UKCES
UK COMMISSION FOR EMPLOYMENT AND SKILLS

A review of occupational regulation and its impact

Evidence Report 40
October 2011

Intelligence › Investment › Impact

A Review of Occupational Regulation and its Impact

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October 2011

Foreword

The UK Commission for Employment and Skills is a social partnership, led by Commissioners from large and small employers, trade unions and the voluntary sector. Our mission is to raise skill levels to help drive enterprise, create more and better jobs and promote economic growth. Our strategic objectives are to:

- Provide outstanding labour market intelligence which helps businesses and people make the best choices for them;

- Work with businesses to develop the best market solutions which leverage greater investment in skills;

- Maximise the impact of employment and skills policies and employer behaviour to support jobs and growth and secure an internationally competitive skills base.

These strategic objectives are supported by a research programme that provides a robust evidence base for our insights and actions and which draws on good practice and the most innovative thinking. The research programme is underpinned by a number of core principles including the importance of: ensuring '**relevance**' to our most pressing strategic priorities; '**salience**' and effectively translating and sharing the key insights we find; **international benchmarking** and drawing insights from good practice abroad; **high quality** analysis which is leading edge, robust and action orientated; being responsive to immediate needs as well as taking a longer term perspective. We also work closely with key partners to ensure a **co ordinated** approach to research.

In the UK Commission's 2010 Employer Perspectives Survey, 40 per cent of UK employers did not provide training for their staff in the last 12 months. Although exacerbated by the worst economic recession in living memory, it is the case that a significant proportion of employers do not provide any training for their staff whatsoever. Businesses which employ few people, as well as establishments in certain sectors, are least likely to fund or arrange training and these patterns have been evident for a number of years.

Through our earlier work, notably the Collective Measures study series, the UK Commission has identified a number of policy levers, each of which have the potential to address this challenge and encourage employers to raise workforce skill levels on a collective basis. This is a challenge worth meeting. For those employers that do train there is evidence that they enjoy benefits relating to survival, productivity, employee job satisfaction and lower absentee rates.

This Evidence Report, undertaken by the National Institute of Economic and Social Research, provides further understanding into one of these policy levers, **occupational regulation**. This umbrella term covers those mechanisms, both voluntary and mandatory, through which minimum skill standards can be applied within occupations. In the right circumstances occupational regulation has the potential to raise levels of employer provided training. The right circumstances here revolve around the chosen occupation, the type of occupational regulation applied and its subsequent design, implementation and governance.

Importantly, occupational regulation is just one of a number of policy levers which can stimulate employer investment in skills on a collective basis. Known as Best Market Solutions, the UK Commission has set out a range of different tools that employers might want to use to raise their skills ambitions to compete on a world stage, both at an individual business level and for their sector as a whole. These include inter employer networks, levies, tax incentives, human capital reporting and tools for high performance working.

This Evidence Report will further contribute to our understanding of such levers. This is particularly the case for an area which has been sorely under researched. It provides a greater appreciation of the nature and impact of occupational regulation in the UK and, in so doing, helps to build the evidence base on the conditions and circumstances required to use such a lever in the pursuit of investing in skills.

Sharing the findings of our research and engaging with our audience is important to further develop the evidence on which we base our work. Evidence Reports are our chief means of reporting our detailed analytical work. Each Evidence Report is accompanied by an executive summary. All of our outputs can be accessed on the UK Commission's website at www.ukces.org.uk

But these outputs are only the beginning of the process and we will be continually looking for mechanisms to share our findings, debate the issues they raise and we can extend their reach and impact.

We hope you find this report useful and informative. If you would like to provide any feedback or comments please e-mail info@ukces.org.uk quoting the report title or series number.

Lesley Giles
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Executive Summary

Introduction

The use of occupational licensing as a mechanism for increasing the demand for, and supply of, skills was considered – alongside other measures such as training levies – as part of the UK Commission's recent Review of Employer Collective Measures (Stanfield *et al.*, 2009). However, that Review acknowledged that the general topic of occupational regulation remains severely under researched in the UK. It went on to recommend that a further, more detailed investigation of the issue should be carried out. This report presents the findings from that investigation.

The overall aims of the research were to:

- map the current pattern of occupational regulation in the UK;
- review the theory regarding the operation and impact of occupational regulation;
- examine the existing evidence on the impacts of occupational regulation in the UK and abroad;
- provide initial estimates of the impact of occupational regulation on labour market outcomes such as skill levels, wages and employment in the UK.

The focus of the report

The report focuses on three forms of legal regulation (licensing, certification and registration) and one form of voluntary regulation (accreditation) that has no legal backing or state involvement.

- **Licensing:** This refers to situations in which it is unlawful to carry out a specified range of activities for pay without first having obtained a licence which confirms that the licence holder meets prescribed standards of competence. Workers who require such licences to practice in the UK include doctors, solicitors, veterinary nurses, private security guards, gas installers, taxi drivers and heavy goods vehicle drivers.
- **Certification:** This refers to situations in which there are no restrictions on the right to practice in an occupation, but job holders may voluntarily apply to be certified as competent by a state appointed regulatory body. Workers in the UK who may apply for certification include fitness instructors (who may apply to be certified by the Register of Exercise Professionals) and hairdressers (who may apply to be certified by the Hairdressing Council).

- **Registration:** This refers to situations in which it is unlawful to practice without having first registered one's name and address with the appropriate regulatory body. Registration thus provides some form of legal barrier to entry, but an explicit skill standard is not provided. An example in the UK is the requirement for estate agents to register with the Office of Fair Trading under regulations designed to prevent money laundering.
- **Accreditation:** We use this term to refer to situations in which an individual may apply to be accredited as competent by a recognised professional body or industry association. Accreditation is distinct from certification in that the criteria governing accreditation and the procedures regarding enforcement are entirely the responsibility of the accrediting body rather than the state. An example in the UK is the accreditation scheme for accountants, who may apply to the Institute of Chartered Accountants in England and Wales for accreditation as a Chartered Accountant.

