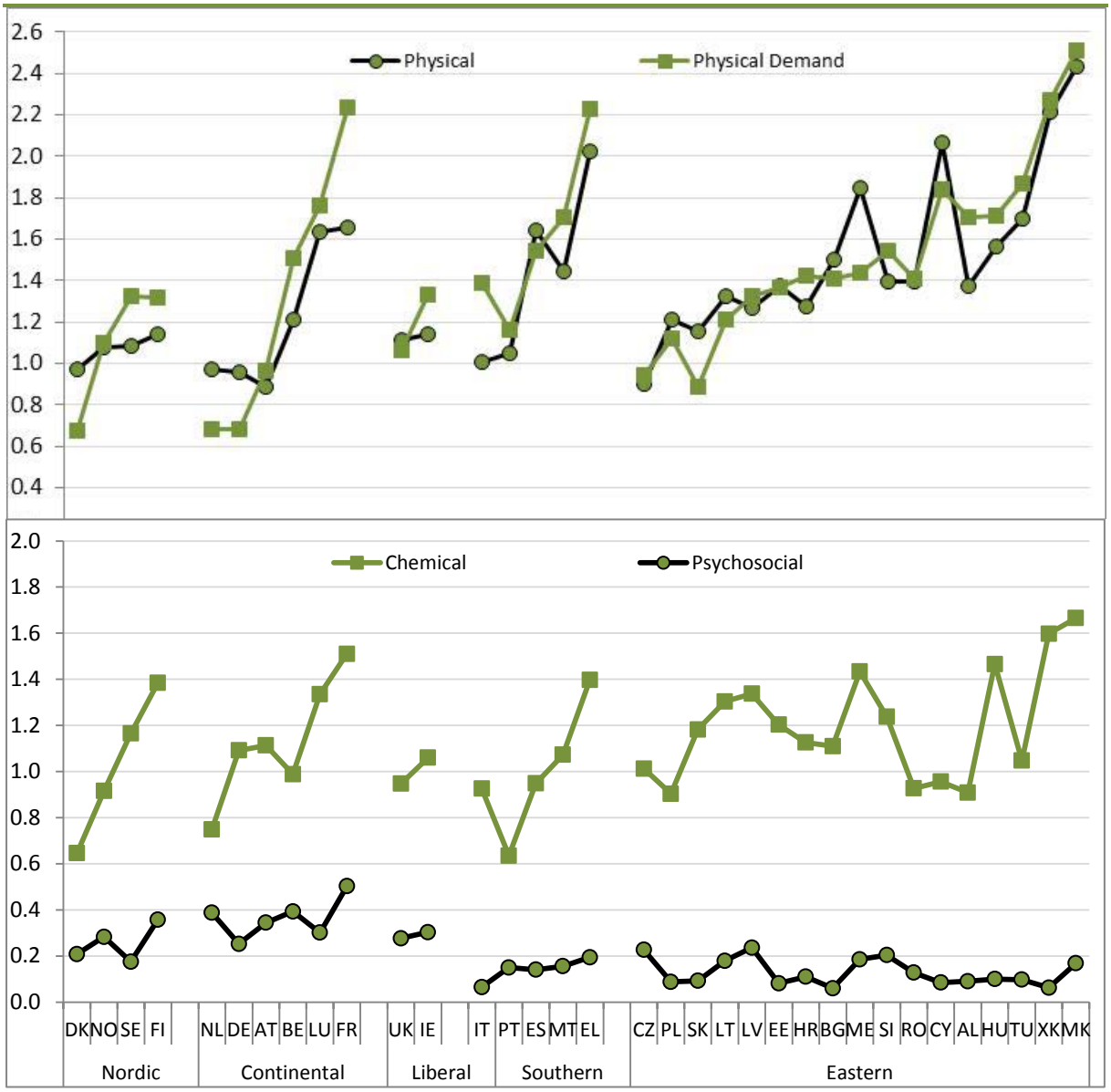
Figure 2.12 examines the net exposure to risk by country: the level of exposure we would expect if the countries were similar in terms of the composition of jobs and of workers, based on the models in Appendix Table A2.1. In essence, it is asking how much difference there remains between countries, other than the differences due to sector, organisation size and other characteristics of jobs and of the workforce.

Despite the importance of composition in accounting for variation in exposure to risk, as seen in the increase in the r-squared statistic, the country pattern remains remarkably similar after adding the controls. The country pattern looks similar because the same countries remain outliers within their groups: Finland still has the highest level of risk within the Nordic group; France is an outlier in the Continental regime; Greece is an outlier in the Southern regime and Turkey, Kosovo and Macedonia still have the highest exposure to risk in the Eastern regime.

In general, the ordering of countries within group in terms of level of risk remains very similar, but with some more significant changes in the Southern and Eastern groups. In the Southern group, Portugal now has an overall risk that is lowest in the group. The risk of exposure to chemical/biological risk and physically demanding work in Portugal is lower than we would expect based on the composition of its jobs and workforce. In the Eastern Group, exposure to chemical/biological risk in Turkey is lower than we would expect based on the composition of its jobs and workforce and the level of exposure to physical risk in Cyprus is lower than we might expect.

[14] Unfortunately, there were too few cases to conduct this test for trainees; agency temporary workers; agriculture, forestry and fishing; mining and quarrying; electricity, gas and water supply; public administration and defence; and armed forces.

FIGURE 2.12 Model-Estimated Country Differences in Exposure to Risk, after Taking Account of Composition of Jobs and Workforce



Source: Based on model in Appendix Table A2.1. Countries sorted as in Figure 2.1.

2.8 SUMMARY

The analysis in this chapter showed that there are substantial country differences in exposure to different kinds of risk in the workplace but that differences in the composition of jobs and workers explain an important fraction of the overall variation.

Ireland is similar to the UK in terms of the level of risk. In general, Ireland is towards the lower to middle part of the distribution across countries for physical, chemical/biological and physical demand risks but is 7th highest (out of 34 countries) in terms of exposure to psycho-social risk (or 6th highest with

characteristics of jobs and workers controlled). Ireland is similar in this respect to many Western European countries such as UK, Norway, Austria and Finland. Reported exposure to psycho-social risk tends to be higher in the wealthier countries, which suggests that it might be linked to a heightened awareness of the right to be treated with dignity in the workplace.

Sector and occupation are the most important factors in explaining differences in exposure to risk. Levels of exposure to physical, chemical/biological and physical demand risks were all higher in agriculture, forestry and fishing and in construction. Exposure to both physical and chemical/biological risk was higher in manufacturing and mining and quarrying. Exposure to chemical/biological risk was also higher in health and social work.

In terms of occupation, exposure was generally higher among manual workers (physical risk, chemical/biological, physically demanding work) and among lower service and sales workers (physical, chemical/biological). Technicians and associate professionals also had a higher exposure to chemical/biological risks.

The level of exposure to psycho-social risk is much lower, and much less variation in this type of risk is explained in the models. The job and worker characteristics make less of a difference to the risk of exposure to psycho-social risk than was true of physical, chemical/biological and physical demand risks. Exposure was somewhat higher in health and social work than in retail and wholesale, and higher in the public than the private sector.

There were some groups where the number of sample cases in the Irish data for 2010 was not large enough to permit us to test whether the pattern of risk exposure was similar in Ireland to Europe in general. These were the employment statuses of ‘trainee’ and ‘agency temporary worker’; the industrial sectors of agriculture, forestry and fishing; mining and quarrying; electricity, gas and water supply and public administration and defence; and the occupational group ‘armed forces’.

Nevertheless, we were able to test for the significance of 50 interactions for each of the four types of workplace risk. In general, the association between characteristics of jobs or workers and the different types of risk were similar in Ireland to other European countries. There were a number of differences, including a higher risk of exposure to physical and chemical/biological risk among those in craft and related trade work; higher exposure to chemical/biological risk

in Ireland among professionals, and lower service or sales workers; higher exposure to physically demanding work in the health sector; higher exposure to psycho-social risks in the public sector and in technical, clerical, sales and service occupations. The exposure to chemical/biological risk among professionals and service and sales workers in Ireland mainly involved skin contact with chemicals and exposure to infectious materials rather than breathing in smoke, dust, fumes or vapours.

In comparing workplace risks and outcomes across a large number of countries, researchers have developed a number of classifications or typologies which group countries according to their similarity to certain 'ideal types' with respect to institutional or structural features. The results in this chapter, like other figures from Eurostat, suggest that patterns of country differences in exposure to risk in the workplace do not map onto these different regimes or varieties of capitalism, however. Both the 'varieties of capitalism' and 'employment regime' approach would predict that job quality in Ireland would be less favourable than average; yet statistics produced by Eurostat suggest that the Irish record on occupational injuries is second only to Sweden (HSA, 2014). Our results in this chapter also suggest that exposure to workplace risks among Irish workers tends to be towards the middle or lower end of the range across European countries. An exception is the level of exposure to psycho-social workplace risks, which tends to be high in Ireland and in other countries of Northern Europe. The findings suggest that while the concept of welfare regimes has been a useful framework for understanding differences between countries in working conditions and a range of welfare-related outcomes, it would appear to be less useful for the purpose of examining exposure to health and safety risk in the workplace.

Chapter 3

Changes in Workplace Hazards between 2005 and 2010

3.1 INTRODUCTION

This chapter examines the second research question which is concerned with change in exposure to risks between 2005 and 2010. We examine the extent to which there were changes in exposure to risks in the period and whether these changes were more or less noticeable in Ireland than elsewhere.

Multivariate statistical techniques are again used to examine country differences in the levels of exposure to risk as they change over time. The results will be presented both before and after statistically taking account of country differences in the composition of jobs and of the workforce. While the last chapter focused on 2010, in this chapter we include the data for 2005 as well, and we include the 30 countries for which data is available in both waves. We begin with an overview of the change in the level of exposure to each type of risk and then ask whether the association between risk and characteristics of the individuals and jobs changed over time.

3.2 CHANGE OVER TIME IN EXPOSURE TO PHYSICAL RISK

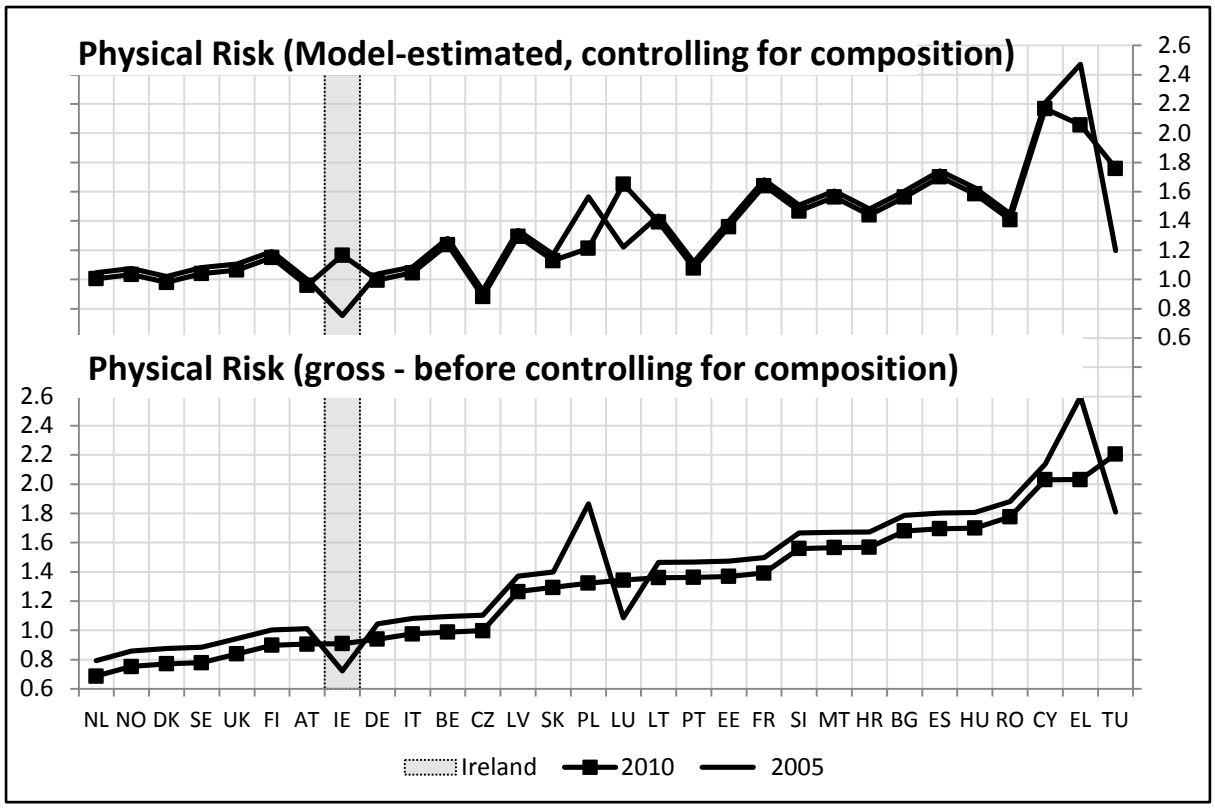
We report in Figure 3.1 the average level of exposure to physical risk, which includes vibration from machinery, noise and extremes of temperature. The lower panel of the chart shows the gross risk which is the overall risk before any controls are included for the composition of the jobs and workforce. The green line in the chart shows the risk for 2010 while the black line shows the risk for 2005.

As we saw in the previous chapter, Ireland had a relatively low level of exposure to physical risk in 2010, with a physical risk score less than 1.0. The level of exposure to physical risk was not significantly different from the levels in Germany or the UK. The level of exposure was considerably higher in many of the Eastern European countries but with the highest levels in Greece and Turkey.

The pattern over time varies by country but there was a tendency towards a small fall in most countries (about 0.1 on the ten point scale). There was a larger drop in the exposure to physical risk in Greece and Poland and this difference

compared to other countries was statistically significant. There were statistically significant increases in the level of exposure to physical risk in Luxembourg, Ireland and Turkey. The increase was not large in Ireland (about 0.2 on the ten point scale) and the level of exposure was about the same by 2010 as in Germany and the UK.

FIGURE 3.1 Physical Risk by Country and Year Gross (Overall) and Net (Controlling for Other Characteristics)



Source: European Working Conditions Survey, 2010, analysis by authors. Net figures based on Appendix Table A3.1. Worker characteristics include gender, age, nationality, education; job characteristics include sector, occupation, organisation size, job tenure and hours worked.

The net or adjusted figures are shown in the top panel of Figure 3.1. The net figures are the average estimated level in each country and time period, when we control for the composition of jobs (sector, occupation, hours worked, job tenure and size of organisation) and of the workers (gender, age group and level of education). In calculating the net figures, we assume that these job and worker characteristics have a similar relationship with workplace risk across all countries. The analysis in the last chapter showed that, in general, the pattern in Ireland did not differ from the general pattern across countries.

When we control for these characteristics, the increase in risk between 2005 and 2010 remains significantly greater than elsewhere for Luxembourg, Ireland and

Turkey and significantly lower than elsewhere for Poland and Greece. With job and individual characteristics controlled, the change over time is not statistically significant in the other countries.

In the last chapter, we saw that sector and occupation had the strongest association with physical risk in 2010. The levels of exposure to physical risk were higher in agriculture, forestry and fishing; construction; manufacturing; mining and quarrying and among manual workers and lower service and sales workers. Exposure to physical risk was also higher among those with lower levels of education, those working longer hours and among male workers. At this point we turn to an examination of the job and individual characteristics that differed in their association with physical risk between 2005 and 2010. Of the more than 50 relationships we tested, in only three cases did their association with the level of exposure to physical risk change over time. These are shown in Table 3.1. Note that the figures refer to the general pattern across countries.

In 2005, exposure to physical risk was lower in the financial/real estate and business services sector than in the retail and wholesale sector. By 2010, this gap had closed and was not statistically significant. It is not clear which might be driving this pattern, but it may be linked to a change over time in the mix of occupations in the sector.

TABLE 3.1 Characteristics of Jobs or Workers that Differ in their Association with Physical Risk between 2005 and 2010

	2005 effect	2010 effect
Financial etc. sector vs. retail and wholesale	-0.275***	-0.038 (ns)
Elementary (unskilled) occupations vs. senior officials and managers	0.649***	0.932***
2nd to lower 3rd level educ. vs. third level	0.723***	0.564***

Source: EWCS, 2005 and 2010; analysis by authors.
Note: See Appendix Table A3.1 for the full model. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1.

There was also a significant difference between 2005 and 2010 in the association between physical risk and working in an elementary or unskilled occupation. In 2005, these workers had a higher exposure to physical risk than those working as senior officials and managers by about 0.65 points on the ten point scale. By 2010, this gap had increased to 0.9 points. In general, then, the lowest-skilled occupations had a higher exposure to physical risk by 2010.

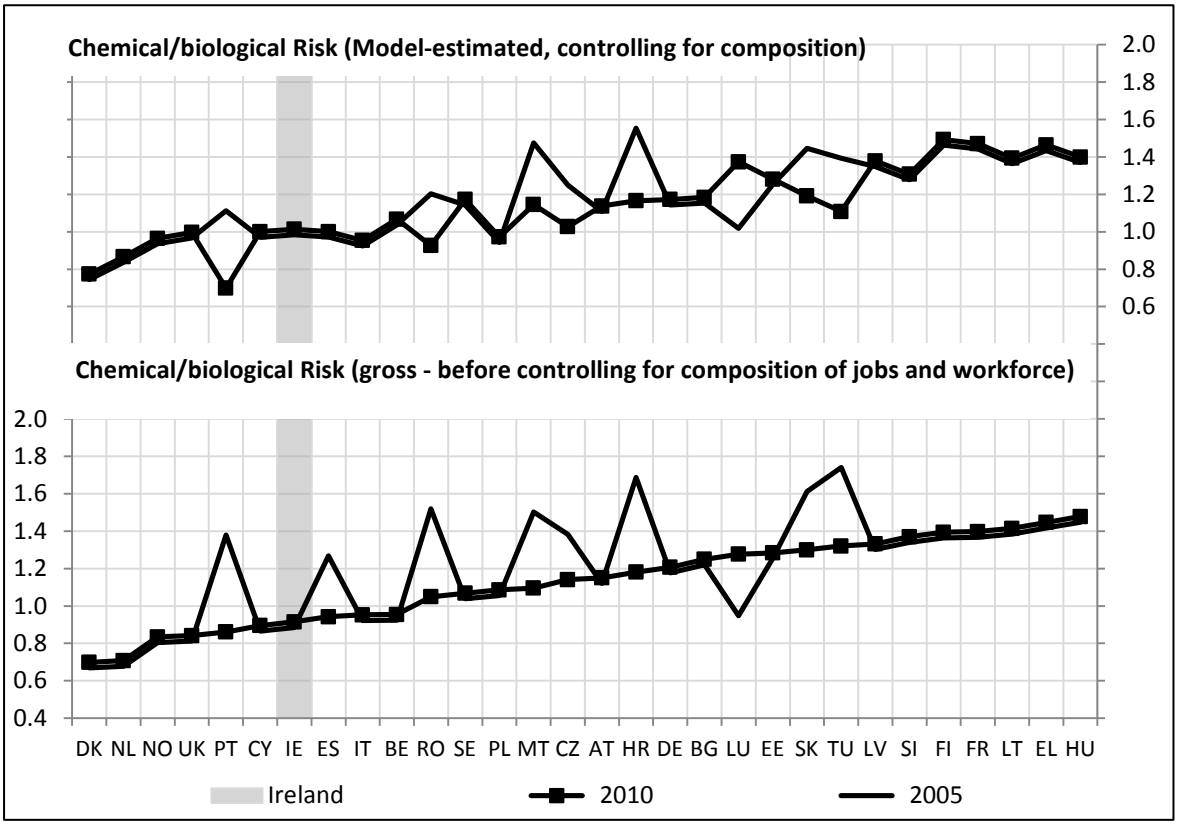
The third difference in association with physical risk between 2005 and 2010 was for level of education. In 2005, those with higher second level to lower third-level

education had a higher risk of exposure to physical risk than those with higher third-level education by about 0.7 on the ten point scale. The gap had narrowed by 2010 to 0.56 points.

