

# Occupational Change in Europe

How Technology and Education Transform the Job Structure

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# Introduction

## Jobs Prospects and Life Chances

This book examines the patterns of occupational change in Western Europe. It sifts through a mountain of labour market data in order to throw new light on an old question. At least since the Industrial Revolution and Karl Marx, scholars have been obsessed by the question of how the employment structure evolves: towards good jobs, bad jobs, or increasing polarization? Three issues are at stake in this debate. At the micro-level of single jobs, the concern is with the quality of new employment created. Academics and politicians alike want to know what types of jobs are expanding: well-paid managerial jobs or low-paid auxiliary jobs, high-end professional jobs or bottom-end service jobs? At the macro-level of social structure, the question raised is whether occupational change transforms affluent countries into large middle-class societies, or whether we head towards a future of increasingly divided class societies? The micro- and macro-levels of analysis are bridged by the concern for social mobility. The key question here is whether changes in the employment structure will allow forthcoming generations to move to more rewarding jobs than those held by their parents—or whether downward mobility is the more likely outcome.

Changes in the employment structure have far-reaching social implications. Of course, a student of occupational change primarily learns about the future of work, skills, and employment. But additionally, by grasping the job prospects in contemporary labour markets, he or she also gets an idea of the life chances that European societies offer to people. And beyond the production sphere, he or she also finds out what occupational groups and electoral constituencies are likely to form the backbone of European democracies in the first decades of the 21st century.

Very different verdicts have been rendered on the evolution of the employment structure in the history of the social sciences. In the 1850s, Karl Marx observed that mechanization in textiles had led to the substitution of qualified artisans by low-educated labour. Extrapolating this trend from the early phases of

industrialization to the future, he expected that technology would downgrade the occupational system and lead to a steady expansion of the proletariat. A century later, Daniel Bell (1973) proclaimed the arrival of the post-industrial knowledge society, where the growth of the 'professional and technical stratum' would upgrade the employment structure. More recently, labour economist David Autor and his colleagues (2003) argued that technology would make mid-range jobs in manufacturing and the back office increasingly redundant, while leading to growth in both high- and low-end services. The result would be a polarization of the employment structure. This argument shook the consensus view among economists that skill-biased technical change was leading to a linear increase in the demand for a highly educated workforce at the expense of low-educated workers.

The jury is thus still out on the pattern of occupational change. However, there is consensus on a related issue, namely that educational attainment has risen dramatically in Western Europe over the last decades. It suffices to compare over time the proportion of 25- to 34-year-old people who have attained tertiary education. In the 1960s, only 8 per cent of young Spaniards and 16 per cent of young Britons and Swiss had a degree from a university, college, or polytechnic. In 2009 this was the case for 40 per cent of 25- to 34-year olds in Britain, Spain, and Switzerland. Educational expansion is all the more striking if we remember that it has not been limited to the tertiary level, but also extended to upper secondary schooling and vocational training. In Britain, only 52 per cent of the 25- to 34-year-old group had obtained at least upper secondary education in the mid-1960s compared with 77 per cent in 2009. In Spain, the share of young people with upper secondary education took an even more impressive leap from 11 per cent in the mid-60s to 64 per cent in 2009 (OECD 2011: 15).

We thus have a clear idea of what has happened with education. Yet the open question is to what extent growing educational attainment also translated into more highly skilled and better-paid jobs. This question lies at the heart of this book—and the following pages strive to answer it for five West European countries: Britain, Denmark, Germany, Spain, and Switzerland. The period under study stretches over the two decades between the fall of the Berlin Wall in 1989 and the Great Recession in 2008. Our study is not based on aggregate data readily available from government reports and OECD reviews, but relies on a myriad of individual-level analyses. These analyses greatly benefit from the availability of large-scale labour force surveys since the early 1990s.