In this report, we use the term 'occupational regulation' as a broad heading for these various forms of standard setting mechanisms. Occupations which are not regulated in any of these ways are termed 'unregulated'.

Theoretical perspectives on occupational regulation

A simple theory of licensing (the strictest form of occupational regulation) indicates that the imposition of a universal, skills based entry requirement through licensing can be expected to raise average skill levels in the occupation, since low quality workers who cannot meet the new entry requirement are forced out whilst other low quality workers must engage in job related training in order to increase their human capital to the new minimum standard. If the stock of human capital in the occupation rises because of the new entry requirement, then one may also expect the quality of the product or service to increase. Yet if prices and wages are free to respond to changes in quality or supply of qualified practitioners, then any restriction of the number of workers in the occupation may also drive prices upwards and allow wages to rise.

Employment levels within the occupation – and the availability of the associated product or service to consumers – may fall in the short term, as low quality workers who cannot meet the new minimum standard are barred from engaging in the now regulated activity. If their numbers are sufficient, their unemployment may drive down wages in the wider labour market. Consequently, there are potentially important spillover effects in the labour market, at least in the short term. In the medium to long term, however, any rise in average wages in the occupation may attract higher quality workers who now see the possibility of a return on their human capital investments. This could increase average skill levels further, whilst also depressing any negative employment effect.

Less restrictive forms of regulation such as certification and accreditation offer the possibility of ensuring quality for consumers and of providing practitioners with higher incomes and labour market status. However, they have the disadvantage of providing weaker incentives for upskilling since, in the absence of a universal entry barrier, the strength of any incentives for human capital investments will ultimately depend upon the degree of demand for certified/accredited workers in the product market.

Given that the theorised effects of occupational regulation are complex empirical studies are critical in understanding the effects of occupational regulation under different scenarios.

Existing evidence

As noted above, evidence of the impact of occupational regulation is limited, and that which is available tends to focus only on licensing, the strictest form of occupational regulation. The existing evidence is also heavily dominated by US studies.

The available evidence suggests that licensing is less common in the UK than it is in the US. The overall conclusions from the US studies on the impact of licensing are that, in general, occupational licensing increases the wage of licensed workers, reduces employment growth and raises the price of goods or services but without overall improvements in the quality of service or product offered. The magnitude of the effects vary by occupation and location. Notwithstanding this, there is very limited evidence on the impact on skill levels or the propensity to engage in job related training, as licensing tends not to have been introduced for these explicit purposes.

In relation to many EU countries it appears that the UK is less restrictive in its approach to regulating some professions, but that it is more restrictive than many in its approach to regulating lower skilled occupations. The available evidence on the operation of occupational regulation within countries such as Germany, France and Italy is extremely limited. However, wage premia do seem lower in some EU countries such as Germany than they are in the US. Post entry controls on the level of professionals' fees and, by implication, earnings have been offered as one potential explanation. This serves to indicate the importance of the broader regulatory framework (particularly competition law) in shaping the effects of occupational licensing.

In the UK, there is some evidence that the training requirements recommended or imposed in lower skilled occupations, through licensing, have had some effect in increasing the level of training and qualifications (e.g. among care workers). In other cases, however, (e.g. security guards) the existing evidence suggests that the new skill

standards have been too low (or the barriers to access them have been too high) to result in any substantial up skilling of the workforce in question. Existing research also indicates licensing is associated with a wage premium in the UK and that this is higher for the more skilled and better paid occupations. However, firm evidence on the employment effects of licensing is currently missing, as is evidence on the impact of regulation on product markets.

Mapping occupational regulation in the UK

In order to address the absence of any comprehensive information on the prevalence or nature of occupational regulation in the UK, we draw up a map of occupational regulation in the UK. The map has been compiled at SOC(2000) Unit Group level and classifies the type of occupational regulation that applies within each Unit Group, as well as providing a range of details about the characteristics and enforcement of these regulations. Among the 353 Unit Groups in the SOC(2000) Classification, some 82 contain jobs require licences to practice, 19 contain jobs for which there is a state based certification scheme, whilst 20 contain jobs that are subject to registration requirements. A further 67 Unit Groups contain jobs for which there exists a recognised, non-governmental accreditation scheme. This leaves 165 Unit Groups that are classified as being 'unregulated'.

The prevalence of occupational regulation in the UK

Estimates of the prevalence of occupational regulation are derived using data from the UK's Quarterly Labour Force Survey (QLFS). By matching the mapping spreadsheet to the QLFS one is able to classify each job in the economy according to the regulatory characteristics of the Unit Group to which it belongs. The estimates indicate that at least 14 per cent of all jobs in the UK are subject to licensing. At least three per cent have the option of certification, whilst at least 10 per cent have the option of accreditation. At least two per cent are subject to registration requirements. The true figures are likely to be higher, as precise estimates cannot be obtained for jobs belonging to Unit Groups where only some tasks are regulated. In total, at least 28 per cent of all jobs in the UK are covered by one of the four types of regulation, although the true figure is likely to be at least one third and may be as high as fifty per cent. The share of all jobs that are subject to regulation has risen over the period 2001-2010 through the combined effect of employment growth in occupations that were regulated in 2001 and the extension of regulation to occupations which were unregulated in 2001.