3.3 CHANGE OVER TIME IN EXPOSURE TO CHEMICAL/BIOLOGICAL RISK

In Figure 3.2 we turn to chemical/biological risk. There was a small decline in risk over time in the overall figures for certain countries (Spain, Portugal, Poland, the Czech Republic, Malta, Romania, Slovakia, Croatia and Turkey) and a slight rise in Luxembourg. There was no overall change in Ireland. When we control for differences in the composition of jobs and the workforce, the change is no longer statistically significant in Spain. Ireland was among the countries with the lowest risk of exposure to chemical/biological risk. It was 7th lowest of the 34 countries in 2010 and at about the same rank in 2005, controlling for composition.

FIGURE 3.2 Exposure to Chemical/Biological Risk by Country and Year



Source: European Working Conditions Survey, 2010, analysis by authors. Net figures based on Appendix Table A3.1. Worker characteristics include gender, age, nationality, education; job characteristics include sector, occupation, organisation size, job tenure and hours worked.

Apart from differences between countries in the pattern over time, there are also some changes over time in the association between chemical/biological risk and characteristics of jobs and workers, as shown in Table 3.2. The figures here refer to the general pattern across countries.

The higher risk of exposure to chemical/biological risk among those working in agriculture, forestry and fishing in 2005 (by about 0.3 points on the ten point scale) was no longer statistically significant in 2010, compared to workers in the retail/wholesale sector. There was an increase between 2005 and 2010 in the risk associated with being in an elementary occupation by about 0.2 on the ten point scale, bringing it to 0.8 compared to managers and officials in 2010. There was also in increase of about 0.2 associated with having a shorter tenure in the job (less than one year), essentially eliminating the difference in exposure to chemical/biological risk between this group and those with job tenure of 11 or more years. On the other hand, the gap between those with higher second level and third-level education decreased over the period, from about 0.5 in 2005 to 0.3 in 2010.

TABLE 3.2 Changes between 2005 and 2010 in the Association between Chemical/Biological Risk and Characteristics of Jobs or Workers

	2005 effect	2010 effect
Agriculture/forest/fish. vs retail/wholesale	0.300***	0.083 (ns)
Construction vs. retail/wholesale	0.807 ***	0.541***
Elementary occupations in 2005	0.595 ***	0.808***
Job tenure under 1 year vs. 11+ years	-0.287***	-0.102*
2nd to lower 3rd level educ.	0.514***	0.302***

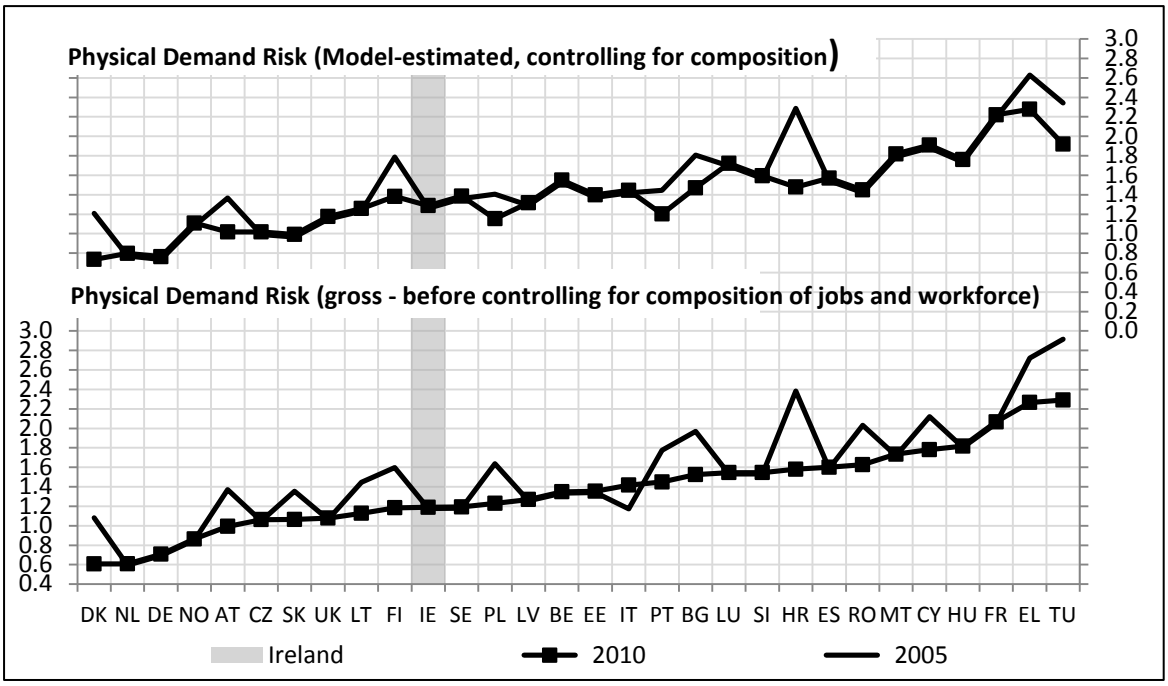
Source: European Working Conditions Survey, 2010, analysis by authors, based on Appendix Table A3.1.
Note: *** p<0.01, ** p<0.05, * p<0.1.

3.4 CHANGE OVER TIME IN EXPOSURE TO PHYSICALLY DEMANDING WORK

Figure 3.3 shows the country differences in exposure to physically demanding work. Turning first to the gross figures, we see a fall between 2005 and 2010 in exposure to physically demanding work in 13 of the 30 countries, and an increase in Italy. There was no change in Ireland, despite significant changes in the sectoral composition of the workforce over this period.

Apart from differences between countries in the pattern over time, there are also some changes over time in the association between physically demanding work and characteristics of jobs and workers, as shown in Table 3.3. These are general patterns across the countries.

FIGURE 3.3 Physically Demanding Work by Country and Year (Net, Controlling for Composition of Jobs and Workforce)



Source: EWCS, 2010, analysis by authors. Net figures based on Appendix Table A3.1. Worker characteristics include gender, age, nationality, education; job characteristics include sector, occupation, organisation size, job tenure and hours worked.

TABLE 3.3 Changes between 2005 and 2010 in the Association between Physically Demanding Work and

	2005	2010
Technicians etc. vs. officials/managers	0.194***	0.052
Craft and trades vs. officials/managers	1.428***	1.011***
21-30 hours vs. 31-40 hours pw.	0.162**	-0.060
Age 25-34 vs. 35-44	0.120**	-0.044

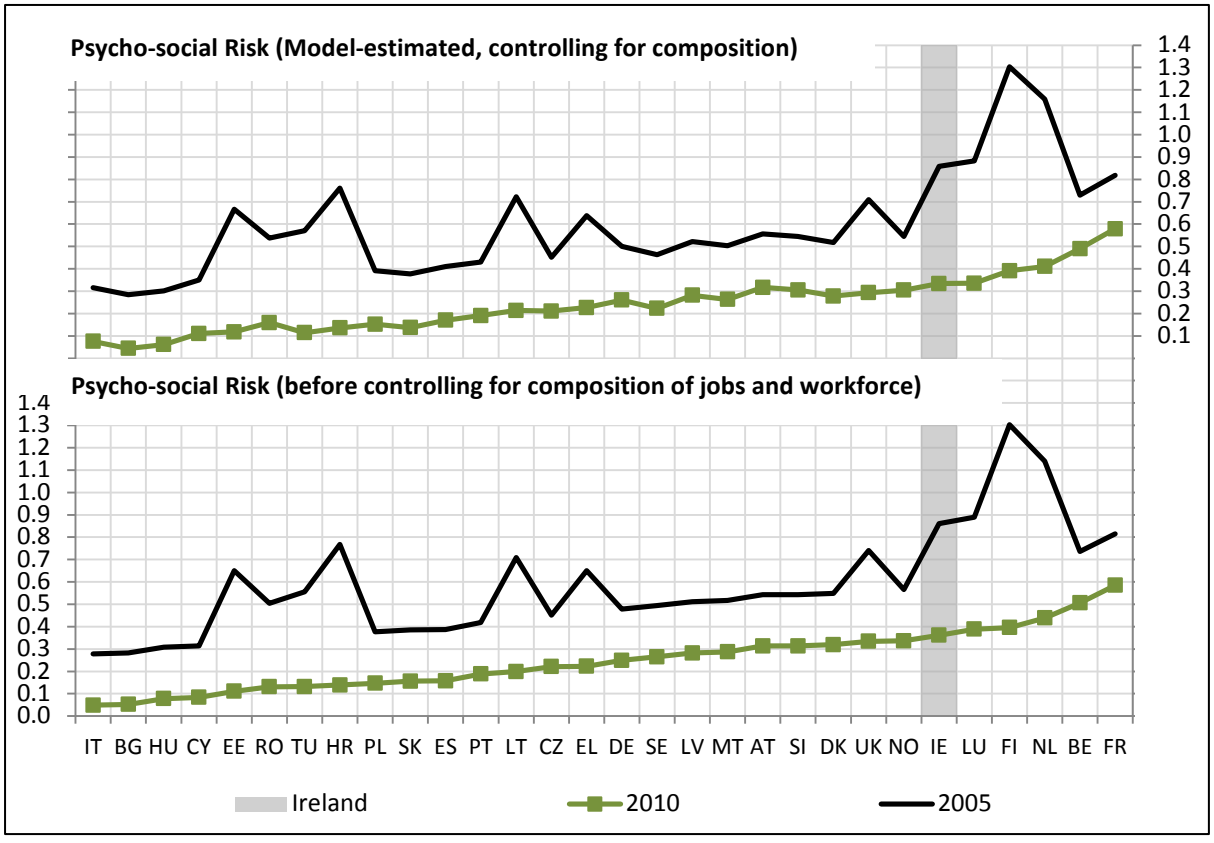
Source: EWCS, 2005 and 2010, analysis by authors, from Appendix Table A3.1.

There were certain groups of workers who had a higher exposure to demanding work in 2005, but this had been virtually eliminated by 2010: technicians and associate professionals (compared to managers and officials), those working 21 to 30 hours per week (compared to those working 31 to 40 Characteristics of Jobs or Workershours) and those aged 25 to 34 (compared to those aged 35 to 44). These groups had experienced a higher exposure to physically demanding work in 2005 but their level of exposure was not significantly different from the reference category in 2010. There was also a decline in exposure to physically demanding work among craft and related trades workers (compared to officials and managers), but their level of exposure remained significantly higher in 2010. In 2005, this group had a level of exposure that was 1.4 points higher than officials and managers on the ten point scale but this had fallen to about 1.0 point by 2010.

3.5 CHANGE OVER TIME IN EXPOSURE TO PSYCHO-SOCIAL RISK

Country differences in exposure to psycho-social risk in 2005 and 2010 are shown in Figure 3.4. The gross figures indicate that there was a substantial drop in exposure to this type of risk between 2005 and 2010 in all countries. There was no country where the level of exposure was higher, on average, in 2010 than in 2005. There are a number of countries where the drop in the level of exposure was even more substantial than the average fall of about 0.17 points on the ten point scale, especially Finland and the Netherlands. In Finland, the average level of exposure in 2005 was 1.3, falling to 0.4 by 2010. The corresponding figures in the Netherlands were 1.14 and 0.44. In Ireland, the average level of exposure was 0.86 in 2005 falling to 0.36 in 2010, representing a drop of about 0.5 points.

FIGURE 3.4 Exposure to Psycho-social Risk by Country and Year (Net, Controlling for Composition of Jobs and Workforce)



Source: European Working Conditions Survey, 2010, analysis by authors. Net figures based on Appendix Table A3.1. Worker characteristics include gender, age, nationality, education; job characteristics include sector, occupation, organisation size, job tenure and hours worked.

Apart from Finland, the Netherlands and Ireland, the fall in the level of exposure to psycho-social risk was also greater than average in Estonia, Croatia, Lithuania, Greece, Luxembourg, Romania, Turkey and the UK.

The net figures represent the average level of exposure we would expect if the countries and years had a similar composition of jobs and the workforce in terms of the characteristics controlled in the model. The ranking of countries remains unchanged and the general decline in the level of exposure to psycho-social risk remains statistically significant. The fall in those countries which had a significantly larger drop before controlling for composition remained significantly larger after adding these controls.

As a result of the fall in exposure to psycho-social risk in the workplace in those countries where the level had been particularly high in 2005 (such as the Netherlands and Finland), the gap between countries in 2010 was smaller than it had been in the earlier year. In 2005, the country net averages ranged from 0.3 to 1.3, a range of about one point on the ten point scale. In 2010, the corresponding low and high averages were 0.04 and 0.58, respectively, or a range of about 0.5 points.

Table 3.4 shows those characteristics of jobs and workers where the association with exposure to psycho-social risk had changed significantly between 2005 and 2010. These figures refer to the general pattern across countries. The self-employed had not differed significantly from permanent employees in exposure to psycho-social risk in 2005, but their level of risk had increased significantly by 2010.

TABLE 3.4 Changes between 2005 and 2010 in the Association between Psycho-social Risk and Characteristics of Jobs or Workers

	2005	2010
Self-employed vs. perm. employee	-0.089	0.112***
Financial sector vs. retail etc.	-0.242***	-0.045
Public admin. vs. retail etc.	0.219**	-0.021
Education vs. Retail etc.	0.187**	-0.073
Health and social work vs. retail etc.	0.576***	0.179***
41-50 hours per week vs. 31-40	0.154***	0.022
51+ hours per week vs. 31-40	0.417***	0.051*
Upr. 2nd and lower 3rd level educ.	0.073	-0.015

Source: European Working Conditions Survey, 2010, analysis by authors, based on model for psycho-social risk in Appendix Table A3.1.

Note: *** p<0.01, ** p<0.05, * p<0.1.

There were several significant changes by sector of employment. Some sectors had shown a higher risk of exposure than the reference category (retail and wholesale) in 2005, but this gap had disappeared (public administration and

defence, education) or been very much reduced by 2010 (health and social work). In other sectors, such as financial services/real estate and business services, the exposure had been lower than in retail and wholesale in 2005 but the gap had closed by 2010.

There were also some changes by hours worked. Those working longer hours had been at significantly higher risk of exposure to psycho-social risk in 2005 but this was no longer statistically significant compared to those working 31 to 40 hours by 2010.

The position of those with higher second and lower third-level education improved compared to those with higher third-level education. This was a small change however, from a small (but not statistically significant) disadvantage in 2005 to a small (but still not statistically significant) advantage in 2010. The gap between the two groups was not statistically significant in either period, but the change over time was statistically significant. What this means is that any advantage experienced by those with higher education in terms of being less exposed to psycho-social risk is being reduced over time.

3.6 SUMMARY

In this Chapter, the focus was on change over time in the exposure to risk in the workplace.

In terms of **physical risk**, there was a small fall in exposure in most countries but a larger fall in Greece and Poland and a significant increase in Luxembourg, Ireland and Turkey. When we control for changes in the composition of jobs and the workforce, these differences between countries remain, but the overall gap in the level of exposure to physical risk between 2005 and 2010 is no longer statistically significant. In other words, the general pattern across countries for physical risk is one of no significant change over time, but there were significant changes in some countries including Ireland where the level of exposure showed a small but significant increase.

Despite the fact that Ireland was one of the countries where exposure to physical risk increased slightly, we saw in the last chapter that the level of exposure in Ireland was relatively low in 2010 at 12th lowest of 34 countries with characteristics of jobs and workers controlled.

There was only a small number of changes over time in the associations between exposure to physical risk and characteristics of jobs and workers. Those in the financial, real estate and business services sector had a lower exposure to physical risk that those working in retail and wholesale in 2005 but this advantage had disappeared by 2010. On the other hand, the exposure to physical risk among those in elementary or unskilled occupations, which was already higher than those working as officials or managers in 2005, increased further by 2010. There was also a reduction in the gap between those with higher second to lower third-level education and those with higher third-level education.

Exposure to **chemical/biological risk** tended to decline over time when we controlled for the composition of jobs and the workforce. There was a larger fall in exposure in several countries (Portugal, Romania, Malta, the Czech Republic, Croatia, Slovakia and Turkey) and an increase in exposure in Luxembourg. There was no significant overall change over time in Ireland.

There was an overall fall in the association between exposure to chemical/ biological risk and working in certain sectors, such as agriculture, forestry and fishing and in construction. As we saw in the case of exposure to physical risk, there was also an increase in exposure to chemical and biological risk for those working in unskilled elementary occupations. In 2005 those who had been in their jobs for one year or less had a lower exposure to chemical/biological risk. By 2010, this gap (compared to those with 11 or more years of job tenure) had disappeared.

For both physical and chemical/biological risk, we saw a narrowing of the gap between those with higher second level to lower third-level education and those with higher third-level education. In the case of chemical and biological risk, the gap narrowed but the risk remained higher for those with the lower level of education in 2010.

In terms of exposure to **physically demanding work**, there was no change in the level of exposure in just over half of the countries (including Ireland), a small increase in Italy and a drop in the remaining countries.

Across all countries, certain groups experienced a reduction in their exposure to physically demanding work, including technicians and associate professionals and craft and trades workers, those working less than 30 hours per week, and those aged 25 to 34 compared to those aged 35 to 44.

There was a more substantial fall in exposure to **psycho-social risk** overall, particularly in countries where the level had been highest in 2005 such as Finland and the Netherlands. Across all countries, the fall was particularly marked among those working in public administration and defence, education and health and social work and also among those working longer hours. On the other hand, the level of exposure to psycho-social risk increased among the self-employed.

Chapter 4

Health and Wellbeing Outcomes for those in Employment in 2010

4.1 INTRODUCTION

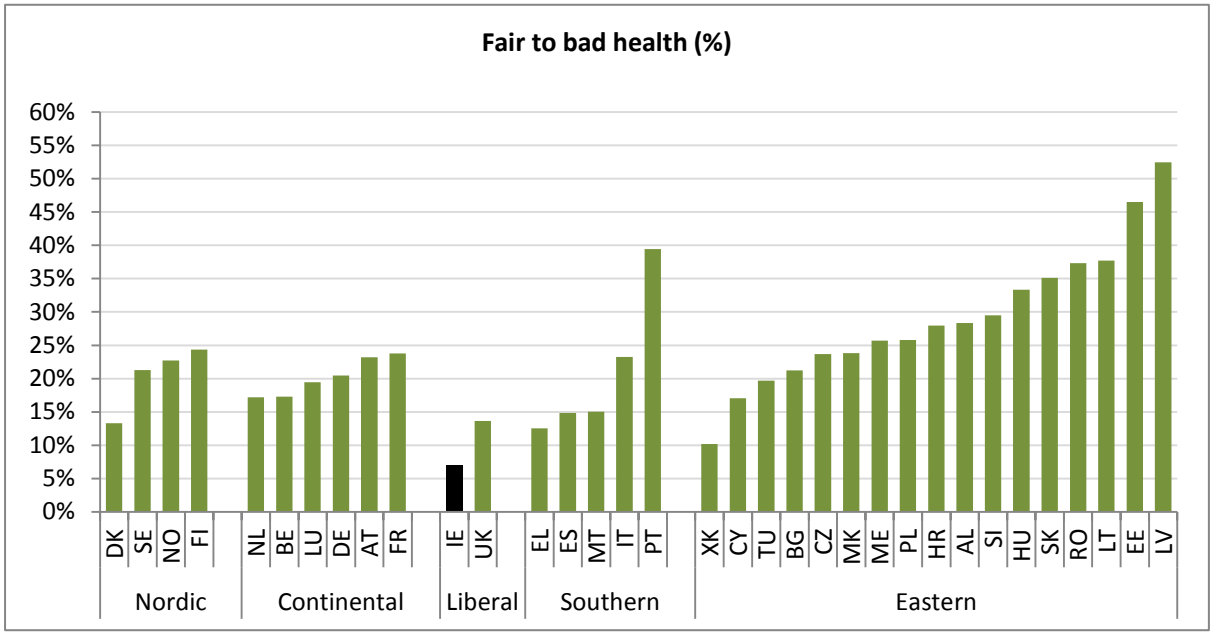
In this chapter we examine country differences in outcomes such as self-reported health, mental distress and injury. As noted in Chapter 1, these indicators are based on the presence of the outcome but without specifically asking the respondent to attribute it to work conditions. The advantage of this approach is that it avoids any bias that might be introduced based on individual or cultural differences in the tendency to attribute such outcomes to working conditions. Given the tendency of mental distress and poor health to emerge over time, it can be quite difficult for experts, let alone respondents, to establish the exact cause. The disadvantage, of course, is that the item will also capture health, mental health and injury outcomes that are largely caused by non-work issues.