Employment polarization would make for the most spectacular finding—and a growth industry of mostly Anglo-Saxon academics has

already gone to work to explain its causes. However, data do not always comply with the wishes of researchers. Our first and foremost finding is not that the occupational structure in Western Europe polarized over the last two decades, but that it was upgraded. In all five countries, employment expanded much more strongly in professional and managerial occupations than in production jobs, menial services, or back office positions. No matter whether job quality is measured in terms of median earnings or educational requirements, we observe much stronger employment growth in highly paid and highly skilled occupations than in intermediary and low-end occupations. Occupational upgrading appears to be primarily driven by the expansion of two categories: managers in business services such as administrators, treasurers, consultants, and analysts, as well as (semi)-professionals in social services such as medical doctors, teachers, social workers, and nurses. In contrast, the numerical importance of two other categories strongly declined: production workers such as mechanics, maintenance fitters, machine operators, and assemblers as well as office workers such as secretaries, typists, clerks, and cashiers. In other words, we find that the salaried middle class of professionals and managers expanded at the expense of the lower-middle class and the industrial working class. As a result, the class structure has moved upwards in all five countries.

Although this general trend emerges clearly from our analysis, one reservation needs to be made. Job losses in Britain—and to a smaller extent also in Switzerland—were stronger in the middle than in the bottom of the occupational hierarchy. We observed a j-shaped pattern of occupational change in Britain. The drift towards polarization, although not overwhelming, is thus real in some countries, but not in others. This leads us to the question about the causes behind these cross-country differences—and hence the driving force of occupational change.

## The Determinants of Occupational Change

It is much easier to establish *what* happened—occupational upgrading—than to explain *why* it happened. Occupational change is always the result of the joint actions taken by employers and employees in a given institutional context. Accordingly, the search for a prime suspect is an intricate task. Nonetheless, most sociologists and economists would agree that long-term change in the occupational structure is driven by technology. Yet technological innovations may affect the employment structure differently over time. While the technological advances of the early Industrial Revolution crowded out craft workers and made greater

use of low-educated labour, computers and the Internet have primarily stimulated demand for highly educated staff. More recently, it has been argued that automation readily takes over routine production and clerical tasks, but has little impact on the interpersonal tasks done in low-paid services (Autor et al. 2003; Manning 2004).

From this theoretical premise, it is uncertain whether technological change by itself should lead to upgrading or polarization. What is clear, however, is that it should affect affluent countries in a similar way—to the extent that West European firms have access to similar levels and types of technology. It is here that a comparative research design proves useful. Developments in technology can explain common trends in occupational upgrading across countries, but leave us wondering as to the causes of cross-country variation: why is there a stronger trend towards occupational polarization in Britain and the United States than in Denmark and Germany?

One answer focuses on the evolution of labour supply—on the skill profile of new labour market entrants and immigrants. The idea is that while technological progress affects firms' demand for labour, firms do not adopt new technologies independently from the type of workers they find in the labour market. Rather, firms will resort to different production techniques and create jobs in different occupations depending on whether highly educated or lowly educated workers abound in a given region. This argument suggests that a country's pattern of occupational change can only be understood by looking at changes in both labour demand and labour supply, notably educational output and immigration.

An influential American study found that two thirds of the jobs created in the bottom tier of the US labour market during the 1990s were filled by immigrants, mostly Hispanics (Wright and Dwyer 2003: 309). Immigration was thus paramount for the expansion of low-end service jobs in the United States: without a growing pool of workers willing to fill these low-wage jobs, employment at the labour market's bottom end would not have expanded to the same extent. In our study, two countries also experienced large surges of lowly educated immigration between the end of the 1990s and the recession that began in 2008: Britain and Spain. It is likely that the abundant supply of lowly educated migrant labour has led employers to create jobs in different occupations.

Potentially an even greater source of cross-country differences in occupational change stems from labour market institutions. Governments vary in how they regulate collective organization, wage-setting, and employment relations—and this variation is likely to channel firms' demand for labour into different occupational outcomes. Countries thus have some non-negotiable latitude in how they

accommodate technical change and translate it into the organization of labour (Fernández Macías 2010: 226). Schematically, the idea is that institutional constraints affect the labour market choices of employers who can opt for either a 'high-road' or a 'low-road' job strategy (Streeck 1997; Acemoglu 2003). The 'low-road' implies a low-wage, low-skill, low-training, and low-productivity strategy, whereas the 'high-road' refers to the opposite high-skill and high-productivity option. Upon what path firms embark crucially depends on labour market institutions. Since the 1980s, declining union membership and an eroding minimum wage in the United States have made it substantially easier for American firms to respond to market challenges by taking the 'low road' (Gautié et al. 2010). Over the same period, Continental European institutions—notably collective bargaining, minimum wage legislation, and welfare state benefits—tended to push firms towards the 'high-road' alternative. Companies thus had an interest in improving their workers' productivity through innovative work organization and investment in new technologies and training (Bosch 2009).