Professional occupations are the most likely to be regulated followed by Process, plant and machine operatives. Sales occupations, Skilled trades, Personal service occupations and Elementary occupations are the least likely to be regulated. Regulated jobs are more

likely to be held by men than by women. Those in the licensing and accreditation groups tend to be older, on average, than other groups, which may be related to the time investment that is sometimes needed in order to gain the qualifications or work experience that is required under a licence to practice or an accreditation.

The impact of regulation on qualification levels, training and wages in the UK

In order to provide new evidence on the labour market outcomes of occupational regulation in the UK, qualification levels, training receipt and wages among groups of employees who are subject to different forms of occupational regulation (including those in occupations which are unregulated) were compared using data from the QLFS.

Cross-sectional analysis was used to examine the extent to which any raw differences in wage levels, qualifications and the take up of job related training between workers in regulated and unregulated occupations persist after controlling for demographic and other job characteristics. Among Professional occupations and Associate Professional and Technical occupations, qualifications, wages and the take up of job related training were found to be higher among workers in licensed jobs than among workers in unregulated jobs, as the theory would predict. However, no consistent patterns are identified among other occupational groups or for other types of regulation. This suggests that unobservable factors may be at work which we were unable to account for in this cross-sectional framework with the data available from the QLFS. Such unobservable factors would confound any attempts to identify a causal effect of occupational regulation through cross-sectional analysis.

A difference-in-differences (DiD) approach was employed in an attempt to identify the causal relationship between occupational regulation and labour market outcomes. The analysis examined the wage differential (say) between the workers in a soon to be regulated occupation (the treatment group) and the workers in similar unregulated occupation (the comparison group). It then examined whether the magnitude of that differential changes after the treatment group becomes regulated.

The analysis focused on five occupations which saw either the introduction of regulation or a change in the type of regulation over the period 2001-2010, namely: security guards; care workers; social care managers; childcare workers; and automotive technicians. It identified some effects which could plausibly be attributed to the introduction of occupational regulation. These included a rise in wages among security guards following the introduction of a licensing system in 2003 and a rise in qualification levels and job related training among care workers as a result of the introduction of a organisation level licensing system in 2005.

Elsewhere, in the case of childcare workers and automotive technicians, we found no evidence that the introduction of occupational regulation had affected qualification levels, the take up of job related training or the level of wages. This may be because the regulations were somewhat weaker in these instances, placing qualifications requirements only on a minority of workers (in the case of childcare) or comprising only of a voluntary scheme (in the case of vehicle repairers). It is difficult to make generalisations from these few cases, but the evidence provided by the DiD analysis does suggest, quite plausibly, that the effects of occupational regulation can be expected to be stronger when the entry requirements are either higher or are more extensively applied.

Implications for action by policymakers and employers

This Evidence Report helps inform the implementation of policy in this area in England. The coalition government's skills strategy, *Skills for Sustainable Growth* (Department for Business, Innovation and Skills, 2010), expresses an intention to work with employers in introducing forms of occupational regulation, not just for consumer protection or for the public interest, but also to assist industry in becoming more competitive by raising skill levels. In working with employers to do this, the government has indicated that there is not a "one-size-fits-all solution". Indeed, in encouraging the design and establishment of new occupational regulation schemes to raise skills, the skills strategy requires industry itself to determine what would fit best for an occupation or sector.

Forms of occupational regulation, such as licensing, certification and accreditation, clearly have the potential to raise average skill levels in an occupation. They do so by providing new incentives for workers or firms to invest in occupation specific human capital. The incentives are clearly strongest – and more equally felt by both workers and firms – in the case of licensing.

The limited pre-existing evidence on the impact of occupational regulation in the UK indicated that such upskilling has occurred in some specific cases, and our analysis found further empirical support for this. However, our analysis also supported the notion that the effects on skill levels can also sometimes be limited. We find no widespread and consistent effects on skill levels. The effects appear to be heavily contingent upon the prevailing circumstances within a particular occupation (such as existing levels of training), the nature of the regulatory regime (e.g. the stringency of the new skill requirement) and the characteristics of the occupation's wider labour and product market.

At the heart of any policy on whether or not to regulate an occupation is a trade off between the potential benefits of occupational regulation and its potential costs. Economic theory tells us that the benefits of occupational regulation can include a more

highly skilled labour force, at least in the regulated sector, improvements in quality of goods or services provided in the regulated sector, and welfare benefits for the regulated sector in terms of wages and profits. It also tells us that the potential downsides include possible negative spillovers into the unregulated sector of the labour market, such as the depression of wages in adjacent labour markets due to labour supply shocks, and a diminution in the number of providers.

Our research has found some evidence of wage increases among regulated occupations, but the results were not consistent across all of the occupations that we have studied. We found no evidence of negative effects on employment. The potential downsides of occupational regulation were thus not prominent in our findings. However we were able to look at employment effects for only a small number of occupations and we were unable to look at price/quality effects. The evidence base on these issues thus remains relatively limited for the UK.

If policymakers or employers believe there is a strong prima facie case for regulation of a particular occupation, the other issue they face is how to regulate that occupation. This raises questions about:

- the **design** of the regulation (e.g. should a skill standard be mandatory or voluntary? At what level should the skill standard be set? Is this imposed on the employer or the individual? Is it a one-off enhancement or will there be a requirement to impose continuing professional development to continue to raise skills?);
- its **implementation** (e.g. should grandfathering be allowed for occupational incumbents?); and
- its **governance** (e.g. who is empowered to regulate the scheme? How and how often will standards be monitored to ensure these remain fit for purpose?).

These major design factors can be crucial in determining the actual effects of regulation, although there remains little research evidence on their relative impact.

Two policy considerations emerge from the discussion above. The first is whether there is a prima facie case for regulating a particular occupation. The second consideration is how to go about creating, enforcing and monitoring the regulation. One would expect the latter to be just as important as the former in determining ultimate labour market and product market outcomes.