As in previous chapters, we will build up a set of models that examines overall differences by country/regime before proceeding to include controls for job characteristics and socio-demographic characteristics. We will also include the workplace risks as specific independent variables and check whether the risk factors have a greater or lesser effect on the worker outcomes in Ireland than elsewhere. We focus on the situation in 2010.

4.2 COUNTRY AND REGIME DIFFERENCES IN POOR HEALTH, MENTAL DISTRESS AND INJURY

Figure 4.1 shows the country differences in the percentage reporting that their health is fair, bad or very bad. There is very wide variation across countries, ranging from a low figure of 7 per cent in Ireland to 52 per cent in Latvia.

FIGURE 4.1 Country and Regime Differences in Self-Rated Health (% with Fair, Bad or Very Bad Health)



Source: European Working Conditions Survey, 2010, analysis by authors.

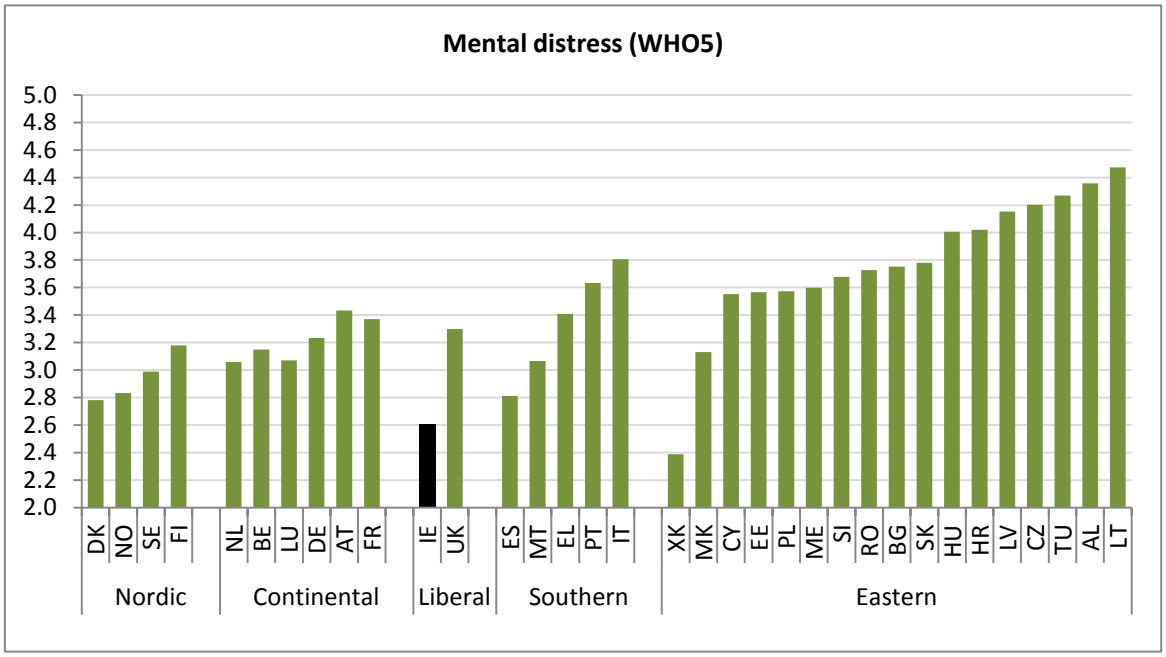
In general, the percentage of the workforce reporting fair to bad health is low in the Nordic, Continental and especially the Liberal countries. There is wide variation within the Southern and Eastern groups. In the Southern Countries, the level of poor health is low in Greece, Spain and Malta but very high in Italy and Portugal. In the Eastern group, the level of reported poor health is low in Kosovo, Cyprus and Turkey but very high in the three Baltic States (Latvia, Lithuania and Estonia).

As noted in Chapter 1, there may be cultural differences in the willingness to regard one's health as fair, bad or very bad, even apart from any underlying health conditions. Therefore, we focus on country differences in the association between job characteristics and health rather than country differences in the levels of health.

Figure 4.2 shows the average score on the WHO-5 mental distress scale. This has been coded to range from 0 (low distress) to 10 (high distress) for ease of interpretation. The pattern within regimes is very mixed and apart from the fact that levels of mental distress are high in many (but not all) countries in the Eastern group, there is no clear difference between regimes. As with health, Ireland stands out as being one of the countries with the lowest scores on the mental distress scale (2.6), after Kosovo (2.4). Several Eastern countries have an

average score from 4.0 to 4.5 (Turkey, the Czech Republic, Croatia, Albania, Hungary, Lithuania and Latvia).

FIGURE 4.2 Country and Regime Differences Mental Distress (Average Score on 0-10 scale)



Source: European Working Conditions Survey, 2010, analysis by authors.

Figure 4.3 shows the percentage of workers reporting injury in the previous year by country and regime. It is worth repeating that the injuries might not have occurred in the workplace. European injury data show that only 9 per cent of hospital treatments for injury in the EU are for injuries occurring in the workplace compared to 59 per cent for injuries occurring in the home or in the course of leisure activities (EuroSafe, 2013, p.7). Although these figures cover all age groups, and the proportion of injuries occurring in the workplace would be higher among the population of working age, it does indicate that the rate of non-work injuries is quite high.

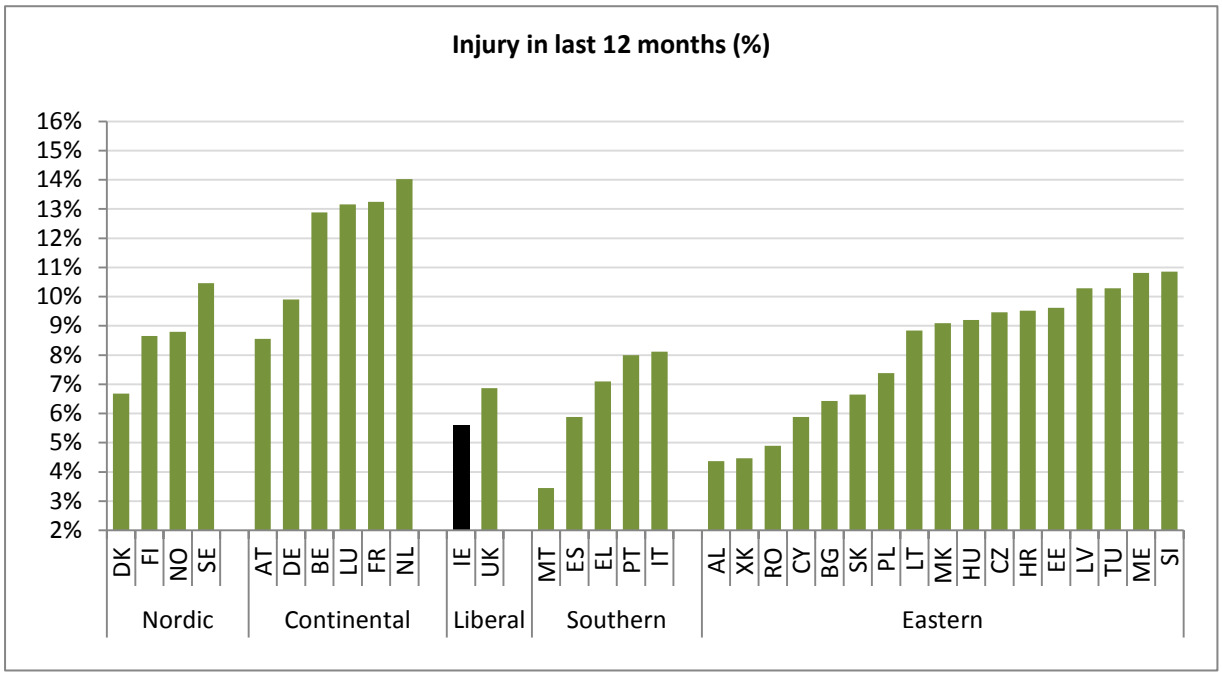
Figure 4.3 shows large variations across countries ranging from 3 per cent in Malta to 13-14 per cent in Belgium, Luxembourg, the Netherlands and France. In terms of regime, the rate of injury tends to be higher in the Continental group than elsewhere. The rate of injury is relatively low in Ireland and the UK at 6 per cent and 7 per cent, respectively. This pattern across countries differs from other injury statistics. For instance, the standardised injury death rate (covering work and non-work injuries) suggests the highest rates are to be found in the Baltic states and Finland with the lowest rates in Spain, the Netherlands, Malta and the UK (EuroSafe, 2013, p.8). The rate of hospital admissions for injury is highest in

Cyprus, Austria, Belgium and Finland and lowest in Portugal, Romania, Bulgaria and Poland (EuroSafe, 2013, p.10). Figures for fatal injuries (covering work and non-work injuries) suggests the highest rates are to be found in the Baltic states and Finland with the lowest rates in Spain, the Netherlands, Malta and the UK (EuroSafe, 2013, p.8).

Comparative worker injury rates compiled by Eurostat[15] show that within the EU15 the standardised injury rate (per 100,000 workers) was highest in France, Spain and Portugal and lowest in Greece, Sweden, Ireland and the UK (see HSA 2014, for 2013). These data only include non-fatal workplace accidents causing more than three days of absence.

The pattern across countries shown in Figure 4.3 suggests that there may be differences in the threshold adopted, with milder forms of injury being included in many continental countries. For this reason, it is prudent to treat the country differences in the mean level of injury with caution.

FIGURE 4.3 Country and Regime Differences Rate of Injury in 2010



Source: European Working Conditions Survey, 2010, analysis by authors.

[15] The data source is European Statistics on Accidents at Work (ESAW), derived from national registers, public insurance/social security schemes or national bodies responsible for the collection of data on accidents at work (e.g. the HSA in Ireland). The figures refer to 2011. Eurostat re-weights the data to adjust for under-reporting in countries without a register system. Despite extensive efforts at harmonisation it remains difficult to compare injury levels across countries.

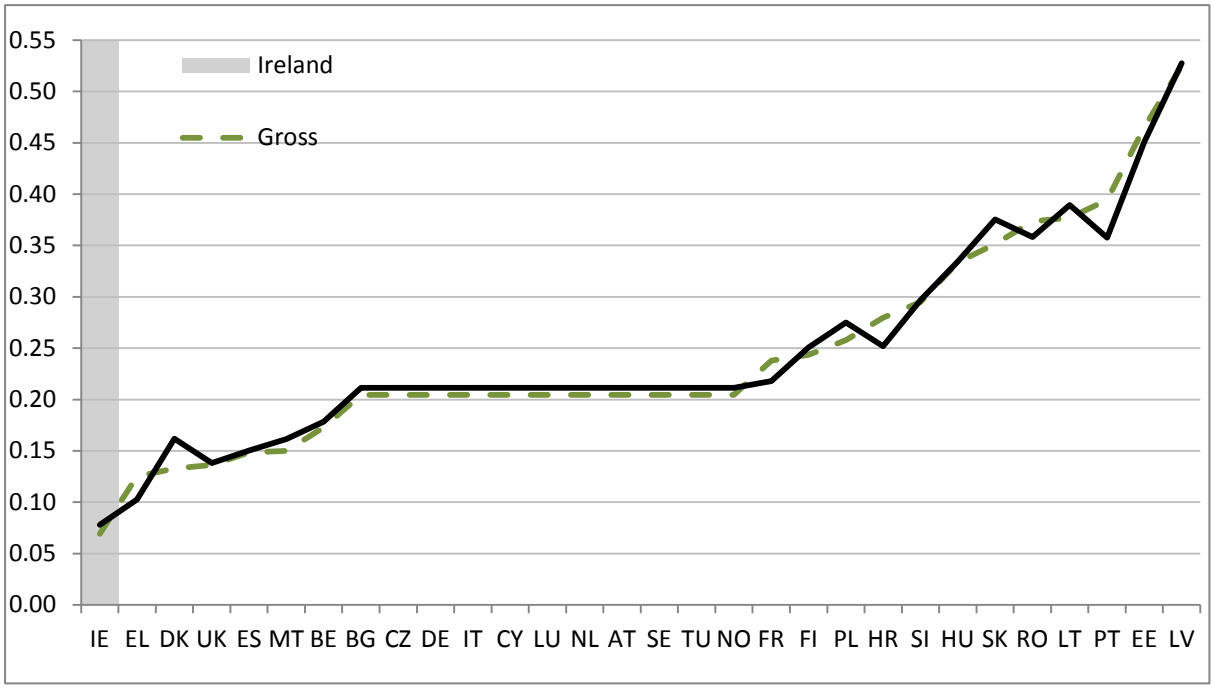
4.3 ACCOUNTING FOR DIFFERENCES IN POOR HEALTH

In order to understand country differences in the self-reported health of the workforce we estimated a series of regression models. The models are shown in Appendix Table A4.1 and are summarised here. We begin in Figure 4.4 by looking at how much it matters to country differences in self-rated health when we take account of the composition of jobs and the workforce. In other words, does the composition of the workforce in terms of characteristics of jobs and of workers account for country differences in self-rated health? In these models, we are looking at the average difference associated with worker and job characteristics across countries.

Figure 4.4 shows the overall country pattern (green dashed line) and the adjusted pattern (the solid black line). The overall pattern is shown with respect to Germany (DE in the chart) as the reference country: if the rate of self-reported fair to bad health is not significantly different from the German rate, the chart shows the same percentage as in Germany. The adjusted rate is the percentage we would expect to see if all countries were similar in terms of the composition of jobs and the workforce. The aspects of composition controlled in this estimate are characteristics of jobs such as sector, occupation, size of organisation, job tenure, hours worked, and exposure to physical risks, chemical/biological risks, physically demanding work and psycho-social risks. Characteristics of the individual worker are also controlled, such as gender, age group, whether native-born or a migrant and level of education. The full model is shown in Appendix Table A4.1.

As we see in Figure 4.4, controlling for these characteristics makes very little difference to the cross-country pattern. Some deviations from the gross pattern are found for Denmark, Poland and Slovakia where the adjusted rate is above the observed rate, and Croatia and Portugal, where the adjusted rate is lower. The higher estimated rate than observed rate indicates that if the composition of jobs and the workforce in Denmark, Slovakia and Poland were similar to that of the other countries, we would expect to see higher levels of health problems than actually observed. In other words, something about the composition of jobs and the workforce in these countries would lead us to expect a higher rate of health problems than we actually observe. The opposite is true of Croatia and Portugal: some aspect of the composition of jobs or the workforce in these countries would lead us to expect a lower rate of self-reported health problems than we actually observe.

FIGURE 4.4 Country Differences in Self-rated Poor Health (% Fair to Very Bad) Before and After Controlling for Workforce Composition



Source: European Working Conditions Survey, 2010, analysis by authors. Net figures based on Model B in Appendix Table A4.1.

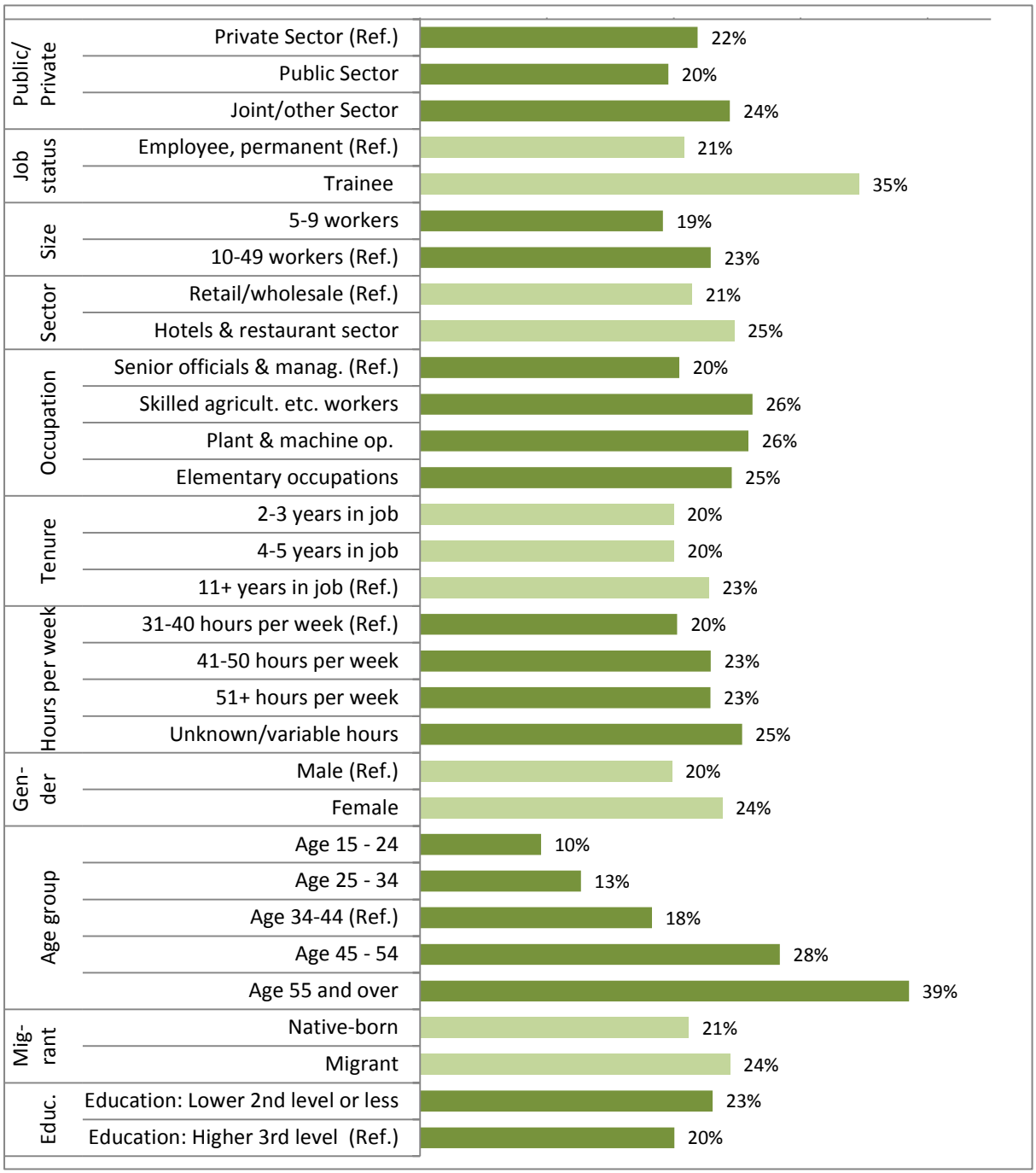
According to both the gross and net figures, the rate of self-reported health problems in Ireland is the lowest across the 34 countries. The rate in the UK is also low, the fourth lowest of the 34 countries.

The failure of the wide range of individual and organisational/work characteristics to account for any of the country differences suggests that much of these differences may be due to underlying cultural differences in reporting.

Figures 4.5 and 4.6 summarise the impact of the aspects of the job and individual characteristics of the workforce on self-reported health problems. The figure shows the adjusted percentage of workers in each group estimated to have poor health if the groups were similar in respect of other aspects of the jobs and other characteristics of the workers. The figures are based on Model B in Appendix Table A4.1. The charts show the percentages of people in each group that we would expect to report poor health if they were similar in terms of the other characteristics of jobs and workers in the models. Note that the models assume that differences by gender, age group and so on are similar across countries although, as noted below, tests indicated that the pattern in Ireland does not differ from the typical European pattern.