Of course, the 'high-road' of occupational upgrading may not warrant excessive optimism if it comes at the cost of unemployment—if the lowly educated are simply pushed out of the labour market. Given the evidence that modern technology reduces the demand for less-educated workers, prominent economists expect governments to be faced with a thorny choice. They can set high wage floors and thus favour the creation of decent jobs; but they then have to cope with weak growth in low-skilled services and high unemployment. Alternatively, governments can deregulate wage-setting and thus promote job creation in low-end services. But they have to then accept greater inequality and a polarizing labour market (Krugman 1994; Iversen and Wren 1998; Scharpf 2000; Kenworthy 2008). The central issue in the debate on occupational change thus concerns the job prospects that post-industrial labour markets offer to lowly educated workers.

Fortunately, governments may have the choice between more than just the two undesirable outcomes of (i) occupational upgrading at the cost of unemployment, or (ii) employment for the lowly educated at the cost of polarization. The experiences of Denmark and Switzerland suggest a third and more attractive option: occupational upgrading without an increase in either lowly educated unemployment or wage inequality. The way out of the dilemma has to do with the evolution of skills supplies. Over the last two decades, not only did jobs for the lowly educated become scarcer, but so too did the lowly educated themselves. While technological advances increased firms' demands for qualified labour, educational expansion made sure that

ever-larger shares of forthcoming cohorts had at least medium levels of qualifications. This is good news for both occupational change and the integration of the lowly educated into the labour market: if educational systems succeed in producing a compressed distribution of rising human capital, the occupational structure can upgrade and the number of low-skilled jobs decline without the corollary of rising unemployment and widening wage differentials (Nickell and Bell 1996; Freeman and Schettkat 2001).

### Plan of the Book

This book starts out with a historical overview about the debate on occupational change in Chapter 1. It sets the gloomy Marxist expectation that employers would down-skill jobs by fragmenting work tasks against the optimistic Industrialist view that technology would shift the workforce from low- to high-skilled sectors. It then discusses two competing visions of how technology shapes the employment structure: skill-biased technical change or routinization. Before reviewing the existing empirical evidence, Chapter 1 sketches out a theoretical framework that relates technology, skills, and institutions to the job structure. We distinguish three driving forces of occupational change: technological change and international trade on the labour market's demand-side; education and immigration on the labour market's supply side; and labour market institutions as a mediating factor. Although these explanations stress different mechanisms, they overlap and complete each other to a considerable degree. There is a large consensus that strongest employment expansion should take place in high-skilled occupations. But three features of occupational change remain controversial: what happens to (i) intermediate jobs, (ii) low-skilled jobs, and (iii) unemployment? The answer strongly depends on the potential of technology to automate low-skilled service tasks.

Chapter 2 presents our empirical evidence. It begins with a discussion of our country selection and the choice of survey data. It then explains the analytical strategy we use to examine change in the employment structure. The methodological challenge consists in reducing a multi-dimensional phenomenon such as occupational change into a single dimension—which then allows us to speak of upgrading, downgrading, or polarization. The chapter's main contribution lies in depicting the overall pattern of occupational change in the five countries under study. We try to verify the reliability of our findings by using two different measures of job quality, namely median earnings and



educational requirements. A last set of analyses then shows how the class structure evolved over the last two decades: which social classes lost out and which social classes benefitted from occupational change?