There may be analogies with the policy making considerations which surrounded the introduction and enforcement of the statutory national minimum wage. The costs and

benefits of the regulation of prices for labour were central in that instance, as were alternative models for setting a wage and enforcing it. If anything, occupational regulation is liable to be more complicated since it must cover a variety of different policy instruments relating to different occupations. The design of such policies therefore requires extensive knowledge of labour market and product markets, and of the incentives and constraints which apply to the various actors within them. The analysis conducted in this research project has identified considerable heterogeneity, both in the design of occupational regulations within the UK and in the apparent impact of regulation across different occupations. This indicates that the detailed outcomes of regulation – and thus the case for regulating – can only be determined on a case by case basis. However, the research also serves to indicate the wide range of factors which should be taken into account in that determination.

1 Introduction

1.1 The origins of the report

This report uses the term ‘occupational regulation’ as a broad heading for various mechanisms through which minimum skill standards are applied within occupations. Such mechanisms provide incentives for workers and employers to invest in skills by establishing a framework of rewards which are contingent upon successful attainment of a specified skill level. As such, they are considered to be one possible means by which the skills base in the UK can be improved, so as to help it develop a world class skills base (see Department for Business, Innovation and Skills, 2010).

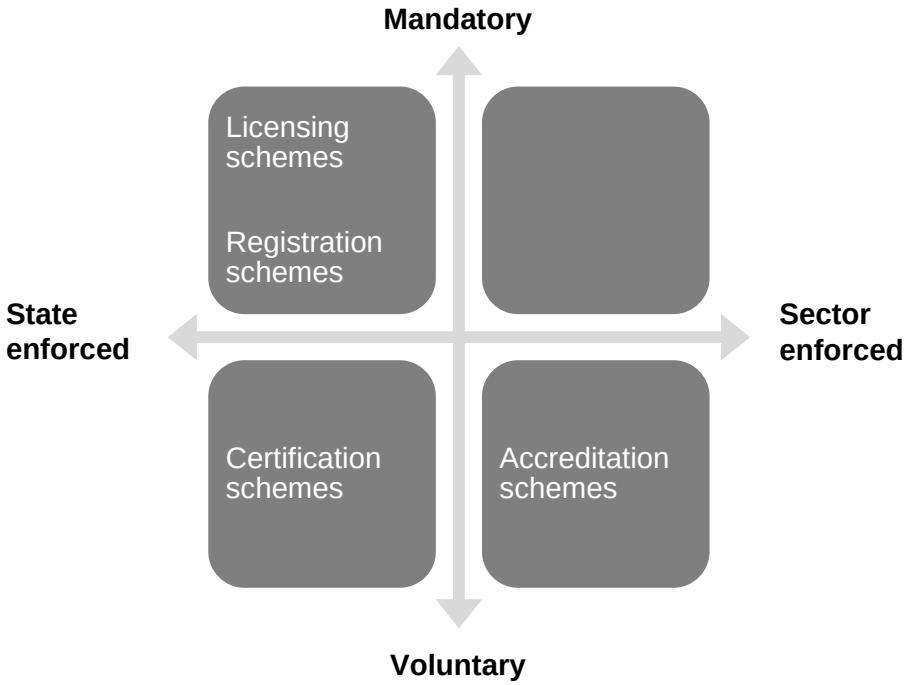
The use of occupational regulation as a mechanism for increasing the demand for, and supply of, skills was considered – alongside other measures such as training levies – as part of the UK Commission for Employment and Skills’ recent Review of Employer Collective Measures (Stanfield *et al.*, 2009).[1] However, that Review acknowledged that the general topic of occupational regulation remains under researched in the UK. It went on to recommend that a further, more detailed investigation of the issue should be carried out in order to provide a more extensive and fully informed platform for policy making in this area. This report presents the findings from that investigation.

1.2 The scope of the research

The research is concerned with forms of regulation (whether mandatory or voluntary) which introduce *minimum skill standards* within certain occupations. The existing research literature in the area of occupational regulation, by contrast, is centrally concerned with *legal barriers to entry*. The two intersect in the case of ‘occupational licensing’, which Kleiner (2000) defines as "a process whereby entry into an occupation requires the permission of the government, and the state requires some demonstration of a minimum degree of competency" (see Figure 1.1). The project has such ‘licences to practice’ as a central focus. However, the boundaries of the project have been drawn more broadly so as to include the other forms of state based and voluntary occupational regulation.

[1] The Review focused mainly on one form of occupational regulation, namely occupational licensing.

Figure 1.1 A typology of occupational regulation



State certification schemes are a common counterpoint to mandatory licensing schemes in the research literature. Run by state appointed regulatory bodies, certification schemes place no barriers on entry to an occupation but provide a means by which practitioners may voluntarily be certified by the state as meeting a prescribed skill standard. They are thus in scope to the research as a form of non-mandatory, state based regulation.

Voluntary schemes which require an applicant to demonstrate a minimum degree of competence are also in scope. These schemes – which we refer to as 'voluntary accreditation schemes' – are typically run by bodies representing the members of a particular occupation or the employers within a particular industry. They provide an important comparator to otherwise equivalent state based certification schemes. In order to be considered as a form of 'regulation', and to maintain equivalence, we focus on recognised accreditation schemes which constitute some form of occupation or industry wide standard. Situations in which firms have their own individual accreditation schemes are considered to be out of scope. Equally, we consider as out of scope simple conventions, whereby the various employers for a particular occupation may typically require a certain qualification but where there is no coordination mechanism for either determining or upholding the standard.