The most salient pattern in Figure 4.5 is the difference between age groups. Even with other characteristics of the jobs and of the workers taken into account, the estimated percentage reporting poor health ranges from 10 per cent among those aged 15 to 24 to 39 per cent among those aged 55 and over.

FIGURE 4.5 Adjusted Risk of Poor Health by Selected Characteristics of Jobs and Workers



Source: European Working Conditions Survey, 2010, analysis by authors. Figures derived from Model B in Appendix Table A4.1, using the 'margins' command in Stata.

Another large difference is between trainees, of whom 35 per cent would be estimated to report poor health, and permanent employees with a figure of 21 per cent. Other differences between employment statuses, in particular the contrast between employees and the self-employed, do not reach statistical significance.

Other differences in the figure are more modest in size with gaps between the groups of five percentage points or less. We see a higher estimated percentage reporting poor health in the private sector than the public sector; in the hotel and restaurant sector than the retail and wholesale sector; those working long hours (41 or more per week) or variable hours compared to those working 31 to 40 hours per week. The estimated risk is also higher for women than for men, for migrants than native-born workers and for those with lower levels of education. In terms of occupation, the estimated risk is higher among manual workers (in skilled agricultural and fishery workers, machine operatives and assemblers and elementary/unskilled occupations) than among senior officials and managers. Note however, that there is not a significantly higher risk of health problems among those working in skilled craft and related trades work.

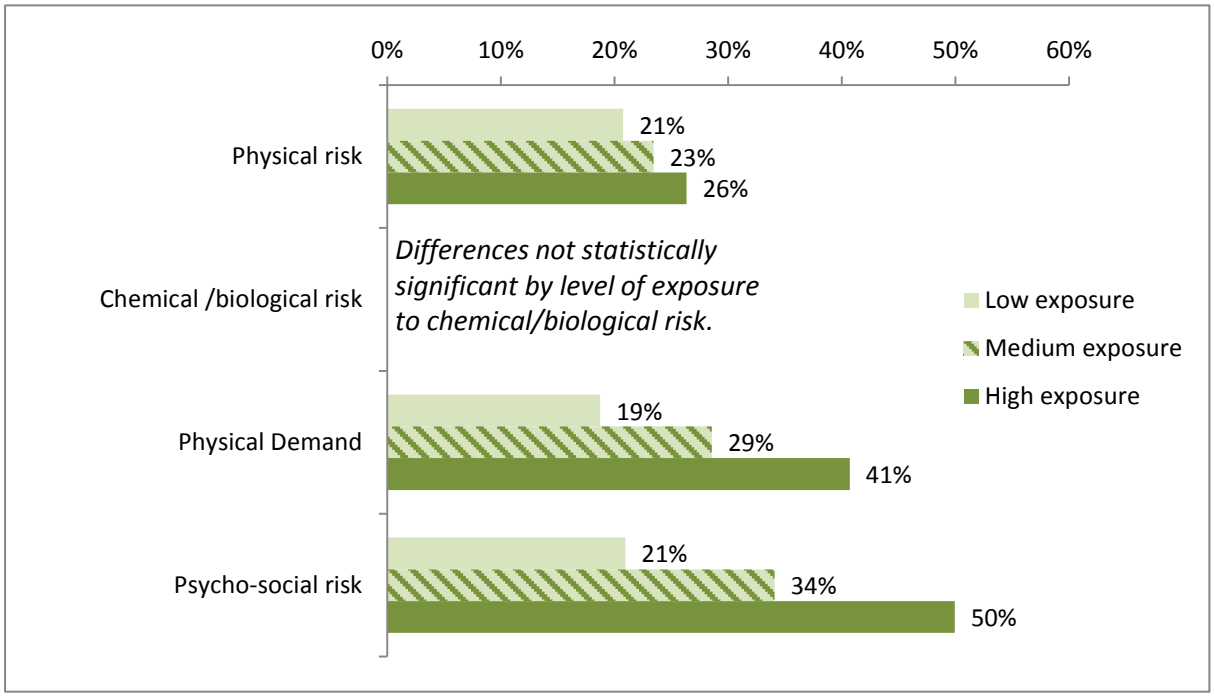
The estimated percentage reporting poor health is lower in workplaces with five to nine employees than the reference category with ten to 49 employees; and among those with tenures between three and five years compared to those in the job for 11 or more years.

In interpreting these figures, it is important to keep in mind that the sample is one of people who are currently at work. Those who have become so ill that they are no longer able to work (or who are on short-term sick leave) are not included. Moreover, this process of withdrawal may differ across countries due to variation in the compensation systems and supports for workers who are ill or injured.

The results in Figure 4.5 controlled for the level of exposure to the different kinds of workplace risk, physical, chemical/biological, physical demand and psycho-social risks. The impact of exposure to these kinds of risk is illustrated in Figure 4.6, which shows the adjusted percentage reporting poor health where each kind of risk is low (value = 0 on the 0 to 10 scale), medium (value = 5) and high (value = 10). The figures are calculated based on Model B in Appendix Table A4.1. The model includes exposure to each of the four different kinds of risk as continuous variables. The model results are used to calculate the expected percentage reporting poor health at these three levels of exposure to each type of risk. As

before, the pattern is the general pattern across countries and does not take account of any unique features in particular countries.

FIGURE 4.6 Adjusted Risk of Poor Health by Exposure to Workplace Risks



Source: European Working Conditions Survey, 2010, analysis by authors. Figures based on Model B in Appendix Table A4.1. Physical risks relate to noise, vibration and temperature, while physical demands relate to factors such as lifting, carrying, repetitive movement etc. See Chapter 1 for definitions.

The model showed that poor health is significantly increased where there is exposure to physical risk, physically demanding work and psycho-social risk. The impact of exposure to chemical/biological risk is not statistically significant when other characteristics are controlled. Where exposure to physical risk is high (score = 10), the percentage reporting poor health would be estimated to be five percentage points higher than when there is no exposure to physical risk (26 per cent vs. 21 per cent). The difference is much larger in the case of physically demanding work, at 22 percentage points (41 per cent vs. 19 per cent) and in the case of psycho-social risks such as bullying and harassment at 29 percentage points (50 per cent vs. 21 per cent). Clearly, then, there is a strong association between self-reported poor health and exposure to risks in the workplace.

With these patterns, we need to be careful not to conclude that the relationship is necessarily causal. For instance, other attributes that make it difficult for people to move into better quality work – such as having low skills, household poverty, or living in a disadvantaged area – may explain both why this person works in a risky job and has poor health.

We checked whether the impact of these physical risks, and other job and worker characteristics, in Ireland were similar to their impact in other European countries. We did this by adding interaction terms to the model. None of the interactions were statistically significant, however. This indicates that the associations between self-rated poor health and job or worker characteristics are similar in Ireland to the associations in Europe in general.

4.4 ACCOUNTING FOR DIFFERENCES IN MENTAL DISTRESS

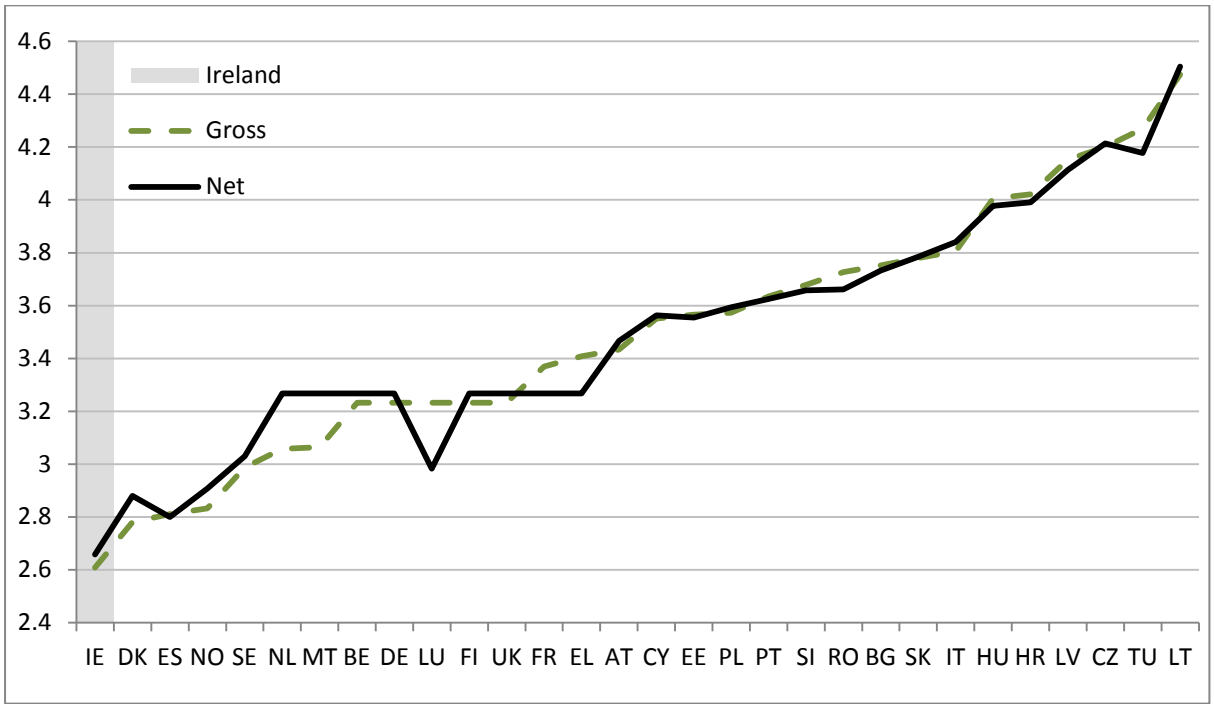
In this section we focus on mental distress as measured using the WHO 5-item scale. We estimate a series of regression models in order to understand country differences and the extent to which these are due to the composition of jobs and the workforce. The models are shown in Appendix Table A4.1 and are summarised here. The models are regression models on the weighted data.

We begin in Figure 4.7 by looking at how much of a difference it makes to country differences in mental distress when we take account of the composition of jobs and the workforce. The overall country pattern is shown in the green dashed line and the adjusted pattern, after controlling for country differences in the characteristics of jobs and workers, are shown in the black solid line. Germany is taken as the reference country: if the average level of mental distress in a particular country is not significantly different from the German level, the chart shows the same level as in Germany. The adjusted mean is the level of mental distress we would expect to see if all countries were similar in terms of the composition of jobs and the workforce. As before, the aspects of composition controlled in this estimate are characteristics of jobs such as sector, occupation, size of organisation, job tenure, hours worked, and exposure to physical risks, chemical/biological risks, physically demanding work and psycho-social risks. Characteristics of the individual worker are also controlled, including gender, age group, whether native-born or a migrant and level of education. The full model is shown in Appendix Table A4.2.

Controlling for characteristics of jobs and of the workforce actually makes very little difference to the country pattern. This parallels the findings above from the models for self-rated health. Ireland is the country with the lowest average level of mental distress, according to both the gross and the adjusted net figures, and the level is highest in Lithuania. The levels of mental distress in the Netherlands and Malta would be higher than actually observed if these countries had the same job and workforce composition at the general European pattern, while the level in Luxembourg and Greece would be somewhat lower. These differences are

small in magnitude, however, even in the context of the relatively narrow range of variation in the country averages.

FIGURE 4.7 Country differences in Mental Distress Before and After Controlling for Composition of Jobs and Workforce in 2010 (Mean on 0-10 Scale, where 10 = High Distress)

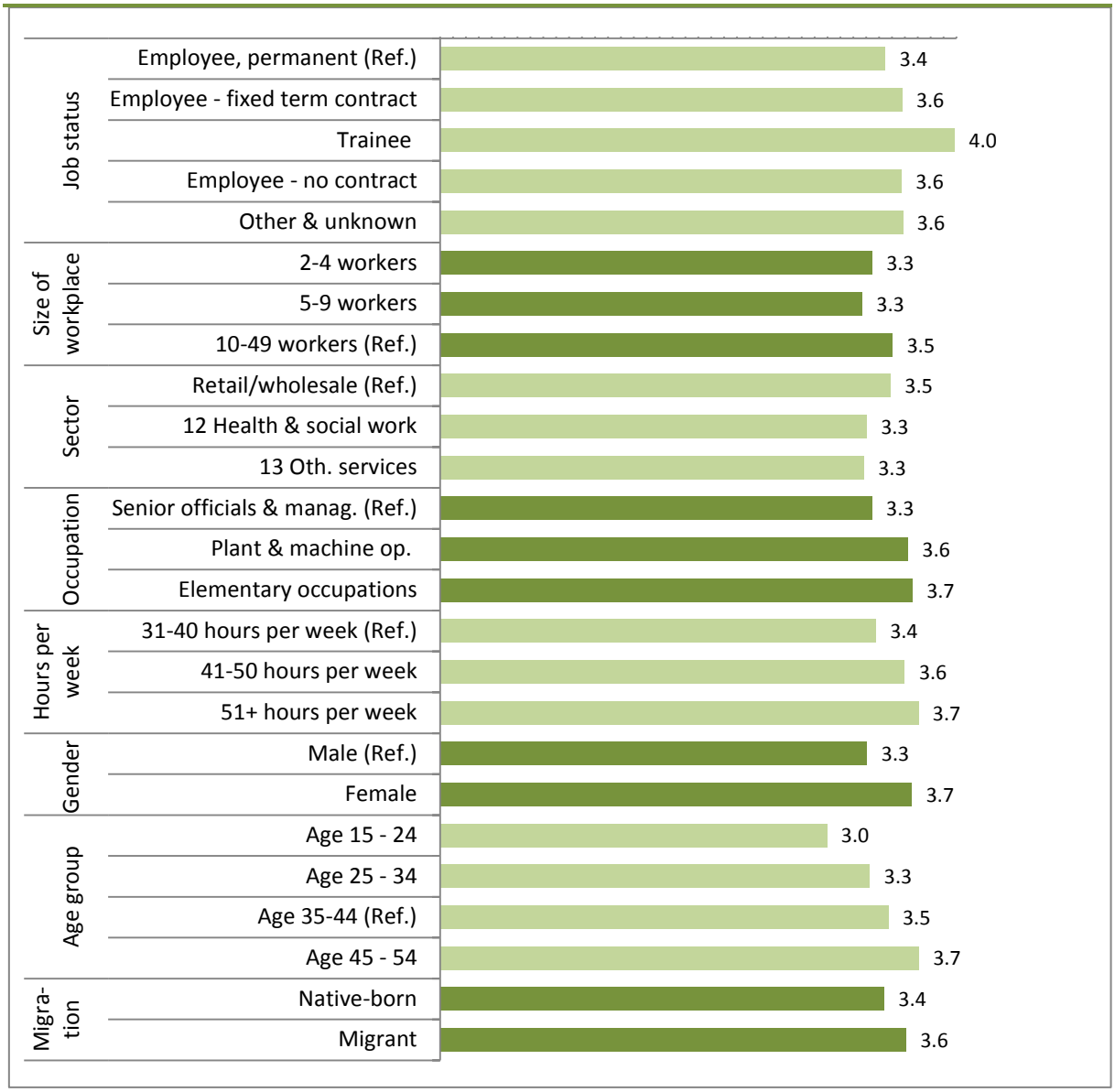


Source: European Working Conditions Survey, 2010, analysis by authors. Net figures based on Model B in Appendix Table A4.2.

Figure 4.8 shows the significant associations between level of mental distress and the characteristics of jobs and workers. Only the patterns that are significantly different from the reference category are shown. These figures are calculated from Model B in Appendix Table A4.2. The models assume that differences by gender, age group and so on are similar across countries and we report later the results of tests that indicate some differences from this general pattern in Ireland (Table 4.1).

As shown in Figure 4.8, the difference made by these job and individual characteristics is relatively modest. In terms of the variance explained, the country on its own accounts for about 4 per cent of the variation in mental distress, as can be seen from the r-squared statistic in Appendix Table A4.2. When we add the characteristics of jobs and workers, this increases to 7.5 per cent.

FIGURE 4.8 Adjusted Level of Mental Distress by Selected Characteristics of Jobs and Workers (Mean on 0 - 10 Scale, where 10 = High Distress)



Source: European Working Conditions Survey, 2010, analysis by authors. Figures based on Model B in Appendix Table A4.2.

Figure 4.8 shows that job status, size of workplace, sector, occupation, hours worked, gender, age and migration have a significant association with mental distress. In terms of job status, trainees again emerge as disadvantaged, with an adjusted average score of 4 on the mental distress scale compared to 3.4 for permanent employees. The level of mental distress is also higher for employees on a fixed-term contract, at 3.6. Smaller workplaces (but not people working alone) tend to be associated with slightly lower levels of mental distress, while the levels tend to be higher in workplaces where the number of employees is unknown or is variable.

In terms of sector, there is a small reduction in the health and social work sector and the other services sector compared to retail and wholesale. Those working in lower-skilled occupations such as plant and machine operatives (with an adjusted mean of 3.6) and those in elementary occupations (3.7) have higher levels of adjusted mental distress than senior officials and managers (3.3). Those working longer hours also experience elevated levels of mental distress at 3.6 to 3.7 compared to 3.4 among those working 31 to 40 hours per week.

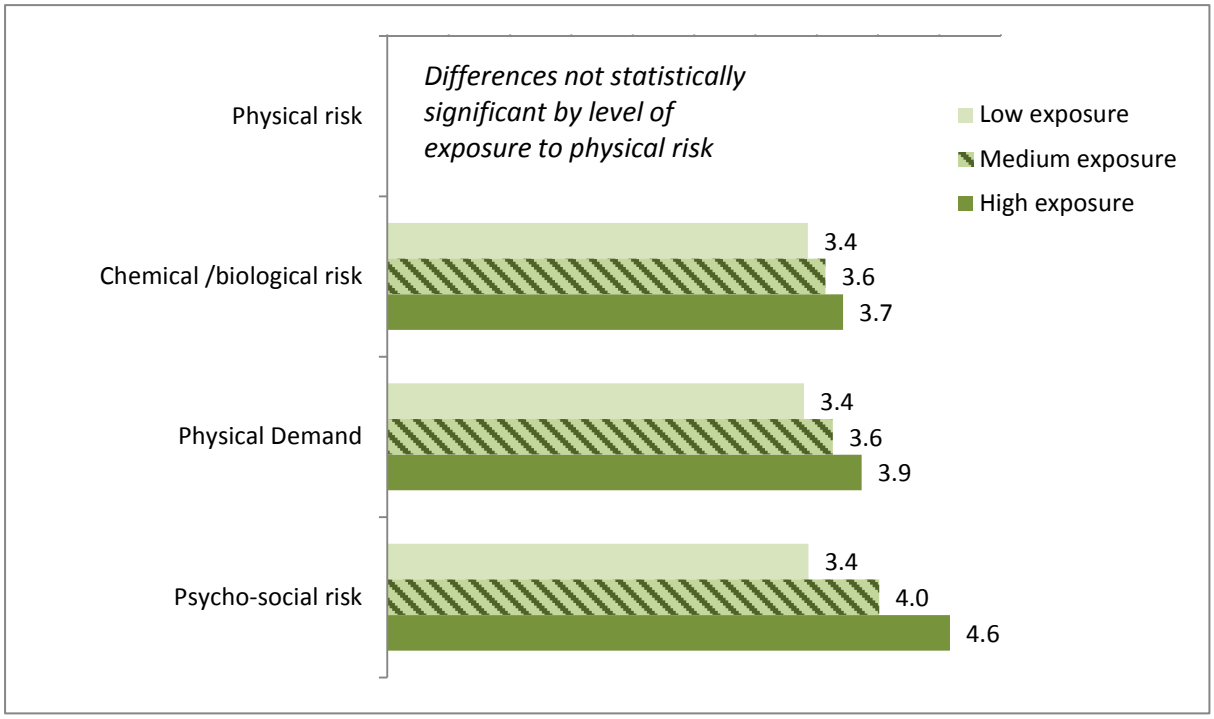
In terms of individual characteristics, women have a higher adjusted risk of mental distress than men (3.7 compared to 3.3) and the level of mental distress tends to be higher among older than younger workers (ranging from 3.0 for those aged 15 to 24, to 3.3 for those aged 25-34, 3.5 for those aged 35 to 44 and 3.7 for those aged 45-54). The workers aged 55 and over do not differ significantly from the reference group aged 35 to 44, however. Finally, the level of mental distress is slightly higher for migrants (3.6 compared to 3.4 for native-born workers).