Chapter 3 moves from description to explanation. It does so by focusing on the role of demand-side determinants for occupational change. Firms' demands for labour may be driven by either technology or—the more commonly quoted vector in newspapers—by international trade. According to this latter argument, recent shifts in the employment structure are primarily due to the outsourcing of low-skilled jobs from affluent to low-wage countries. We test this argument by examining whether occupational change differs between sectors strongly exposed to imports (such as agriculture or textiles) and sectors sheltered from international trade (such as health care or construction). We then turn to technology and compare the predictions of skill-biased technical change (linear upgrading) with that of the routinization thesis (polarization). The question raised is whether technology affects the occupational structure through its interaction with the skills workers possess or with the tasks they do. Is it what people *do* (their job tasks) or what people *know* (their qualification) that matters for employment? We conclude the discussion of demand-side factors by dissecting a third and often-overlooked determinant of occupational change: shifts resulting from the creation of public jobs in the welfare state.

Chapter 4 shifts the focus to supply-side determinants of occupational change: education and immigration. The idea is that firms determine their production techniques and the jobs they create on the basis of available input factors. A crucial input into the production of goods and services are the skill profiles of jobseekers. After showing that educational credentials improved massively in the countries under study, we analyse whether the skill structure evolved in parallel with occupational upgrading. The surges in immigration in the early 2000s in Britain and Spain had an impact on the low-paid labour supply that may not be captured adequately by figures on educational attainment. The reason is that newly arriving immigrants are frequently unable to put their human capital into immediate use and compete with native workers at lower occupational levels than would be expected by looking at their education. We thus analyse whether migratory flows contribute to the explanation of cross-country differences in occupational change. We conclude this chapter by studying the mechanism through which occupational change comes about over time: workers' occupational careers and the process of cohort renewal.

Chapter 5 tries to explain the cross-country differences in occupational change with labour market institutions, notably collective

bargaining and the minimum wage. We discuss the effect that wage setting has on low-productivity jobs and argue that the institutional context should primarily affect low-skilled interpersonal service jobs. The reason is that these jobs have several particularities: they require minimal education, but are difficult to automate, difficult to out-source, and difficult to trade. The wage floor set by institutions should have a strong influence on whether low-skilled service jobs expand in great numbers—and hence whether labour markets polarize. In order to examine the link between wage inequality and low-skilled personal services, we disaggregate occupational change into job categories. Our focus then lies on how *within-country* changes in wage setting affected job growth in personal services: first in Britain where the newly introduced minimum wage increased the wage floor from 1999 onwards; then in Germany where firm exits from collective bargaining and the Hartz laws reduced the wage floor in the 2000s. This chapter thus analyses whether interpersonal services evolved differently where a government embarked on a process of employment de-standardization (as in Germany), than where a government raised the institutional barriers to the creation of low-paid jobs (as in Britain).

The final chapter brings in the issue of unemployment. The question raised is whether occupational upgrading is not such good news after all, as it may imply that the lowly educated have been priced out of employment. This Chapter 6 submits the trade-off argument between upgrading and unemployment to several tests. It begins by analysing the evolution of unemployment in general and of low-educated unemployment in particular. It then analyses in some detail why unemployment afflicts lowly educated workers to a greater extent than highly educated workers. Since unemployment is just one form of labour market exit for redundant workers, the focus then shifts to lowly educated workers' employment rates and notably the evolution in the number of disability benefit claimants. Finally, the chapter closes with a discussion of how it was possible for many low-skilled jobs to disappear over the last two decades without leading to a significant rise in lowly educated unemployment. Three reasons possibly explain why some countries were successful in integrating the low-qualified despite ongoing upgrading and stable wage inequality: avoidance of unemployment hysteresis, investment into active labour market programmes, and policies of skills upgrading.

Our conclusion highlights the book's three major findings and discusses the policy implications. Our evidence suggests that governments should take action at both ends of the labour market in order to bring in the social dividends of occupational upgrading. At the upper end,

public investment into tertiary education allows firms to hire highly educated workers in sufficient numbers and thus to take full advantage of technological progress. At the lower end, a strengthening of upper secondary education—notably vocational training—and the establishment of a minimum wage encourage firms to invest in their workers' productivity rather than rely on a stagnant low-wage sector.

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