Finally, we also include state based registration schemes, in order to maintain a direct read across to the existing research literature on occupational regulation, which is

primarily concerned with standards based entry barriers rather than skills *per se*.[2] Registration schemes introduce a legal barrier to entry which requires a person to register their details with the state in order lawfully to practice in an occupation; unlike licensing and certification, registration does not require a person to demonstrate a minimum level of competence.

We therefore focus on three forms of legal regulation (licensing, certification and registration) and one form of regulation (accreditation) that has no legal backing or state involvement. From another perspective, we focus on three forms of regulation that involve prescribed skill standards (licensing, certification and accreditation) and one which does not (registration). A more detailed description of each form of regulation is provided below.

- **Licensing:** This refers to situations in which it is unlawful to carry out a specified range of activities for pay without first having obtained a licence which confirms that the licence holder meets prescribed standards of competence. The award of the licence to practice is typically conditional upon the job holder: (i) being able to prove that they hold specified qualifications: (ii) possessing a prescribed amount of relevant work experience; (iii) obtaining a pass in a licensing examination; or, occasionally, all three. Workers who require such licences to practice in the UK include doctors, solicitors, veterinary nurses, private security guards, gas installers, taxi drivers and heavy goods vehicle drivers.
- **Certification:** This refers to situations in which there are no restrictions on the right to practice in an occupation, but job holders may voluntarily apply to be certified as competent by a state appointed regulatory body. Again, certification may depend on possession of appropriate qualifications, possession of relevant work experience or successfully passing a certification examination. Workers in the UK who may apply for certification include fitness instructors (who may apply to be certified by the Register of Exercise Professionals) and hairdressers (who may apply to be certified by the Hairdressing Council). Certification is a weaker form of regulation than licensing because it does not prohibit those without a licence from carrying out the activities.
- **Accreditation:** We use this term to refer to situations in which an individual may apply to be accredited as competent by a recognised professional body or industry association. Accreditation is analogous to certification, in that it confers a mark of competence which is recognised as such by other practitioners or consumers. In common with certification, accreditation may also bring with it a specific title or label; for example, only those personnel managers accredited by the Chartered Institute for

[2] Most of the academic literature on occupational licensing is focused on entry barriers.

Personnel and Development may use the letters MCIPD.[3] However, accreditation is distinct from certification in that the accreditation process has no involvement from the state. The criteria governing accreditation and the procedures regarding enforcement are thus entirely the responsibility of the accrediting body.

- **Registration:** This refers to situations in which it is unlawful to practice without having first registered one's name and address with the appropriate regulatory body. Other conditions are sometimes also imposed, such as the requirement to hold a clean criminal record or to have never previously been declared bankrupt. However, registration does not involve any explicit test of competence. Registration thus provides some form of legal barrier to entry, but its impact on skill levels within an occupation can be expected to be small when compared with licensing. An example in the UK is the requirement for estate agents to register with the Office for Fair Trading under regulations designed to prevent money laundering.

In this report, we use the term 'occupational regulation' as a broad heading for these various forms of standard setting mechanisms. Occupations which are not regulated in any of these ways are termed 'unregulated'.

1.3 Some further comments

The scope of occupational regulation in the UK is broad in nature. Regulations apply to individual occupations within the *managerial*, *professional* and *non-professional* sections of the occupational hierarchy. Licensing schemes, for example, are in operation for the managers of residential care homes, for social workers and for private security guards.

Occupational regulation in the UK can occur at a *local* level, although the overwhelming majority of regulation is applied and managed *nationally*. For example, the regulations applying to market traders or taxi drivers are administered locally, with local authorities determining who should be issued with a licence, whereas the regulations applying to doctors are administered nationally by the General Medical Council.

Some forms of regulation do not apply directly to individual workers but, instead, apply indirectly via requirements which are placed on the firms that employ those workers. For example, it is required under the Food Hygiene Regulation EC 852/2004 that kitchen workers who handle food are supervised by someone that possesses a current Food Hygiene and Safety Certificate. Similarly, between 2005 and 2010 there was a requirement for all residential care homes to have at least fifty per cent of their care workers trained to NVQ Level 2. Such regulations – which make the award or retention of a workplace's licences to practice dependent upon the attainment of a skills quota within

[3] If a non accredited personnel manager were to do so, they would be open to charges of fraud or false advertising.

its workforce – are likely to affect the demand for skills among workers within the relevant sector, although the effects can be expected to be smaller than if the regulation were to apply directly to all workers in that occupation. Regulations which impose a skill quota upon workplaces as a condition of the award or retention of workplaces' licence to practice are in scope to the research. We refer to them as 'organisation level licensing schemes'

However, where firms run their own individual training or accreditation schemes these are deemed to be out of scope to the research since, in such cases, there is no occupation or industry wide co-coordinating mechanism for establishing or maintaining occupational entry standards. Likewise, industry codes of practice are also out of scope if they do not incorporate specific requirements about the skill standards to be met by those working under such a code.[4] Furthermore, skills passports initiatives, administered by Sector Skills Councils and industry bodies, are also out of scope to the research because they merely provide a record of an individual's skills rather than placing requirements on the skills they must possess.

1.4 Aims and content

The principal aims of the research project are as follows:

- to provide a discussion of the existing theory on occupational regulation;
- to provide a detailed review of the existing evidence on occupational regulation in the UK, Europe and North America;
- to provide a comprehensive map of occupational regulation in the UK;
- to produce estimates of the labour market impact of occupational regulation in the UK.

The outputs are presented in subsequent chapters of the report, which are organised as follows:

- Chapter Two presents a detailed discussion of the theory of occupational regulation. The aim of this chapter is to indicate the range of direct and indirect effects of occupational regulation on labour and product markets.
- Chapter Three presents a review of the existing evidence on the prevalence, labour market impact and product market effects of occupational regulation. The chapter begins with a discussion of the United States, where the evidence is most extensive, and Canada. It then goes on to discuss the limited existing evidence for the UK,

[4] Most do not, setting guidelines only for the way in which prices are advertised, complaints dealt with and so on, or stating in an unspecified way that job holders should be 'competent'.

before moving on to discuss the regulation of occupations within the European Union more broadly.