It is worth noting that there is no significant difference between the public and private sectors or between workers with different levels of education.

Figure 4.9 shows the association between exposure to workplace risks and mental distress. The figures are calculated based on Model B in Appendix Table A4.2. The model includes the indicators of risk exposure as continuous variables. The model results are used to calculate the expected percentage reporting mental distress where each kind of risk exposure is low (value = 0 on the 0 to 10 scale), medium (value = 5) and high (value = 10).

The estimated mean score on the mental distress scale increases from 3.4 to 3.7 as exposure to chemical/biological risk increases from its minimum to its maximum level, a difference of 0.3 on the ten point scale. The level of mental distress increased by a larger amount where work is physically demanding, from 3.4 to 3.9, an increase of 0.5 points. The largest increase is found where there is exposure to psycho-social risks in the workplace, from 3.4 to 4.6, or an increase of 1.2 on the ten point scale. Unlike physical health, there is no significant relationship between exposure to physical risk and mental distress when the other characteristics in the model are controlled.

FIGURE 4.9 Adjusted Level of Mental Distress by Exposure to Different Kinds of Workplace Risks (mean on 0-10 scale, where 10 = High Distress)



Source: European Working Conditions Survey, 2010, analysis by authors. Figures based on Model B in Appendix Table A4.2.

As in earlier analyses, we checked whether the association between mental distress and any of the characteristics of jobs or workers was different in Ireland than in other countries. All of the interactions were tested. Of the 50 interactions tested, only the five shown in Table 4.1 were statistically significant. In general, then, workplace and individual characteristics that are associated with mental distress generally in Europe are associated with mental distress in Ireland as well.

As Table 4.1 shows, there were four patterns seen in the Irish model for mental distress that were not seen in Europe generally. The first pattern is counter-intuitive in that, while there is no general association between mental distress and exposure to physical workplace risk in Europe, there is a negative association in Ireland. In other words, Irish workers who are exposed to high levels of physical risk, like vibration, noise and extremes of temperature, have a lower average score on the mental distress scale (about one point lower on the ten point scale). This may reflect selection into these occupations of people who are less likely to experience mental distress, or a selection out of these occupations (through illness, early retirement, job change and so on) of workers who do experience mental distress. This points to the need for caution in interpreting the associations as causal.

TABLE 4.1 Average Difference in Level of Mental Distress by Exposure to Workplace Risks in Ireland and other European Countries (on scale ranging from 0 to 10, where 10 = high distress)

	Overall	Ireland interaction
Physical risk (10 vs. 0)	ns	-1.010***
Joint/other sector (includes NGOs and semi-states)	ns	0.541**
Age 55 and over vs. 35-44	ns	-0.679***
Lower 2nd level ed. or less	ns	-0.543***
Higher 2nd -lo 3rd level ed.	ns	-0.453***

Source: European Working Conditions Survey, 2010, analysis by authors. Figures based on Model C in Appendix Table A4.2.

Older Irish workers are also less likely than their younger counterparts to experience mental distress (about 0.68 points lower for those aged 55 and over compared to adults aged 35 to 44 years old). This, again, may reflect a selection out of the workforce among those experiencing mental distress. On the other hand, levels of mental distress average about 0.5 higher for Irish workers in the semi-state sector (which includes NGOs).

The pattern by education is also unusual in Ireland, whereby those with lower levels of education report lower levels of mental distress than those with third-level education. There is no overall association between mental distress and level of education among workers in Europe when the other characteristics of the individual and the job are controlled. We could speculate that the unexpected pattern in Ireland may be linked to the impact of the recession on the earnings and work pressure of those with higher levels of education working in the public sector, where many professionals are employed. Alternatively, it may reflect a disproportionate loss of employment among those with lower levels of education in precarious private sector jobs, so that those remaining in 2010 are a relatively select group with more secure (and perhaps better) jobs.[16] However, a fuller investigation of these potential explanations would require considerably more analysis than the scope of the present project allows.

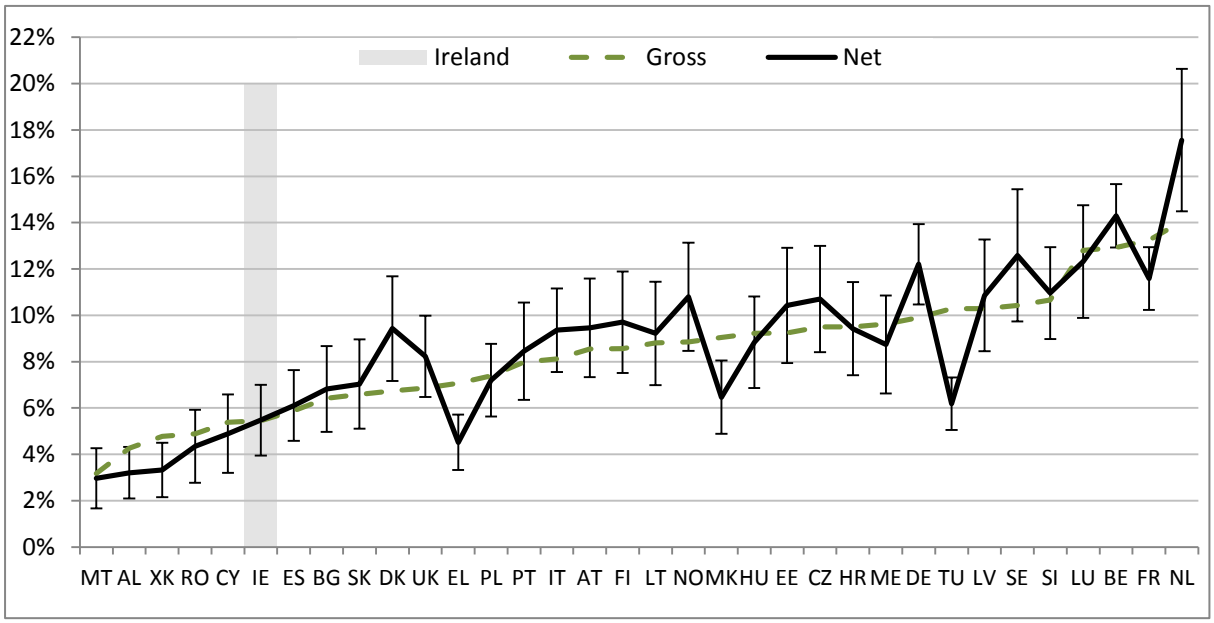
4.5 ACCOUNTING FOR DIFFERENCES IN INJURY

As noted above, the indicator of injury includes all injuries in the last 12 months, not just those that occurred in the workplace. It is similar to the indicators of health and mental distress in this respect. The logic of this approach is that it avoids any bias that might be due to the attribution of health or injury problems to work. It does have a disadvantage, however, in that the health problems or injury may have had an entirely different cause.

[16] It may also reflect non-work issues, see work on economic stress by Whelan et al.

Figure 4.10 shows the overall risk of injury as recorded in the EWCS (the gross figure), and the adjusted rate when characteristics of jobs and of workers are taken into account (the net figures). The controls for the composition of jobs and the workforce make rather more difference in the case of injury than in the case of poor health or mental distress. Nevertheless, the rate remains high in the Netherlands and Belgium and low in Malta. The controls make little difference to the estimated rate in Ireland and a number of other countries with relatively low overall injury rates, such as Malta, Cyprus, Spain, Bulgaria and Slovakia. When we control for other characteristics, the rate would be reduced substantially in Greece, Macedonia and Turkey but would be even higher in Denmark, Germany and the Netherlands. The high rate of injury in the Netherlands, then, is not accounted for by the characteristics of the jobs and workforce that we have included in the model.

FIGURE 4.10 Country Differences in Injury Rate (%) Before and After Controlling for Composition of Jobs and Workforce in 2010

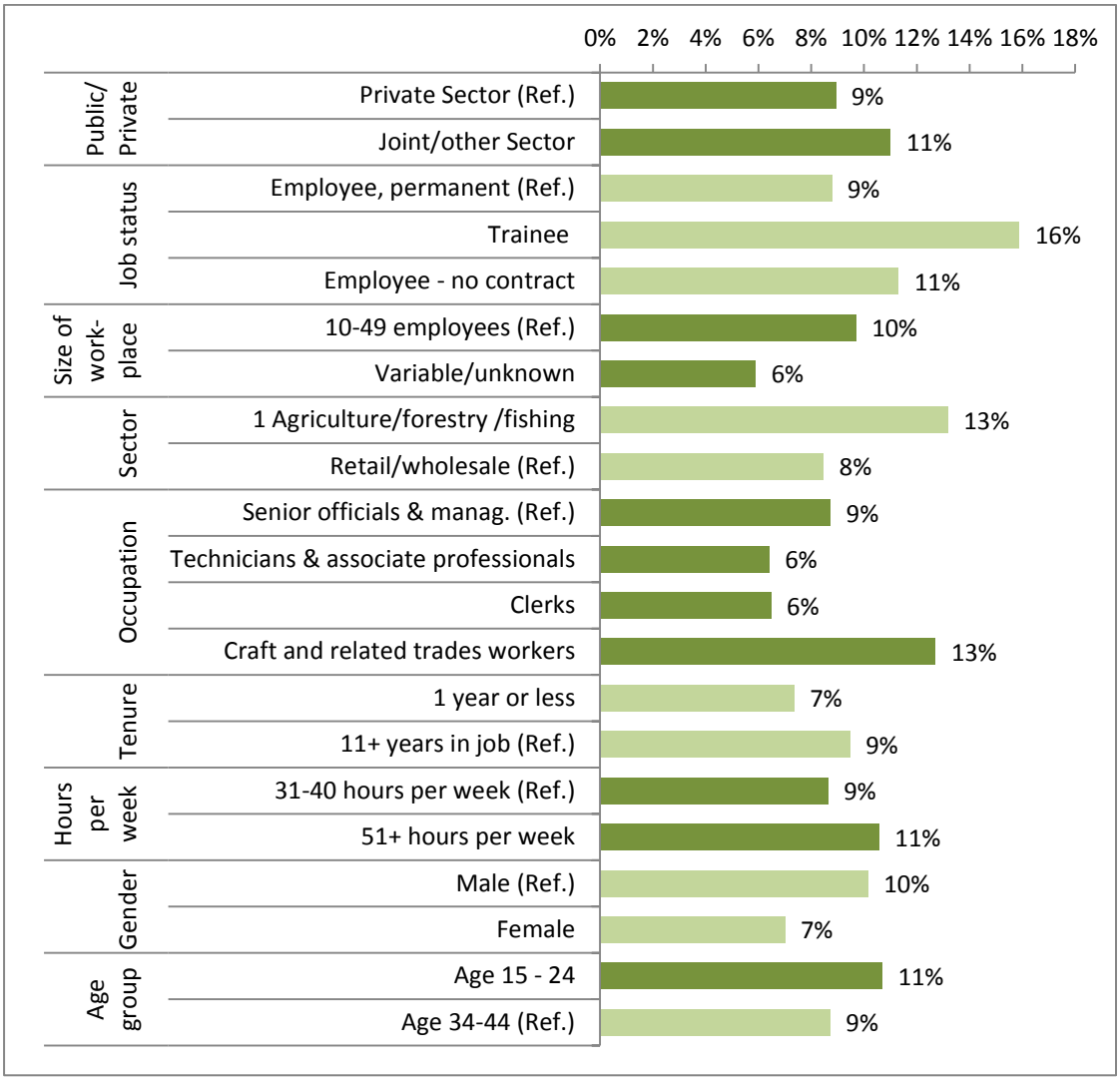


Source: European Working Conditions Survey, 2010, analysis by authors. Net figures are based on Model B in Appendix Table A4.3. Error bars show the limits of the 95 per cent confidence interval for the model estimated injury rate.

In Figures 4.11 and 4.12 we show the characteristics of jobs and workers that were significantly associated with differences in the risk of injury. The figures show the general pattern across European countries. As we show below, there is only one association that is significantly different for Ireland. The figures in Figure 4.11 are based on a model where exposure to risk is controlled. The patterns in Figure 4.11 point to the importance of job status, sector, occupation and age group. Trainees have the highest estimated risk across job status categories, at 16 per cent compared to 9 per cent for permanent employees. In terms of sector,

the risk of injury is higher in the combined public/private sector (at 11 per cent) than in the private sector and is higher in agriculture, forestry and fishing (13 per cent) than in retail and wholesale (8 per cent). In terms of occupation, the risk of injury is significantly lower for clerical workers and for technicians and associate professionals (at 6 per cent) than for the reference occupational group of senior officials and managers (9 per cent) and is significantly higher for craft and related trades workers.

FIGURE 4.11 Adjusted Risk of Injury by Selected Characteristics of Jobs and Workers



Source: European Working Conditions Survey, 2010, analysis by authors. Figures derived from Model B in Appendix Table A4.3, using the 'margins' command in Stata.

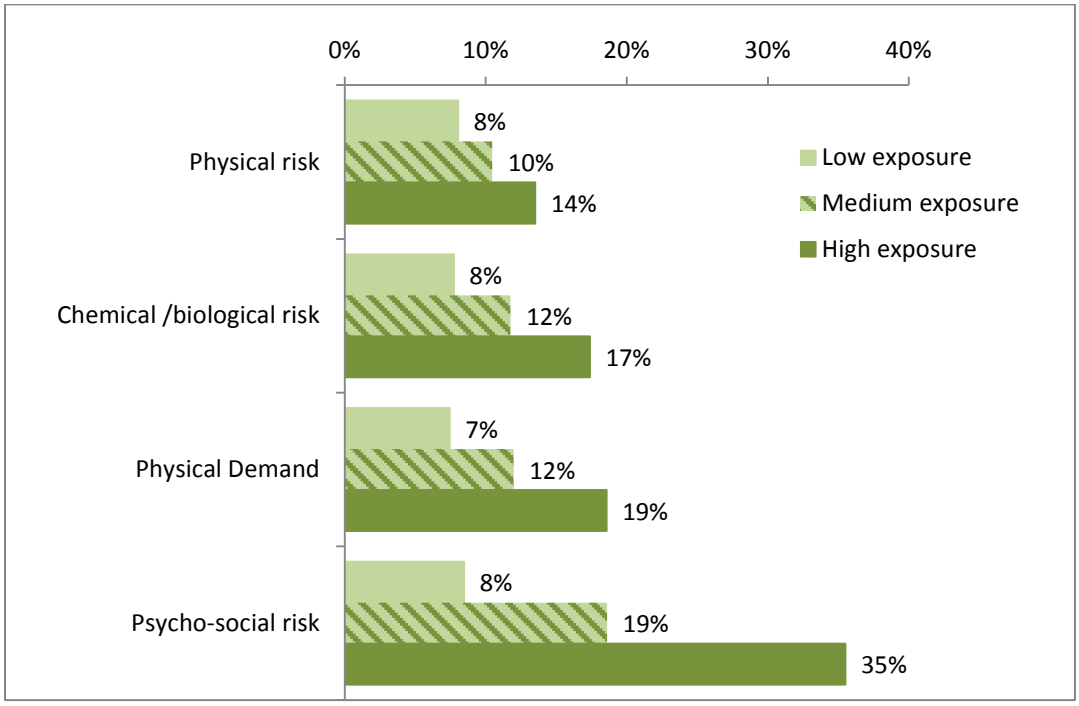
It is worth noting that it is occupation rather than industrial sector that is capturing the higher risk of injury in construction; many craft and related trades workers such as bricklayers, plumbers, carpenters and electricians are employed in the construction sector. When we control for sector and occupation, job tenure shows an unexpected pattern, in that workers with less than one year on

the job have a lower estimated risk than those with job tenure of eleven or more years. As we saw in the case of poor health and mental distress, those working longer hours are at higher risk of negative outcomes: the estimated risk of injury is 11 per cent for those working 51 or more hours per week compared to 9 per cent among those working 31 to 40 hours per week.

In terms of worker characteristics, males (10 per cent) and workers under age 25 (11 per cent) are estimated to have a higher risk of injury than females (7 per cent) or workers aged 34 to 44 (9 per cent). These results are consistent with the pattern of non-fatal work-related injury in Ireland, as measured by a special module to the Quarterly National Household Survey (Russell et al., 2015). This analysis confirmed the finding of higher workplace accident rates for men and younger workers.

Figure 4.12 shows the estimated risk of injury at different levels of exposure to physical, chemical/biological, physical demand and psycho-social risks. The figures are calculated from Model B in Appendix Table A4.3, where exposure to each of the different kinds of risk is treated as a continuous variable. As before, we show the estimated probability of injury when each of these workplace risks is low (0 on a scale of 0 to 10), medium (5) and high (10).

FIGURE 4.12 Adjusted Risk of Injury by Exposure to Different Kinds of Workplace Risks



Source: European Working Conditions Survey, 2010, analysis by authors. Figures based on Model B in Appendix Table A4.3, derived using the margins command in Stata.

An analysis of the QNHS module on occupational injury for Ireland (Russell et al., forthcoming) also found a higher risk for workers in the agricultural/forestry/ fishing sector, who were almost twice as likely as those in services (excluding health, retail/wholesale, and accommodation) to have been injured in work. In addition, sector specific comparisons by Eurostat across nine of the EU15 countries suggest that the fatality rates in agriculture, forestry and fishing in Ireland are amongst the highest observed (Russell et al., 2015). However, retail/wholesale workers in Ireland also had a higher injury risk (1.4 times greater) than other service sector workers, a finding which does not appear to be general across other European countries.

Although workers with shorter job tenures (less than one year) appear to be less at risk of injury, this may reflect differences in exposure: they have had less time at work in the previous year in which they might have been injured. The analysis of the QNHS data for Ireland found that those with shorter job tenures of less than one year had a significantly higher injury risk once an adjustment was made for exposure. The data in the EWCS were not detailed enough to allow this kind of adjustment.

We can see in Figure 4.12 that as exposure to each of the workplace risks rises, there is an increase in the probability of injury. The association is particularly strong for psycho-social risks where there is a difference of 27 percentage points between the estimated risk of injury of those with the lowest exposure to this risk factor compared to those with the highest risk of exposure (8 per cent and 35 per cent, respectively). There is also a strong association with physically demanding work, where the estimated risk of injury is 7 per cent among those with the lowest level of exposure and 19 per cent among those with the highest risk of exposure. The pattern is not as strong, but remains statistically significant, for physical risk (with a range of six percentage points between those with the highest and lowest exposure) and chemical/biological risk (with a range of nine percentage points).

We also tested whether the impact of these job and individual characteristics differed in their association with the risk of injury in Ireland compared to other countries. Only one of the possible interactions was statistically significant. In general, employees with no contract are more likely than those with a permanent or indefinite contract to report having been injured in the previous year, (odds are about 39 per cent higher), but there is no significant difference between the two groups in Ireland.

TABLE 4.2 Differences between Ireland and Other European Countries in the Association between Job Characteristics and Risk of Injury, 2010 (Odds Ratios)

	Overall	Ireland
Job status employee, no contract vs. permanent employee	1.387**	n.s.

Source: European Working Conditions Survey, 2010, analysis by authors. Figures based on Model C in Appendix Table A4.3.

4.6 SUMMARY

The analyses in this chapter focused on three outcomes for workers: poor health, mental distress and injury. Analysing the data for 2010, we examined the extent to which variations in these outcomes were associated with characteristics of their jobs, including exposure to workplace risks, and characteristics of the workers themselves.

We observed large differences between the countries, but cautioned that the pattern of differences pointed to the adoption of different thresholds across countries, particularly for injury. The rates were high in many continental countries where other indicators of injury indicate a relatively low rate.