- Chapter Four describes the results of a mapping exercise whereby the extent and nature of occupational regulation has been charted in managerial, professional and non-professional occupations in the UK. The mapping has been undertaken at the Unit Group level of the *Standard Occupational Classification (2000).*
- Chapter Five uses the information obtained in the mapping exercise on the regulation status of each Unit Group to derive estimates of the prevalence of each form of occupational regulation in the UK. These estimates are based upon Unit Group data obtained from the Quarterly Labour Force Survey (QLFS).
- Chapter Six presents further analysis of the QLFS in which multivariate methods are used to compare levels of qualifications, training and wages among groups of employees who are subject to different forms of occupational regulation (including those in occupations which are unregulated). A 'difference-in-differences' approach is taken among a subset of recently regulated occupations in order to estimate the independent causal impact of regulation on such labour market outcomes.
- Finally, Chapter Eight provides a summary of the findings of the research project and presents some conclusions.

The research project also included a feasibility study to explore the possible alternatives to a SOC based approach to the measurement of occupational regulation in the UK. The conclusions of this feasibility study are presented in an annexe to this report.

2 Theoretical perspectives on occupational regulation

Chapter Summary

- Occupational regulation has the potential to serve as a strong incentive for employers and workers to invest more heavily in the acquisition of skills. It can therefore contribute to efforts to address the failures which are considered to exist in the market for skills investment in the UK.
- *Licensing* is the most restrictive form of such regulation. It restricts entry to an occupation to those who are able to meet a prescribed skill standard.
- The mandatory nature of this requirement can be used as a lever to raise the stock of human capital in the occupation. The quality of the product or service that is provided may increase as a consequence, whilst low-quality producers are driven out of the market.
- Licensing, however, is expected to have some broader effects on labour and product markets. First, it is likely to restrict the supply of labour to the licensed occupation and thus to enable practitioners to raise the price of goods and services. Such monopoly rents may be apparent in wage increases for incumbents. Second, it will force those who cannot meet the licensing requirements to migrate to similar non licensed occupations, thus putting downward pressure on the wages in these occupations.
- The scale of any product and labour market effects which arise from alternative modes of regulation (namely *certification*, *accreditation* and *registration*) are expected to depend on the demand for such practitioners in the market and the extent to which consumers are prepared to pay a premium for such services.

2.1 Introduction

The contention that the current level of investment in skills in the UK is sub-optimal is a prominent element which underpins much of the policy discourse (see, for example: Department for Business, Innovation and Skills, 2010). The hypothesis is that there are failures in the market for investment in skills, caused by (among other things): a lack of reliable information for workers or employers on the likely benefits that may accrue for skills investments; problems in obtaining funding to invest in skills; or employers' inability

to recoup investments in skills because of poaching (see Keep, 2006, for a broader discussion).

It is argued that there is a case for state intervention to address these market failures, with a variety of policy levers being available. These include mandatory training levies and loan guarantees. The introduction of skill based entry barriers, through the imposition of a requirement for workers to possess a licence to practice in their chosen occupation, is another such lever. Licensing systems require a worker to demonstrate a particular level of competence (usually through the possession of a relevant qualification) before they are legally permitted to carry out the activities of a specified occupation. As such, they provide an "absolute incentive" for skill investments, and so are expected to provide a stronger motivation than many other incentives to engage in training (such as observation of the likely wage returns) (Keep and James, 2010).

However, the UK Commission's Review of Collective Measures (Stanfield *et al.*, 2009) noted that the introduction of licensing brings costs as well as benefits, and that there are risks of unintended consequences for both labour and product markets. A fuller understanding of these potential consequences can be obtained through a detailed discussion of the theory of licensing. Such an overview is presented in this chapter.

The theoretical overview initially presents the development of the theory on occupational licensing. It then goes on to discuss the rationale for the introduction of licensing, followed by an overview of the role of quality and restriction of supply when governmental regulation is introduced. The theory of occupational licensing is then discussed within a supply and demand framework. The implications of governmental standardisation of policies for practitioners and consumers are also highlighted.

Later sections of the chapter move on from licensing to discuss the theorised effects of other forms of regulation, namely certification, accreditation and registration. The theoretical literature is much less developed in these areas. However, we provide some discussion of the possible implications for skill levels, as well as pointing to some of broader possible effects on labour and product markets.

2.2 Evolution of theories on occupational licensing

In this section we review the evolution of theories of occupational licensing from mechanistic ones to those that utilise human capital theory. Within this context, we note the role they might have in workforce development. We begin the discussion by outlining the simplest theory of occupational licensing, which draws more on administrative procedures than on economics. We then bring in insights from more complex theoretical

models which challenge some of the straightforward assumptions of the simple theory and which thereby provide richer insights into the operation and effects of regulation.

2.2.1 An administrative theory of licensing

A simple theory of licensing envisions an essentially costless supply of unbiased, capable gatekeepers and enforcers. The gatekeepers screen entrants to the occupation, barring those whose skills or character suggest a tendency toward low quality output. The enforcers monitor incumbents and discipline those whose performance is below standard with punishments that may include revocation of the licence needed to practice. Assuming that entry and ongoing performance are controlled in these ways, the quality of service in the profession will almost automatically be maintained at or above standards that are typically set by the profession. Within this approach only those who have the funds to invest in training and the ability to do the work are able to enter the occupation.