We examined the association between self-rated poor health, mental distress and injury, and aspects of the composition of jobs and of the workforce. The characteristics of jobs included in the models included status in employment and contract type, sector, occupation, job tenure, hours worked, size of organisation and level of exposure to the different types of workplace risk: physical, chemical/biological, physically demanding work and psycho-social risk. The characteristics of the individuals were gender, age, migration, and level of education.

There were large differences in self-rated poor health by age group, with rates that were 39 per cent for workers over age 55 compared to 10 per cent for workers aged 15 to 24. The risk of mental distress was higher for older workers, with other characteristics controlled, and also for trainees, women, those in unskilled occupations and those working longer hours. We also see a higher risk of injury among trainees (16 per cent compared to 9 per cent among permanent employees), as well as among those in agriculture, forestry and fishing (13 per cent), those in craft and trade occupations (13 per cent) and workers aged 15 to 24 (11 per cent).

Poor health is significantly increased where there is higher exposure to physical risk, physically demanding work and psycho-social risk, with particularly strong associations with the latter two. The relationship to chemical/biological risk is not statistically significant with other factors, including the other types of risk, controlled.

Mental distress was significantly associated with exposure to chemical/biological risk, physically demanding work and, especially, psycho-social risk. The gap in mental distress scores between workers with the highest levels of exposure to psycho-social risk and the lowest level is 1.2 points on the ten point scale, with other characteristics controlled.

Each of the workplace risks was also associated with an increase in the risk of injury, with a particularly strong association in the case of exposure to psycho-social risk (35 per cent among those with the highest level of exposure compared to 8 per cent among those with the lowest level of exposure).

We tested models with interaction terms to investigate whether the association between the worker outcomes and job and worker characteristics were similar in Ireland to other countries. There were no differences in the case of the association with poor health. There were some differences between Ireland and other countries in the association with mental distress. The level of mental distress is lower than elsewhere in Ireland among workers exposed to physical risk; those over age 55; those with lower levels of education. On the other hand, the levels are higher than in other countries among those in the semi-state sector (including NGOs). These differences do not have a clear interpretation and may reflect differential selection into occupations and sectors rather than a causal relationship.

There was just one difference between Ireland and the other countries in the association with injury. In general, employees with no contract had odds of injury that were about 39 per cent higher than permanent employees, but this difference was not found for Ireland.

In general, workers who were themselves born outside the country of residence or whose parents were born outside the country of residence experienced poorer health and higher levels of mental distress, but did not differ from native-born workers in terms of the risk of injury. A test of the interactions showed that migrants in Ireland did not differ significantly from this general pattern. This

contrasts with work on trends in workplace injury and illness in Ireland, which found a lower rate of injury among non-Irish nationals, although the difference is not statistically significant if we exclude those who were in the job for less than one year (Russell et al., 2015). There are also some differences in measurement between the analysis here and that by Russell et al. which uses a measure of migration that is based on the respondent's own place of birth (i.e. not counting second generation migrants). In addition, the indicators of illness and injury are specifically work-related in Russell et al., whereas in the present analysis, the illness or injury need not have been work-related. The Russell et al. analysis is also specific to Ireland, with a larger sample for Ireland than the present analysis which covers 34 European countries but has a smaller sample for Ireland.

Chapter 5

Conclusions

5.1 INTRODUCTION

The issue of health and safety at work, alongside adequate income and job security, is an important component of the 'decent' work agenda of the International Labour Organisation (Anker et al., 2003). It is also important to issues of competitiveness, productivity and the sustainability of social protection systems (European Commission, 2014, p.2). In this report, we draw on the European Working Conditions Surveys (EWCS) for 2005 and 2010. The analysis complements other work that focuses specifically on Ireland. The value of the comparative perspective is that it allows us to say whether Health and Safety policies in Ireland could learn from experience elsewhere or must reflect the specific contextual factors in Irish workplaces. The inclusion of the two time periods is also valuable, given the dramatic impact of the Great Recession on employment in the EU, and especially in Ireland.

At the start of this report we identified the three main research questions:

1. How did risk factors in Ireland compare to those in other European countries in 2010 and to what extent are differences due to the composition of the workforce, the composition of jobs and country group/regime?
2. How did these risk factors change between 2005 and 2010, with the onset of the Great Recession, both in Ireland and elsewhere?
3. How strong is the association between these risk factors and negative outcomes (such as health problems, reduced wellbeing, injury) for the individual worker?

   Does the association differ in Ireland compared to other European countries?

In the following, we draw together the findings in order to answer these questions and draw out the implications for policy in Ireland. We also highlight a number of issues that warrant further research or data collection.

5.2 WORKPLACE RISKS IN IRELAND IN COMPARATIVE PERSPECTIVE, 2010

We examined exposure to four different kinds of workplace risk in 2010, analysing the data from 34 countries. Physical risk involves exposure to vibration from tools or machinery, loud noise and extremes of temperature. Chemical/biological risk involves exposure to smoke, fumes, dust, vapours, skin contact with chemicals or contact with potentially infectious materials. Physically demanding work requires painful or tiring positions almost all the time, lifting or moving people, carrying or moving heavy loads or constant repetitive hand or arm movements. Psycho-social risks include unwanted sexual attention, physical violence in the last 12 months or bullying or harassment in the last 12 months. Each of these is measured on a scale that ranges from 0 (no exposure) to 10 (highest level of exposure).

We found that, after controlling for characteristics of jobs and of workers, the level of exposure to physical, chemical/biological and physical demand risk in Ireland was towards the middle part of the Europe-wide distribution. In common with many other Western European countries, the level of exposure to psycho-social risk was high. The finding of a higher reported level of exposure to psycho-social risk in the wealthier countries might be linked to a heightened awareness of the right to be treated with dignity in the workplace.

Countries differ in the organisation of work and the relationship between workers and management. Based on existing literature, we anticipated that this might be related to differences between countries in exposure to workplace risks. Contrary to our expectations, however, we found that the classification of countries into these 'employment regimes' accounted for very little of the pattern of differences between countries. The differences between countries within a given regime were much more marked than the average differences between regimes. The level of exposure to risk in Ireland was similar to the UK, the other country typically classified as having a 'liberal' employment regime. However, there were substantial differences between countries within each of the other regimes, even after controlling for the composition of jobs and workers. In other words, the classification of countries into employment regimes added little to our understanding of country differences in exposure to risks in the workplace.

Within countries, there was a social pattern to risk such that the jobs that tend to be poorly paid and less secure were also the ones that had a higher level of exposure to workplace risks. Across all countries, the characteristics of jobs were quite important in accounting for differences in exposure to workplace risks, particularly industrial sector and occupation. The levels of exposure tended to be

higher in particular sectors (agriculture, forestry and fishing, construction, manufacturing, mining and quarrying) and particular occupations (lower-skilled and manual occupations). This pattern was true of exposure to physical, chemical/biological and physical demand risk. Exposure to psycho-social risk was unusual in that characteristics of jobs and of workers were less important in accounting for variation in the risk of exposure to this type of risk.

In general, Ireland was similar to other European countries in the associations between the characteristics of jobs and workers and exposure to risks, with only a small number of distinctive patterns.

5.3 CHANGE IN EXPOSURE TO WORKPLACE RISKS BETWEEN 2005 AND 2010

The second main group of analyses was designed to examine how exposure to the four different types of workplace risk changed between 2005 and 2010. In this analysis we included the 30 countries which were included in both the 2005 and 2010 rounds of the EWCS. We might expect substantial change as a result of the recession, though it is difficult to anticipate in advance the direction of change when it comes to workplace risks. On the one hand, an economic downturn might be associated with a disproportionate loss of jobs in more marginal employment characterised by unsafe working conditions. This might result in an improvement in the risk profile of the remaining jobs. On the other hand, economic pressures to cut costs may result in cuts to health and safety procedures and personnel, leading to an increased exposure to risk.

In this analysis we first asked whether there was a significant change in the level of exposure to each time of risk and whether this change differed by country. In the second part of the analysis, we asked whether there was a significant change over time in the association between risk and the characteristics of jobs and workers. In other words, was there any evidence that certain types of jobs were becoming more risky or less risky.

5.3.1 Overall Change in Exposure to Risk

In general across the 30 countries, we saw a small fall in exposure to physical risk, which was mainly accounted for by shifts in the composition of jobs and workers, but an increase in exposure in three countries: Ireland, Luxembourg and Turkey. There was no clear association between the changes in exposure and the extent to which the countries were hit by the recession. In spite of the increase in Ireland, the level of exposure to physical risk in 2010 remained relatively low.

There was also a general fall in exposure to chemical/biological risk, including in Ireland. About half the countries, including Ireland, experienced no change in the level of exposure to physically demanding work, while most of the remainder experienced a reduction in exposure.

There was a more substantial fall in the level of exposure to psycho-social risk, especially in countries like Finland and the Netherlands where levels had been highest in 2005. The fall in Ireland was not significantly different from the fall in most countries.

Note that these figures refer to changes over time in exposure to a range of different types of workplace risk rather than to the outcome for workers. An analysis of trends in workplace illness and injury in Ireland, based on an analysis of the Quarterly National Household Survey module on Health and Safety in the Workplace, found that the rate of workplace illness and injury fell between 2001 and 2012 (Russell et al., 2015). The authors find that the sharpest reduction in the injury rate occurred between 2008 and 2009 and was associated with the change in composition of jobs and workers with the recession, including the fall in employment in construction. The results here pointed to a mixed pattern in terms of exposure to workplace risks in Ireland, with a small increase in exposure to physical risk; little change in exposure to physically demanding work; a small fall in exposure to chemical/biological risk and a more substantial fall in exposure to psycho-social risk.

In terms of the overall change over time, then, there was a small fall in the exposure to physical and chemical/biological risk and to physically demanding work, while there was a more substantial fall in the level of exposure to psycho-social risk. Ireland differed from this general pattern with respect to physical risk (which increased slightly in Ireland) and physically demanding work (no change over time in Ireland).

5.3.2 Change in Correlates of Exposure to Risk

A second aspect of the research question regarding change over time concerned whether there was a general shift in the association between workplace risk and characteristics of jobs and workers. A small fall in exposure overall, for instance, might mask a more substantial fall in some industries and an increase in others. In general, most of the associations that were present in 2010 did not differ significantly from those found in 2005. So as well as examining whether the

change differed by country, as described above, we examined whether the change differed by characteristics of jobs and workers. This analysis was conducted across the 30 countries present in the 2005 and 2010 datasets.

We found some changes over time across the 30 countries in the association between exposure to physical risk and job or worker characteristics. The relative advantage experienced by some groups had narrowed. For instance, workers in the financial, real estate and business services sector and workers with third-level education were less distinctive than the reference categories (retail/whole sector and workers with higher second level education, respectively). On the other hand, the gap between managers and officials, on the one hand, and unskilled workers in elementary occupations had increased. By 2010, the unskilled workers had a level of exposure to physical risk that was 0.9 points higher than managers and officials on the ten point scale, compared to a gap of 0.6 points in 2005.

Unskilled workers in elementary occupations also experienced an increase in exposure to chemical/biological risk compared to managers and officials, with the gap increasing from 0.6 points in 2005 to 0.8 points in 2010 on the ten point scale. Apart from this increase in the disadvantage faced by unskilled workers, the other significant changes over time represented a weakening of the association between job or worker characteristics and exposure to chemical/ biological risk. As with physical risk, the advantage experienced by those with degree-level education narrowed over time in terms of exposure to chemical/ biological risk. There was a weakening of the differences between economic sectors. The higher risk of exposure among those in agriculture, forestry and fishing in 2005 had disappeared by 2010 and the higher risk among those in the construction sector had become less pronounced. Where recently-hired workers in 2005 had a higher risk of exposure to chemical/biological risk than workers with more than ten years tenure, this was no longer the case in 2010.

We also saw a weakening of the association between certain characteristics of jobs or workers and the level of exposure to physically demanding work. The gap between officials/managers and certain other occupations narrowed (technicians and associate professionals; craft and trades workers); the difference between those working full-time and those working part-time (who had a higher level of exposure in 2005) narrowed; the difference between younger workers, who had a higher level of exposure in 2005, and older workers also narrowed.

In terms of exposure to psycho-social risk, apart from an increase in the risk of exposure among the self-employed,[17] there was a narrowing of other differentials with a larger fall in many public sector jobs that had a high level of exposure in 2005. Compared to the retail and wholesale sector, the higher levels of exposure experienced by workers in education and in public administration and defence had disappeared, while the higher level experienced by workers in the health and social work sector had been reduced. The advantage experienced by workers in the financial, real estate and business service sector had also disappeared. The association between long hours and exposure to psycho-social risk had become non-significant.

It is worth repeating that the general pattern of association between job and worker characteristics across the 30 countries remained unchanged over time. Of the more than 50 contrasts we examined for each of the four types of risk, only a handful were different in 2005 from the pattern in 2010. More often than not, the changes took the form of a narrowing of differentials between groups of workers. The exception, of course, was the increase in exposure to physical and chemical/biological risk among unskilled workers in elementary occupations.

5.4 WORKPLACE RISKS AND WORKER OUTCOMES, 2010

We examined the impact of exposure to workplace risks, controlling for other job and individual characteristics, on three outcomes: self-rated poor health, mental distress measured on the basis of the WHO 5-item scale, and injury experienced in the last year. None of these indicators is linked specifically to work; the work-relatedness could not be explored as the question wording related to any illness or injury. The advantage of this approach is that it avoids any potential bias due to differences in attribution of illness or distress to working conditions. Such biases may be linked to level of education and knowledge of the impact of the impact of work on health and wellbeing. This logic may have less merit in case of injury, because it is often clearer where the injury occurred, but it is not possible to exclude non-work injuries given the way the question is asked in the 2010 EWCS.

In Chapter 4 we noted that there appear to be differences between countries and cultures in the thresholds adopted, such that the percentages reporting poor health or injury are higher in some countries than would be suggested by other indicators of population health and injury rates. As a result, we caution against drawing conclusions about the differences between countries in the levels of

[17] Violence and harassment need not be from supervisors, managers or co-workers but might come from members of the public, clients, customers or employees.

health, injury or mental distress. Instead, we focus on the associations between these outcomes and characteristics of jobs and workers, particularly in the association with exposure to the different types of workplace risk.

The strongest associations in the case of self-rated **poor health** are by age of the worker and exposure to workplace risks. Self-rated poor health is more often reported by older workers, and among those exposed to physical risk, physically demanding work and psycho-social risk. The increase in the percentage reporting poor health between those with the lowest and the highest level of exposure to these risks was five percentage points in the case of physical risk, 22 percentage points in the case of physically demanding work and 29 percentage points in the case of psycho-social risks. These associations are similar in Ireland to other countries.

The second outcome, **mental distress** was measured on a ten-point scale and was also influenced by both characteristics of the job (those exposed to workplace risks, trainees and those in unskilled occupations or working long hours) and of the worker (higher among older workers and women). The level of mental distress was considerably higher in the context of exposure to psycho-social workplace risks (by 1.2 points on the ten point scale), as we might expect, but was also increased where the worker was exposed to chemical/biological risk (by 0.3 points) or physically demanding work (by 0.5 points).

There were some differences between Ireland and the European average in the association between mental distress and job or worker characteristics. The level of mental distress is lower than elsewhere among Irish workers exposed to physical risk; those over age 55 and those with lower levels of education. Levels are higher than in other countries among those in the semi-state sector. Some of these patterns may reflect country differences in the selection into certain jobs (such as those involving physical risk) or country differences in early retirement rates among workers experiencing mental distress. The impact of the recession and austerity measures on funding for NGOs and semi-state organisations in Ireland may also have contributed to increasing worker stress in these sectors.

The third outcome was **injury**. The risk of injury was higher among males, younger workers and also among trainees, those working in the agriculture, forestry or fishing sector and those working in craft and related trades occupations. The differences by gender, age and sector were consistent with findings for Ireland based on an analysis of the Quarterly National Household Survey Health and Safety module (Russell et al., 2015). The risk of injury was

higher among those exposed to each kind of workplace risk. The gaps between those with the highest and lowest levels of exposure were 6 percentage points for physical risk, 9 percentage points for chemical/biological risk; 12 percentage points for physically demanding work and 27 percentage points for those exposed to psycho-social risk. The patterns were generally similar in Ireland to other countries. The only exception was the Irish workers with no formal contract did not have a higher risk of injury than permanent employees as was found in Europe generally.

Because of differences in measurement between 2005 and 2010, we did not examine changes over time in the risk of illness, mental distress or injury. Nevertheless, as noted above, we were able to examine change over time in the level of exposure to workplace risks (physical, chemical/biological, physical demand and psycho-social). Our findings pointed to a reduction in exposure to psycho-social risks, one of the aspects of the workplace which was most strongly associated to negative outcomes for workers.

5.5 WHERE IS IRELAND DIFFERENT?

Throughout the report, the analysis was conducted on a dataset that included 30 European countries (or 34 in the case of analyses for 2010). This allowed us to take advantage of a very large sample in examining (a) the association between workplace risk and characteristics of the job and worker; and (b) the association between negative outcomes such as poor health, mental health problems or injury and characteristics of the jobs and workers. Where there were at least 50 cases in a category in the Irish 2010 data, we were able to test whether the pattern was different in Ireland to the general pattern. There were only a small number of instances where this test could not be done because the sample size was too small. These included trainees; agency or temporary workers; those in agriculture, forestry and fishing; mining and quarrying; electricity, gas and water supply; public administration and defence; and armed forces. Given the concern with risk to temporary workers and in sectors such as agriculture, this is unfortunate. However, in other work based on the Quarterly National Household Data for Ireland, we were able to examine whether the level of risk was different for these smaller groups of workers (e.g. Russell et al., 2015).

In general, most of the interactions were not statistically significant when examining exposure to workplace risks. This indicates that Ireland was similar to the other countries in terms of the job and individual characteristics that were related to such exposure. There were some differences in Ireland, but there was no tendency for the same groups or jobs to have a higher or lower level of risk

exposure across all types of risk. For instance, the gap in exposure between Irish skilled craft workers and managerial workers was larger than in other European countries for physical risk and chemical/biological risk, but was not significantly different to other countries in the case of physically demanding work or psycho-social risk.

When we focused on worker outcomes in 2010, we found that Ireland was similar to other countries in terms of most of the worker and job characteristics associated with poor health, mental health problems and injury. There were no differences when it came to self-rated poor health. In terms of the factors associated with mental distress, most of the patterns were similar in Ireland to those in other countries. We found that a small number of associations were weaker in Ireland (such as exposure to physical risk, older age and lower education) but there was a stronger link between semi-state employment and mental distress. Finally, in examining injury there was only one pattern that was different for Ireland: the contrast in injury risk between employees with no contract and permanent employees was smaller in Ireland than elsewhere. Overall, then, the negative worker outcomes were shaped by substantially the same factors in Ireland as elsewhere.

5.6 LIMITATIONS AND FURTHER RESEARCH

One limitation of the present analysis, as noted in Chapter 1, is that the EWCS does not have data on people who may have left a job because of illness or injury. For this reason, the survey does not capture the most severe impacts on employee wellbeing. Future research could supplement this analysis by drawing on surveys of the general population to investigate the extent to which workplace injury or work-related illness accounted for people leaving employment.

Another limitation is that, like any analysis of cross-sectional survey data, the results may be biased by potential endogeneity. An association does not necessarily indicate causation. In the present set of analyses, this needs to be kept in mind in the focus on worker outcomes such as self-rated health and mental distress. For instance, workers experiencing mental distress or poor health might also have a heightened perception of the workplace as hazardous, leading to a higher level of reported exposure to workplace risk. We have included controls in the models for a large number of other factors that might be related to the perception of risk, such as age, gender, job tenure, level of education. Nevertheless, it is never possible to be completely confident that the relationships observed in cross-sectional data are causal.

A final caveat concerns the possibility that there may be differences between the countries in the way the questions are answered. This is likely to be more of an issue where the questions are general, such as the item on self-rated health or the question on injury. It is for this reason that we caution against comparing average levels on the general health item across countries but focus instead on how health is related to workplace experiences. In contrast, the indicators of workplace risk were based on more specific questions about working conditions such as exposure to vibration, fumes, and having to lift heavy objects. The issue of potential differences in answering general items could be addressed in future research by repeating some of the analyses of outcomes using some of the more specific health outcomes (such as the presence of backache, respiratory difficulties or cardiovascular problems) recorded on the EWCS.

There are a number of other fruitful areas of research that could take this further. In particular, there are aspects of the work and of the workplace that might be expected to ameliorate the impact of risks on outcomes for workers or even to reduce exposure to risk. Many of these are of particular relevance to employees and were beyond the scope of the present project which emphasised aspects of the work that were relevant to the self-employed as well. These include an examination of the impact of employee representation on both exposure to risk and, given a certain level of exposure, on outcomes for workers. Other aspects of the workplace that may mediate the impact of risk on outcomes include work pressure (time pressure, overall pressure, and cognitive demand), autonomy, control over the pacing or quantity of work, consultation and the supportiveness of the supervisor and work colleagues. Indeed, the finding here that exposure to risk was not strongly structured by the welfare regime to which a country belonged may simply indicate that a narrower focus is required. It may well be the case that occupation and industrial sector are the primary determinants of exposure to workplace risk, but that aspects of the organisation of work (structured by the welfare regime) are important to the protection of workers at a given level of risk exposure.

One of the interesting findings here was the substantial drop in exposure to psycho-social risk between 2005 and 2010. This may have been linked to policy changes in areas outside the health and safety area, such as equality policies or work-life balance initiatives. Future work could fruitfully explore the extent to which there were health and safety initiatives or changes in the areas of equality policies or work-life balance initiatives that may have accounted for this drop in the risk of exposure to psycho-social risks.

The increase in exposure to physical risk in Ireland between 2005 and 2010 is something that warrants further exploration. This does not appear to be due to changes in the composition of jobs or the workforce insofar as we were able to measure them in the present analysis. It would be important to understand whether this increase represents a response to the economic and other pressures associated with the recession or to some other change in workplace practices.

Finally, once the data for 2015 becomes available, it will be possible to examine how exposure to workplace risk has evolved as Ireland and other countries move from recession into recovery.

5.7 POLICY IMPLICATIONS

The results indicated that there is a significant social patterning to exposure to workplace risks. Those jobs exposed to the highest risks are often those that are also disadvantaged in other respects, such as pay, job security and working conditions. Controlling for sector, those in lower-skilled and manual occupations had a higher level of exposure to physical, chemical/biological risk and physically demanding work. The sectors where risk was highest were agriculture, forestry and fishing, mining and quarrying and manufacturing. This points to a continuing need to target health and safety policies towards these sectors and occupations.

The findings pointed to a significant association between workplace risks and negative outcomes for workers, even when controlling for other characteristics such as gender, age and level of education. Apart from any impact on job satisfaction, the findings suggest that the physical and mental health of workers are also influenced by exposure to risk in the workplace.

The association between negative outcomes and psycho-social risks is particularly striking. It was not surprising to find mental distress associated with psycho-social risk, but the relationship between psycho-social risk and the other outcomes (general health and injury) was also very strong. Although exposure to unwanted sexual attention, physical violence, bullying or harassment is rare (with an average score ranging from 0.05 to 0.5 on the ten point scale), the findings suggest a strong potential for negative outcomes. This indicates to the need to take this form of workplace risk as seriously as the physical hazards that have been the more traditional focus of health and safety policies. Psycho-social risks are not as strongly differentiated by job and worker characteristics as the other types of risk but they tend to be more prevalent in the public sector and in the health and social work sector.

Even with exposure to these workplace risks controlled, a number of groups emerged as having an increased risk of negative outcomes in 2010. Those in sectors or occupations which are associated with lower-skilled or manual work, often the same types of job that are lower-paid and less secure, were more likely to experience negative outcomes. These included those in the agriculture/ forestry/fishing sector (injury), craft and related trades (injury), unskilled workers in elementary occupations (mental distress), trainees (mental distress, injury), and those working long hours (mental distress). The high rate of negative outcomes for these workers, even apart from their higher levels of exposure to workplace risks, points to the continuing importance of the emphasis on sectors such as agriculture and construction in Health and Safety policy.

In terms of worker characteristics, negative outcomes were more frequent among older workers (poor health, mental distress), younger workers (injury) and women (mental distress). Although the workplace risks we examined here did not account for the higher rate of negative outcomes of these groups, further research may throw light on other types of risk (such as work pressure or work-life balance) or on factors that might ameliorate the risk (such as flexibility, supportiveness of the employer, consultation and autonomy). Information on these issues would further guide policy on healthy workplaces. In this regard, the European Agency for Safety and Health at Work (EU-OSHA) has identified a number of emerging risks in the workplace, including lack of physical activity and exposure to musculoskeletal disorders (MSDs) (EU-OSHA, 2005).

The increase in exposure to physical risk in Ireland is something that warrants further exploration. This does not appear to be due to changes in the composition of jobs or the workforce insofar as we were able to determine in the present analysis. It would be important to understand whether this increase represents a response to the economic and other pressures associated with the recession or to some other change in workplace practices.

The analysis suggested that a reduction in exposure to workplace risk is possible, even in the context of recession. There was a significant fall over time in the level of exposure to psycho-social risk. The change was not accounted for by shifts in the composition of jobs, something that might be linked to the recession. There were also reductions, though more modest, in the level of exposure to chemical/ biological risk. These improvements are encouraging in that they indicate that change is possible in terms of exposure to these workplace risks.

Finally, the comparison between Ireland and other countries in the association between workplace risk and workplace characteristics or between workplace risk and worker outcomes indicated more similarities than differences. This suggests that Ireland could learn from the experience of other countries in terms of policies and interventions that have been successful in improving health and safety in the workplace.

Appendix Tables

TABLE A2.1 Regression Models for Exposure to Workplace Risks (OLS Coefficients)

		Physical Risk	Chemical/ biological	Physical demand	Psycho-social
Country	1 Belgium	0.256***	-0.103	0.822***	0.141***
	2 Bulgaria	0.545***	0.019	0.720***	-0.192***
	3 Czech Republic	-0.053	-0.078	0.257**	-0.026
	4 Denmark	0.013	-0.445***	-0.01	-0.044
	5 Germany	(base)	(base)	(base)	(base)
	6 Estonia	0.418***	0.112	0.681***	-0.171***
	7 Greece	1.066***	0.307***	1.544***	-0.058
	8 Spain	0.684***	-0.143	0.856***	-0.112**
	9 France	0.699***	0.418***	1.547***	0.250***
	10 Ireland	0.102	-0.306	0.982**	0.066
	11 Italy	0.049	-0.166*	0.703***	-0.188***
	12 Cyprus	1.106***	-0.134	1.152***	-0.168***
	13 Latvia	0.312***	0.246**	0.637***	-0.017
	14 Lithuania	0.370***	0.213*	0.525***	-0.073
	15 Luxembourg	0.681***	0.244*	1.077***	0.049
	16 Hungary	0.611***	0.374***	1.026***	-0.152***
	17 Malta	0.491***	-0.018	1.020***	-0.096*
	18 Netherlands	0.014	-0.342***	-0.003	0.135*
	19 Austria	-0.068	0.021	0.278***	0.091
	20 Poland	0.257**	-0.187*	0.431***	-0.164***
	21 Portugal	0.093	-0.457***	0.475***	-0.102**
	22 Romania	0.442***	-0.165	0.723***	-0.125**
	23 Slovenia	0.438***	0.147	0.857***	-0.049
	24 Slovakia	0.198*	0.091	0.201*	-0.160***
	25 Finland	0.185*	0.293**	0.634***	0.106*
	26 Sweden	0.131	0.074	0.640***	-0.077
	27 United Kingdom	0.154*	-0.145*	0.374***	0.025
	28 Croatia	0.322***	0.034	0.736***	-0.142***
	29 FYROM	1.479***	0.575***	1.824***	-0.084*
	30 Turkey	0.741***	-0.042	1.182***	-0.154***
	31 Norway	0.121	-0.175*	0.412***	0.031
	32 Albania	0.419***	-0.182	1.019***	-0.162***
	33 Kosovo	1.258***	0.508***	1.589***	-0.189***
	34 Montenegro	0.890***	0.343***	0.750***	-0.067
Public/Private	Private	(base)	(base)	(base)	(base)
	Public	0.144**	0.102	0.110*	0.142***
	Joint/other (e.g. NGO, semi-state)	0.204**	0.134	0.11	0.025

Contd.

TABLE A2.1 Contd.

		Physical Risk	Chemical/ biological	Physical demand	Psycho-social
Job status	Self-employed	0.193**	0.171**	0.306***	0.086**
	Employee – indefinite contract	(base)	(base)	(base)	(base)
	Employee – fixed-term contract	0.094	0.037	0.128*	0.018
	Employee - agency temp.	0.182	0.024	0.564**	0.213
	Trainee	0.035	-0.09	0.176	0.104
	Employee - no contract	0.180*	-0.074	0.051	0.022
	Other and unknown	0.098	-0.229**	0.032	0.06
Size of workplace	Sole trader	-0.491***	-0.203**	-0.214**	0.003
	2-4	-0.242***	0.06	-0.133*	-0.068**
	5-9	-0.004	0.097	-0.007	-0.037
	10-49	(base)	(base)	(base)	(base)
	50-99	0.209**	0.112	0.166**	0.021
	100-249	0.087	0.131*	0.187**	0.057
	250-499	0.023	0.178*	0.230**	-0.025
	500+	0.206**	0.228**	0.290***	0.047
	Variable/unknown	0.072	0.131	0.264*	0.014
Sector	1 Agriculture/forestry /fishing	0.970***	0.046	0.411**	-0.056
	2 Mining and quarrying	1.624***	0.863*	0.141	-0.161***
	3 Manufacturing	0.651***	0.566***	0.154*	-0.060*
	4 Electricity, gas and water	-0.014	-0.197	-0.533***	-0.028
	5 Construction	0.963***	0.549***	0.626***	-0.079*
	6 Wholesale, retail, motor repair	(base)	(base)	(base)	(base)
	7 Hotels and restaurants	0.147	-0.009	0.016	0.094
	8 Transport, storage and commun.	-0.126	-0.272***	0.172*	0.045
	9 Financial/Real estate etc.	-0.086	0.02	-0.115*	-0.051
	10 Public admin. etc.	-0.068	-0.069	-0.341***	-0.013
	11 Education	0.003	0.076	-0.255***	-0.083
	12 Health and social work	-0.016	0.941***	0.452***	0.190***
	13 Other services	0.052	0.418***	0.019	-0.081**
	14 Unknown	-0.097	0.17	-0.07	-0.08

Contd.

TABLE A2.1 Contd.

		Physical Risk	Chemical/ biological	Physical demand	Psycho-social
Occupation	Senior officials and managers etc.	(base)	(base)	(base)	(base)
	Professionals	0.112	0.071	0.150*	0.047
	Technicians etc.	0.045	0.128*	0.029	0.033
	Clerks	0.014	-0.113*	0.117	0.033
	Service and sales workers	0.267***	0.206***	0.490***	0.075*
	Skilled agricultural and fishery	0.602***	0.886***	0.781***	-0.055
	Craft and related trades workers	1.434***	1.623***	0.967***	0.005
	Plant and machine op. /assemblers	1.583***	0.988***	1.134***	0.053
	Elementary occupations	0.961***	0.855***	1.255***	0.042
	Armed forces	0.236	0.194	-0.044	0.017
	Unknown	0.568*	0.564**	0.607**	0.247
Tenure	1 year or less	-0.033	-0.069	0.059	-0.004
	2-3 years	-0.084	-0.143**	-0.045	0.048*
	4-5 years	-0.113	-0.055	-0.068	0.052
	6-10 years	-0.006	-0.029	-0.02	0.056*
	11+ years	(base)	(base)	(base)	(base)
	Unknown	0.127	-0.036	-0.058	0.055
Hours per week	Up to 20	-0.261***	-0.197***	-0.121*	-0.071**
	21-30	-0.068	-0.087	-0.06	0
	31-40	(base)	(base)	(base)	(base)
	41-50	-0.037	-0.079	0.058	0.016
	51+	0.257***	0.085	0.350***	0.047
	Unknown/variable	0.006	0.136	0.193	0.057
Gender	Male	(base)	(base)	(base)	(base)
	Female	-0.325***	-0.323***	0.155***	-0.013
Age group	15 - 24	-0.013	0.029	-0.089	0.015
	25 - 34	0.018	-0.005	-0.063	0.04
	35 - 44	(base)	(base)	(base)	(base)
	45 - 54	-0.029	-0.032	0.008	0.022
	55 and over	-0.269***	-0.233***	-0.246***	-0.060**
Migration	R and parents born in this country	(base)	(base)	(base)	(base)
	Migrant	-0.009	0.091	0.056	0.058
Education	Up to lower 2nd level	0.526***	0.308***	0.600***	0.019
	Higher 2nd and lower 3rd level	0.242***	0.112**	0.334***	-0.02
	Degree or higher	(base)	(base)	(base)	(base)

Contd.

TABLE A2.1 Contd.

		Physical Risk	Chemical/ biological	Physical demand	Psycho-social
Ireland Interactions **(showing only variables which had a significant interaction for at least one outcome)**					
Public/Private	Private	(base)	(base)	(base)	(base)
	Public	0.148	0.028	-0.079	0.378*
Size of workplace	10-49	(base)	(base)	(base)	(base)
	500+	-0.330	-0.600**	-0.449	0.445
Sector	5 Construction	-0.619	-0.809*	-0.447	-0.01
	6 Wholesale, retail; motor repair	(base)	(base)	(base)	(base)
	12 Health and social work	-0.229	-0.105	0.741*	-0.277
Occupation	Senior officials, managers etc.	(base)	(base)	(base)	(base)
	Professionals	0.127	0.544**	0.055	0.115
	Technicians etc.	0.342	0.330	-0.053	0.361*
	Clerks	0.191	0.369*	0.201	0.545*
	Service and sales workers	0.219	0.575*	0.109	0.455*
	Craft and related trades workers	0.721*	1.662***	0.448	0.064
Tenure	1 year or less	-0.100	0.020	-0.960***	0.174
	11+ years	(base)	(base)	(base)	(base)
Hours per week	31-40	(base)	(base)	(base)	(base)
	41-50	0.403	0.557*	0.132	-0.103
Age group	35 - 44	(base)	(base)	(base)	(base)
	45 - 54	-0.035	-0.116	-0.438*	-0.229
	55 and over	0.015	-0.06	-0.732***	-0.196
Education	Up to lower 2nd level	-0.183	-0.363	-0.043	-0.155
	Higher 2nd and lower 3rd level	-0.174	-0.258	-0.341*	-0.234
	Degree or higher	(base)	(base)	(base)	(base)
Constant		0.130	0.382***	-0.396***	0.150**
R-squared	Model with country only	.034	.012	.059	.020
	Model with worker and job characteristics added	.209	.157	.164	.037
	Model with interactions added	.209	.158	.165	.038

Source: EWCS, 2010; analysis by authors.
Note: * p<0.05, ** p<0.01, *** p<0.001.

TABLE A3.1 Regression Models for Exposure to Risks in 2005 and 2010

		Physical	Chemical/ Biological	Phys demand	Psycho-social
Year 2005	(vs. 2010)	0.025	-0.105**	-0.159***	0.137***
Country	1 Belgium	0.260***	-0.084	0.786***	0.231***
(Ref Germany)	2 Bulgaria	0.587***	0.04	0.701***	-0.216***
	3 Czech Republic	-0.093	-0.096	0.252***	-0.050
	4 Denmark	0.004	-0.372***	-0.032	0.027
	6 Estonia	0.373***	0.117*	0.633***	-0.147***
	7 Greece	1.077***	0.310***	1.511***	-0.021
	8 Spain	0.724***	-0.158**	0.808***	-0.081*
	9 France	0.674***	0.331***	1.456***	0.333***
	10 Ireland	0.387***	-0.233***	0.912***	0.124**
	11 Italy	0.069	-0.194***	0.690***	-0.179***
	12 Cyprus	1.179***	-0.161**	1.145***	-0.153***
	13 Latvia	0.311***	0.221***	0.550***	0.018
	14 Lithuania	0.412***	0.234***	0.495***	-0.042
	15 Luxembourg	0.663***	0.221**	0.957***	0.078
	16 Hungary	0.617***	0.267***	0.993***	-0.191***
	17 Malta	0.567***	-0.035	1.055***	-0.003
	18 Netherlands	0.032	-0.278***	0.035	0.161***
	19 Austria	-0.015	-0.007	0.255***	0.065
	20 Poland	0.254***	-0.172***	0.391***	-0.105***
	21 Portugal	0.098	-0.469***	0.444***	-0.063
	22 Romania	0.425***	-0.196**	0.687***	-0.085**
	23 Slovenia	0.490***	0.157**	0.826***	0.047
	24 Slovakia	0.151**	0.074	0.225***	-0.122***
	25 Finland	0.171***	0.346***	0.616***	0.133***
	26 Sweden	0.062	0.026	0.619***	-0.038
	27 United Kingdom	0.066	-0.174***	0.411***	0.034
	28 Croatia	0.459***	0.014	0.707***	-0.121***
	30 Turkey	0.765***	-0.047	1.159***	-0.115***
	31 Norway	0.061	-0.183***	0.340***	0.053

Contd.

TABLE A3.1 Contd.

		Physical	Chemical/ Biological	Phys demand	Psycho-social
Country by year	Austria 2005			0.362***	
	Bulgaria 2005			0.372***	
	Croatia 2005		0.404***	0.847***	0.359***
	Cyprus 2005			0.225	
	Czech Republic 2005		0.182*		
	Denmark 2005			0.507***	
	Estonia 2005				0.309***
	Finland 2005			0.440***	0.667***
	Greece 2005	0.365***		0.375***	0.145*
	Ireland 2005	-0.419***			0.278***
	Italy 2005			-0.140	
	Lithuania 2005			0.124	0.248***
	Luxembourg 2005	-0.437***	-0.312***		0.321***
	Malta 2005		0.368***		
	Netherlands 2005				0.507***
	Poland 2005	0.269**		0.278***	
	Portugal 2005		0.480***	0.254**	
	Romania 2005		0.226*	0.208	0.094
	Slovakia 2005		0.207*		
	Slovenia 2005			0.213*	
	Spain 2005		0.224*		
	Turkey 2005	-0.584***	0.315***	0.450***	0.179*
	UK 2005				0.167**
Public/Private	Public	0.150***	0.078*	0.099**	0.164***
(Ref private)	Joint/other (NGO, semi-state)	0.166***	0.058	0.045	0.003
Job status	Self-employed	0.171***	0.119**	0.299***	0.112***
(Ref perm. Ee)	Employee – fixed-term contract	0.104**	0.021	0.164***	0.018
	Employee - agency temp.	0.332**	0.091	0.457***	0.138
	Trainee	-0.069	-0.098	0.157	0.044
	Employee - no contract	0.057	-0.110**	0.035	-0.020
	Other and unknown	0.087	-0.224***	0.079	0.025
Size of workplace	One	-0.574***	-0.204***	-0.250***	-0.041
(ref 10-49)	2-4	-0.242***	0.001	-0.138***	-0.048*
	5-9	-0.033	0.06	0.012	-0.029
	50-99	0.209***	0.096**	0.163***	0.021
	100-249	0.107*	0.061	0.161***	0.033
	250-499	0.11	0.219***	0.296***	0.023
	500+	0.242***	0.213***	0.256***	0.121***
	Variable/unknown	-0.024	0.074	0.185**	-0.041

Contd.

TABLE A3.1 Contd.