We can add some economics to this otherwise mechanical model by noting that a key discipline on incumbents — the threat of loss of licence — may not mean much if incumbents can easily re-enter the profession, such as by moving to a new firm, or can shift to an alternative occupation with little loss of income. Since grandfathering (i.e. allowing current workers to bypass the new requirements) is the norm when occupations seek to become licensed, incumbent workers are usually supportive of the regulation process. In the absence of grandfathering, lower skilled workers in the occupation may have to seek alternative employment. For example, if sales skills are the key to both providing licensed financial services and the non-licensed selling of shoes or cars, then individuals may shift between these lines of work with little loss of income.

Under these circumstances, meaningful discipline for licence holders may require deliberate steps to ensure that loss of licence entails significant financial loss. Such additional steps could include imposition of fines, improved screening to prevent expelled practitioners from re-entering the occupation, or requiring all incumbents to put up capital that would be forfeited upon loss of licence. To offset the possibility that incumbents could shift to other occupations with little loss of income, entry requirements could be tightened to limit supply and create monopoly rents within the licensed occupation. The threat of losing these monopoly rents could, in principle, give incentives to incumbents to maintain standards. This may also result in some increases in human capital investments in order to attain the additional requirements. The rents also could motivate potential entrants to invest in high levels of training in order to gain admittance. This suggests that licensing can raise quality within an industry by restricting supply and raising prices. Increasing prices may signal either enhanced quality due to perceived or actual skill enhancements

or restrictions on the supply of regulated workers. Workforce development of the skills of licensed workers may gain at the cost of consumer prices.

State regulated occupations can use political institutions to restrict supply and raise the wages of licensed practitioners. There is assumed to be a once and for all income gain that accrues to current members of the occupation who are “grandparented” in, and do not have to meet the newly established standard (Perloff, 1980). Generally, workers who are “grandparented” are not required to ever meet the standards of the new entrants. Individuals who attempt to enter the occupation in the future will need to balance the economic rents of the field’s increased monopoly power against the greater difficulty of meeting the entrance requirements.

Once an occupation is regulated, members of that occupation in a geographic or political jurisdiction can implement tougher statutes or examination pass rates and may gain relative to those who have easier requirements by further restricting the supply of labour and obtaining economic rents for incumbents. Restrictions would include lowering the pass rate on licensing exams, imposing higher general and specific requirements, and implementing tougher residency requirements that limit new arrivals in the area from qualifying for a licence. Moreover, individuals who have finished schooling in the occupation may decide not to go to a particular political jurisdiction where the pass rate is low because both the economic and shame costs may be high.

One additional effect of licensing is that individuals who are not allowed to practice at all in an occupation as a consequence of regulation may then enter a non-licensed occupation, shifting the supply curve outward and driving down wages in these unregulated occupations. If licensing requirements contain elements of general human capital, then it is possible that these workers may raise the average level of skills in their new occupation. On the other hand, if the requirements for licensing are highly specific to the occupation, then skills in the alternative occupation are unlikely to improve.

2.2.2 More complex theories of licensing

Friedman (1962) questioned the assumption of unbiased gatekeepers and enforcers and viewed licensing’s entry restrictions and monopoly rents as negative. He argued that licensing systems are almost always run by and for incumbents, so that gatekeepers and enforcers are in reality self-interested. Their vested interests lead them to not only create monopoly rents through restrictions on entry but also to stifle complaints and disciplinary procedures against most incumbents. Weak discipline on incumbents, along with artificially high client provider ratios, lead to a decrease in the overall quality of service that consumers receive. In other words, Friedman predicts that licensing reduces the size

of an occupation and leads to a combination of higher fees for providers and lower quality for consumers. The argument is that consumers will have only high quality services or none at all, and this would price low and middle income workers out of the service. Such employment losses would occur because consumers would purchase services from workers in adjacent unregulated occupations, and an underground market would develop for lower priced but unregulated services, or they would delay or go without these services. Therefore, overall consumer welfare would decline.

Friedman also stresses that the proper measure of quality is the overall quality of services received by consumers, not the average quality of services provided by licensed providers, because licensing, by raising prices within the licensed occupation, may cause consumers to seek substitute services from unlicensed occupations that provide lower quality output. Friedman's analysis led him to conclude that licensing had no useful role, except possibly in very limited circumstances involving externalities. In these conditions one could imagine lower quality or unlicensed boilermakers, whose poor quality might result in a building being set ablaze, or a worker who does the work of a doctor but who fails to detect a communicable disease. Licensing could set a standard where unregulated competition would result in too low a standard, so that the worse outcomes of service providers might be avoided.

The development of further theories of licensing was spurred subsequently by Akerlof's (1970) analysis of how information asymmetries about the quality of goods could lead to adverse selection and the predominance of low quality goods in unregulated markets. These more recent models ignore Friedman's concerns about self-interest and also largely disregard the disciplining of incumbents in order to focus on more realistic modelling of the capabilities of gatekeepers.[5] In particular, they assume that neither regulators nor consumers can directly observe the quality of producers ex-ante. These models then explore how the theory of licensing changes when entry barriers depend only on information that might realistically be observed. The newer models include not only unobserved heterogeneity in quality among producers, but also heterogeneous tastes for quality among consumers. The newer models yield a mixed perspective on the effects of licensing: licensing can increase the average quality of service within the occupation, but this change benefits some consumers who prefer high quality and harms others who may be satisfied with a lower quality service, and cannot legally obtain it.