		Physical	Chemical/ Biological	Phys demand	Psycho-social
Sector	1 Agriculture/forestry /fishing	0.956***	0.083	0.498***	-0.146**
(Ref:	2 Mining and quarrying	1.440***	0.725***	0.309	-0.171*
retail/wholesale)	3 Manufacturing	0.616***	0.495***	0.092*	-0.104***
	4 Electricity, gas and water supply	0.004	0.002	-0.451***	-0.069
	5 Construction	1.004***	0.541***	0.604***	-0.111***
	7 Hotels and restaurants	0.241***	-0.051	0.074	0.122**
	8 Transport, storage and commun.	-0.036	-0.241***	0.127*	0.081*
	9 Financial/ Real estate/business	-0.038	-0.045	-0.118***	-0.045
	10 Public admin. etc.	-0.125**	-0.072	-0.322***	-0.021
	11 Education	0.070	0.019	-0.275***	-0.073
	12 Health and social work	0.014	0.906***	0.476***	0.179***
	13 Oth. services	0.083*	0.386***	0.108**	-0.070**
	14 Unknown	-0.003	0.082	-0.108	-0.061
Occupation	Professionals	0.042	0.080	0.186***	0.022
(Ref Managers.	Technicians etc.	0.032	0.093*	0.052	0.020
and Officials)	Clerks	-0.066	-0.177***	0.125**	0.030
	Service and sales workers	0.237***	0.153***	0.475***	0.098**
	Skilled agric. and fishery workers	0.639***	0.771***	0.891***	-0.006
	Craft and related trades workers	1.465***	1.565***	1.011***	0.012
	Plant and machine op. / assemblers	1.596***	0.939***	1.236***	0.078
	Elementary occupations	0.932***	0.808***	1.189***	0.049
	Armed forces	0.312	0.498*	0.097	-0.163
	Unknown	0.280*	0.532***	0.581***	0.111
Tenure	1 year or less	-0.087*	-0.102*	0.030	0.031
(ref: 11+ years)	2-3 years	-0.111**	-0.176***	-0.028	0.082***
	4-5 years	-0.104**	-0.121***	-0.074*	0.084**
	6-10 years	-0.031	-0.062	-0.024	0.027
	Unknown	0.112	-0.025	-0.137	0.080
Hours per week	Up to 20	-0.204***	-0.167***	-0.096**	-0.049
(ref: 31-40)	21-30	-0.049	-0.097**	-0.06	-0.029
	41-50	-0.022	-0.036	0.065*	0.022
	51+	0.324***	0.138**	0.365***	0.051*
	Unknown/variable	0.044	0.198**	0.172**	0.095*
Gender (vs. male)	Female	-0.326***	-0.282***	0.193***	0.000

Contd.

TABLE A3.1 Contd.

		Physical	Chemical/ Biological	Phys demand	Psycho-social
Age group	15 - 24	0.064	0.074	-0.064	0.035
Ref: 34-44)	25 - 34	0.06	0.051	-0.044	0.057**
	45 - 54	0.02	-0.012	0.037	0.042*
	55 and over	-0.233***	-0.196***	-0.250***	-0.034
Migrant?	Migrant	-0.006	0.103**	0.065	0.047
Education	Up to lower 2nd level	0.564***	0.302***	0.635***	0.053
	Higher 2nd and lower 3rd level	0.246***	0.116***	0.374***	-0.015
Ireland Interactions	*1 Agriculture etc.*	-0.951***	-0.492***	-0.699***	-0.302***
	5 Construction	-0.622***			
	Self-employed vs. employee		-0.286**		
	5-9 employees vs. 10-49		-0.342***		
	500+ employees vs. 10-49	-0.356**	-0.360**	-0.437***	
	Professionals vs. manager/official		0.397***		
	Clerical vs. manager/official		0.309***		
	Service and sales vs. manager etc.		0.459***		
	Craft and trades vs. manager/official		0.475**		
	Plant and machine op. etc.	-0.744***			
	Elementary occupations	-0.465***		-0.556***	
	Job tenure <= 1 year vs. 11+ yrs.			-0.471***	
	Age 15-24 vs. 35-44			0.356*	
	Age 45-54 vs. 35-44			-0.326**	
	Age 55+ vs. 35-44			-0.487***	-0.225**
	Higher 2nd - lower 3rd level educ.			-0.230**	

Contd.

TABLE A3.1 Contd.

		Physical	Chemical/ Biological	Phys demand	Psycho-social
2005 interactions	Self-employed vs. perm. employee				-0.201***
	Agriculture etc. vs. retail etc.		0.217**		
	Construction s retail/wholesale		0.266**		
	Financial etc. sector in 2005	-0.237***			-0.198***
	Public admin. vs. retail etc.				0.240**
	Education vs. Retail etc.				0.260***
	Health and social work vs. retail etc.				0.397***
	Technicians etc. 2005			0.142**	
	Craft and trades 2005			0.417***	
	Elementary occupations in 2005	-0.283***	-0.213**		
	21-30 hours vs. 31-40 hours pw			0.223***	
	41-50 hours per week vs. 31-40				0.132**
	51+ hours per week vs. 31-40				0.366***
	Job tenure <=1 year vs.11+ years		-0.186***		
	Age 25-34 vs. 35-44, 2005			0.164***	
	Upper 2nd to lower 3rd level educ. 2005	0.159***	0.212***		0.087**
Constant		0.110	0.471***	-0.446***	0.082
		73,416	73,399	73,446	73,374
R-squared		0.210	0.159	0.179	0.051

Source: EWCS, 2005 and 2010; analysis by authors.
Note: The models include interaction terms is they are statistically significant. Where an interaction term is not included, the cell is blank. *** p<0.01, ** p<0.05, * p<0.1.

TABLE A4.1 Logistic Regression for having Fair, Bad or Very Bad Health (Odds Ratios)

		Model A	Model B
Country	1 Belgium	0.812***	0.789***
(Ref Germany)	2 Bulgaria	1.049	0.981
	3 Czech Republic	1.206*	1.235*
	4 Denmark	0.596***	0.694***
	5 Germany (Ref)	1.000	1.000
	6 Estonia	3.384***	3.610***
	7 Greece	0.557***	0.390***
	8 Spain	0.678***	0.629***
	9 France	1.215**	1.045
	10 Ireland	0.290***	0.282***
	11 Italy	1.177*	1.156
	12 Cyprus	0.799*	0.701***
	13 Latvia	4.300***	5.158***
	14 Lithuania	2.355***	2.696***
	15 Luxembourg	0.940	0.839
	16 Hungary	1.948***	2.044***
	17 Malta	0.687***	0.691***
	18 Netherlands	0.808*	0.858
	19 Austria	1.175	1.237*
	20 Poland	1.351***	1.484***
	21 Portugal	2.536***	2.304***
	22 Romania	2.319***	2.310***
	23 Slovenia	1.629***	1.675***
	24 Slovakia	2.109***	2.517***
	25 Finland	1.253**	1.285**
	26 Sweden	1.051	1.054
	27 United Kingdom	0.613***	0.564***
	28 Croatia	1.511***	1.295**
	30 Turkey	0.954	0.841
	31 Norway	1.145	1.306**
Public/Private	Public		0.849**
(Ref private)	Joint/other (NGO, semi-state)		1.180**
Job status	Self-employed		1.026
(Ref perm. Ee)	Employee – fixed-term contract		1.409***
	Employee - agency temp.		1.082
	Trainee		2.275**
	Employee - no contract		1.043
	Other and unknown		1.193

Contd.

TABLE A4.1 Contd.

		Model A	Model B
Size of workplace	One		0.852*
(ref 10-49)	2-4		0.843**
	5-9		0.769***
	50-99		0.996
	100-249		0.864*
	250-499		0.879
	500+		1.033
	Variable/unknown		1.194
Sector	1 Agriculture/forestry /fishing		1.037
(Ref: retail/wholesale)	2 Mining and quarrying		0.780
	3 Manufacturing		0.894
	4 Electricity, gas and water supply		0.714*
	5 Construction		0.963
	7 Hotels and restaurants		1.243**
	8 Transport, storage and commun.		0.974
	9 Financial/Real estate/business		1.013
	10 Public admin. etc.		1.222*
	11 Education		1.131
	12 Health and social work		1.043
	13 Oth. services		0.972
	14 Unknown		0.923
Occupation	Professionals		0.891
(Ref Managers. Officials)	Technicians and assoc. professionals		0.871
	Clerks		1.027
	Service and sales workers		0.980
	Skilled agricultural and fishery workers		1.448**
	Craft and related trades workers		1.163
	Plant and machine op. / assemblers		1.420***
	Elementary occupations		1.311***
	Armed forces		0.720
	Unknown		0.885
Tenure	1 year or less		0.885
(ref: 11+ years)	2-3 years		0.826***
	4-5 years		0.829***
	6-10 years		0.917
	Unknown		0.927
Hours per week	Up to 20		1.146*
(ref: 31-40)	21-30		1.122
	41-50		1.198***
	51+		1.196**
	Unknown/variable		1.401***
Gender (vs. male)	Female		1.310***

Contd.

TABLE A4.1 Contd.

		Model A	Model B
Age group	15 - 24		0.447***
Ref: 34-44)	25 - 34		0.628***
	45 - 54		1.866***
	55 and over		3.101***
R and Parents born here	Migrant		1.240***
Education	Up to lower 2nd level		1.229***
	Higher 2nd level and lower 3rd level		1.072
Exposure to risks	Physical risk		1.037***
	Chemical/biological risk		1.021*
	Psycho-social risk		1.169***
	Physically demanding work		1.133***
Constant		0.257***	0.121***
		39,483	39,483

Source: European Quality of Life Survey, 2010, analysis by authors. *** p<0.01, ** p<0.05, * p<0.1. Interactions between Ireland and exposure job/worker characteristics were tested but none reached statistical significance.

TABLE A4.2 Linear Regression Models for Mental Distress, 2010

		Model A	Model B	Model C
Country	1 Belgium	-0.084	-0.121*	-0.119*
(Ref Germany)	2 Bulgaria	0.519***	0.465***	0.464***
	3 Czech Republic	0.968***	0.946***	0.946***
	4 Denmark	-0.452***	-0.388***	-0.388***
	6 Estonia	0.332***	0.287***	0.287***
	7 Greece	0.176**	0.062	0.062
	8 Spain	-0.421***	-0.468***	-0.468***
	9 France	0.137**	0.043	0.043
	10 Ireland	-0.624***	-0.609***	-0.150
	11 Italy	0.572***	0.572***	0.572***
	12 Cyprus	0.318***	0.295***	0.294***
	13 Latvia	0.919***	0.845***	0.845***
	14 Lithuania	1.241***	1.237***	1.238***
	15 Luxembourg	-0.164*	-0.285***	-0.284***
	16 Hungary	0.773***	0.710***	0.709***
	17 Malta	-0.168**	-0.144*	-0.145*
	18 Netherlands	-0.175**	-0.124	-0.123
	19 Austria	0.201**	0.198**	0.198**
	20 Poland	0.340***	0.326***	0.326***
	21 Portugal	0.401***	0.357***	0.356***
	22 Romania	0.493***	0.393***	0.392***
	23 Slovenia	0.446***	0.390***	0.390***
	24 Slovakia	0.547***	0.517***	0.517***
	25 Finland	-0.053	-0.047	-0.046
	26 Sweden	-0.245***	-0.238***	-0.238***
	27 United Kingdom	0.065	0.054	0.054
	28 Croatia	0.788***	0.722***	0.721***
	30 Turkey	1.037***	0.910***	0.908***
	31 Norway	-0.400***	-0.360***	-0.360***
Public/Private	Public		-0.088*	-0.087*
(Ref private)	Joint/other (NGO, semi-state)		-0.012	-0.016
Job status	Self-employed		-0.121*	-0.121*
(Ref perm. Ee)	Employee – fixed-term contract		0.128**	0.129**
	Employee - agency temp.		0.029	0.029
	Trainee		0.536**	0.537**
	Employee - no contract		0.125	0.127
	Other and unknown		0.135	0.136

Contd.

TABLE A4.2 Contd

		Model A	Model B	Model C
Size of workplace	One		-0.009	-0.007
(ref 10-49)	2-4		-0.159***	-0.158***
	5-9		-0.235***	-0.235***
	50-99		0.059	0.059
	100-249		-0.016	-0.016
	250-499		-0.017	-0.018
	500+		0.07	0.07
	Variable/unknown		0.207**	0.206**
Sector	1 Agriculture/forestry /fishing		0.085	0.085
(Ref: retail/wholesale)	2 Mining and quarrying		-0.107	-0.107
	3 Manufacturing		0.014	0.013
	4 Electricity, gas and water supply		-0.143	-0.145
	5 Construction		-0.12	-0.12
	7 Hotels and restaurants		0.047	0.047
	8 Transport, storage and commun.		0.001	0.001
	9 Financial/Real estate/business		0.047	0.047
	10 Public admin. etc.		0.072	0.073
	11 Education		-0.07	-0.069
	12 Health and social work		-0.186***	-0.187***
	13 Oth. services		-0.207***	-0.207***
	14 Unknown		0.035	0.036
Occupation	Professionals		0.066	0.066
(Ref Managers. Officials)	Technicians and associate professionals		0.106	0.107
	Clerks		0.092	0.093
	Service and sales workers		0.019	0.02
	Skilled agric. and fishery workers		0.159	0.16
	Craft and related trades workers		0.111	0.112
	Plant and machine op. / assemblers		0.278***	0.279***
	Elementary occupations		0.312***	0.312***
	Armed forces		-0.344*	-0.339*
	Unknown		-0.258	-0.257
Tenure	1 year or less		0.110*	0.110*
(ref: 11+ years)	2-3 years		0.011	0.01
	4-5 years		0.022	0.022
	6-10 years		-0.034	-0.034
	Unknown		0.324***	0.323***
Hours per week	Up to 20		0.034	0.034
(ref: 31-40)	21-30		0.075	0.075
	41-50		0.224***	0.224***
	51+		0.330***	0.330***
	Unknown/variable		0.047	0.047

Contd.

TABLE A4.2 Contd

		Model A	Model B	Model C
Gender (vs. male)	Female		0.347***	0.347***
Age group	15 - 24		-0.476***	-0.476***
Ref: 34-44)	25 - 34		-0.144***	-0.144***
	45 - 54		0.236***	0.236***
	55 and over		0.081	0.087
Migrant?	Migrant		0.169***	0.168***
Education	Up to lower 2nd level		0.01	0.015
	Higher 2nd and lower 3rd level		-0.023	-0.019
Workplace Risk	*Physical*		0.015	0.015*
	Chemical/biological		0.029***	0.029***
	Psycho-social		0.115***	0.115***
	Physical demand		0.047***	0.047***
Ireland Interactions	Physical risk			-0.101***
	Joint public/private sector (e.g. NGO, semi-state)			0.541**
	Age 55 and over			-0.679***
	Lower 2nd level ed. or less			-0.543***
	Higher 2nd - lo 3rd level ed.			-0.453***
Constant		3.233***	2.844***	2.839***
R-squared		0.04	0.075	0.075
N observations		39,457	39,457	39,457

Source: European Quality of Life Survey, analysis by authors (linear regression). *** p<0.01, ** p<0.05, * p<0.1.

TABLE A4.3 Logistic Regression Models for Injury (Odds Ratios)

		Model A	Model B	Model C
Country	1 Belgium	1.350***	1.230*	1.230*
(Ref Germany)	2 Bulgaria	0.624***	0.493***	0.492***
	3 Czech Republic	0.955	0.848	0.848
	4 Denmark	0.657***	0.727*	0.726*
	6 Estonia	0.925	0.821	0.82
	7 Greece	0.691**	0.306***	0.305***
	8 Spain	0.568***	0.433***	0.432***
	9 France	1.389***	0.938	0.938
	10 Ireland	0.524***	0.382***	0.466***
	11 Italy	0.803	0.719**	0.719**
	12 Cyprus	0.517***	0.336***	0.334***
	13 Latvia	1.044	0.863	0.863
	14 Lithuania	0.878	0.704*	0.704**
	15 Luxembourg	1.335**	1.014	1.014
	16 Hungary	0.923	0.671**	0.671**
	17 Malta	0.298***	0.193***	0.192***
	18 Netherlands	1.486***	1.620***	1.620***
	19 Austria	0.85	0.730*	0.729*
	20 Poland	0.725**	0.525***	0.525***
	21 Portugal	0.788	0.635***	0.634***
	22 Romania	0.467***	0.293***	0.293***
	23 Slovenia	1.085	0.874	0.874
	24 Slovakia	0.641***	0.511***	0.511***
	25 Finland	0.851	0.752*	0.752*
	26 Sweden	1.058	1.042	1.043
	27 United Kingdom	0.670***	0.615***	0.615***
	28 Croatia	0.955	0.723**	0.723**
	30 Turkey	1.043	0.437***	0.435***
	31 Norway	0.883	0.859	0.858
Public/Private	Public		0.93	0.93
(Ref private)	Joint/other (NGO, semi-state)		1.295**	1.295**
Job status	Self-employed		0.983	0.984
(Ref perm. Ee)	Employee – fixed-term contract		0.991	0.991
	Employee - agency temp.		1.16	1.16
	Trainee		2.133**	2.131**
	Employee - no contract		1.368**	1.389**
	Other and unknown		0.871	0.871

Contd.

TABLE A4.3 Contd.

		Model A	Model B	Model C
Size of workplace	One		0.952	0.951
(ref 10-49)	2-4		0.828*	0.827*
	5-9		0.851*	0.850*
	50-99		0.913	0.913
	100-249		1.004	1.003
	250-499		0.964	0.963
	500+		0.858	0.858
	Variable/unknown		0.554***	0.554***
Sector	1 Agriculture/forestry /fishing		1.772***	1.772***
(Ref:	2 Mining and quarrying		0.825	0.825
retail/wholesale)	3 Manufacturing		0.861	0.862
	4 Electricity, gas and water supply		0.704	0.704
	5 Construction		1.221*	1.221*
	7 Hotels and restaurants		1.11	1.111
	8 Transport, storage and commun.		0.928	0.928
	9 Financial/Real estate/business		1.039	1.039
	10 Public admin. etc.		1.125	1.126
	11 Education		1.059	1.06
	12 Health and social work		0.991	0.991
	13 Other services		1.222	1.221
	14 Unknown		1.197	1.197
Occupation	Professionals		0.778	0.778
(Ref Managers.	Technicians and associate professionals		0.700**	0.700**
Officials)	Clerks		0.709**	0.709**
	Service and sales workers		1.086	1.087
	Skilled agric. and fishery workers		1.445	1.448
	Craft and related trades workers		1.591***	1.592***
	Plant and machine op. / assemblers		0.879	0.879
	Elementary occupations		1.048	1.048
	Armed forces		1.143	1.143
	Unknown		1.133	1.134
Tenure	1 year or less		0.731***	0.730***
(ref: 11+ years)	2-3 years		0.997	0.996
	4-5 years		0.992	0.992
	6-10 years		0.932	0.932
	Unknown		0.846	0.845
Hours per week	Up to 20		0.869	0.869
(ref: 31-40)	21-30		1.073	1.072
	41-50		1.1	1.099
	51+		1.282**	1.280**
	Unknown/variable		1.193	1.193

Contd.

TABLE A4.3 Contd.

		Model A	Model B	Model C
Gender (vs. male)	Female		0.642***	0.642***
Age group	15 - 24		1.281**	1.283**
Ref: 34-44)	25 - 34		1.159*	1.159*
	45 - 54		0.863*	0.863*
	55 and over		1.041	1.041
Migrant?	Migrant		1.146	1.145
Education	Up to lower 2nd level		0.945	0.945
	Higher 2nd and lower 3rd level		1.062	1.062
Workplace Risk	*Physical*		1.066***	1.066***
	Chemical/biological		1.105***	1.105***
	Psycho-social		1.222***	1.222***
	Physical demand		1.120***	1.120***
Ireland interactions	Employee, no contract			0.310**
Constant		0.110***	0.093***	0.093***
N observations		39,477	39,477	39,477

Source: European Quality of Life Survey 2010, analysis by authors.
Note: *** p<0.01, ** p<0.05, * p<0.1.

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