In some of the new models, licensing requirements take the form of unspecified fixed costs controlled by the licensing authority, broadly similar to typical licensing requirements such as payment of an annual licensing fee or maintenance of a surety

[5] In fact, a common assumption of these models, as in Shapiro (1986) or Rogerson (1983), is that quality is chosen at the time of entry and cannot be changed thereafter, so that enforcement of standards on incumbents is meaningless.

bond. In one highly cited model (Shapiro, 1986), skill affects the relative cost of producing high quality services, and licensing takes the more specific form of a minimal human capital requirement, similar to actual requirements that entrants and sometimes incumbents take certain training programs or pass an exam. Apart from these special fixed costs, entry into and exit out of the occupation are unrestricted, which ensures that providers earn zero profits in equilibrium. In this economic model there are no incentives for human capital development after entry.

The basic theory, which is based on Shapiro (1986), represents a fixed unit mass of consumers uniformly distributed from lowest preference for quality services, corresponding to zero, to highest, corresponding to one. In the model there is heterogeneity among consumers and providers of the service. Each consumer consumes one unit of service per period.[6] Consumers can choose among three markets: a market for mature producers known to sell high quality services, a market for mature producers known to produce low quality services, and a market for young producers whose quality of service (low or high) is not known by the consumer at time of purchase. The aggregate demand curve for services in the low quality-only market, relative to the number of units demanded that is measured, is either limited or nonexistent. Initially proportions of low and high quality producers in the economy would prevail among the new practitioners in the mixed market but in the long run would show an increase in those who provide high quality services with regulation, and those who ask for and receive low quality services would be limited (see Kleiner and Todd, 2009). Overall, the number of persons going into the licensed occupation in this model would not increase, rather the distribution would change within the occupation toward the consumer who wants higher quality, and they would receive an even higher quality service at a lower price than if licensing did not exist in the occupation.

Suppose an increased fixed cost requirement is imposed by the licensing authority (which in the context of this research project might be the requirement for an individual to make investments in their level of human capital). This makes low quality production unprofitable at the initially prevailing prices. In the new steady state, there are fewer mature low quality producers. With no other changes, this would raise the blended price in the mixed quality market and cause lifetime profits for high quality producers to exceed zero. Hence more producers choose to be high quality, raising output in the high quality-only market and lowering price. Consumers in the high quality market are clearly better off in the new steady state, because they consume the same high quality service as in the initial steady state but at a lower price. By similar logic, consumers in the low quality

[6] Other models allow the total number of consumers and thus aggregate demand to vary; see Garcia-Fontes and Hopenhayn (2000).

interval are clearly worse off. This illustrates how, in asymmetric information models such as the one noted by Shapiro, licensing tends to generate outcomes where some consumers gain at the expense of others. However, the new models resemble the simple model above in predicting, typically, that both the average quality and the average price of services within the regulated industry will rise as licensing requirements are tightened. Thus, compared to the simple model, the asymmetric information models add more realistic assumptions about what licensing gatekeepers can see or control and yield deeper insights into the welfare effects of licensing, but their predictions regarding quality and price are similar. A possible effect not explicitly illustrated here is that the passage of tougher regulations not only raises providers' costs but also shifts out the demand for their services, by enhancing consumers' confidence that these services are of good quality. This effect would operate in the market for young providers whose quality is not yet known. An outward shift in demand would accentuate the increase in the price of services, boosting provider incomes. In more general models where the total number of providers is endogenous, this effect can offset the direct effect of higher production costs, so that the overall effect of tighter regulation on the number of providers becomes ambiguous. Overall the workforce implications of these models are at best murky.

2.3 Why do occupations become licensed?

The current policy interest in licensing derives from its potential to serve as a strong incentive for employers and workers to invest more heavily in skills and address sub-optimal investment where that arises. The notion is that, by introducing an entry barrier based on the attainment of a specified level of competence, the state (or its agents) will motivate both incumbents and new entrants alike to raise their skill to a pre-specified level which is necessarily higher than the current minimum level seen within the occupation. This is not the typical motivation for licensing. Consequently, in this section we go on to review some of the other (more common) reasons as to why occupations may become subject to regulation. The motivations for regulation can be grouped under four headings: information asymmetries; quality standardisation; quality signalling; and rent capture. The first three concern issues of public interest, whereas in the fourth, the motivation is primarily self-interest on the part of incumbents. An understanding of these motivations is important when trying to understand possible effects on labour and product markets.

2.3.1 Information asymmetries

As noted earlier a theoretical justification for licensing is that there are market failures due to asymmetric information on quality between producers and consumers that regulation can correct. Such failures can occur if it is more difficult for consumers than sellers to determine the quality of a service offered. Generally, licensed occupations claim that they will successfully cope with such undesirable market failures. Many of the occupations provide training programs to their new and continuing members that highlight the important benefits to the public of licensing their occupation (Benham, 1980). All else equal the process would enhance the educational levels of the workforce and enhance aggregate productivity in a nation.

One of the major issues on costs and benefits of occupational licensing is that initially, licensing may be the product of consumer demands for higher levels of credible information on the quality of service (Law and Kim, 2005). During the early period of regulation in the US, there was a period where licensing laws were passed in response to the growth of knowledge within the professions and the reduction in transportation costs that made urbanisation more feasible. The theory suggests that urbanisation and population density were the dominant factors in the passage of initial licensing laws during the 20th Century in the United States. Evidence of information asymmetry as the major force for regulation may occur as individuals move to an urban area and have no information on the quality of key service providers such as lawyers and doctors. A similar argument can be made currently for the maintenance of licensing laws as immigrants, the poor, and the elderly also have little knowledge of doctors' or lawyers' competences or have little experience with information sources like the internet or other sources of data on service quality. Consequently, licensing may provide a relatively low cost method of providing information on critical services.

The structure of the market may nevertheless result in the demand for licensing being lower than optimum because of potential "free rider" problems that occur because consumers purchase professional services infrequently (Cox and Foster, 1990). Consequently, an individual consumer may incur high costs learning about a particular profession and determining which type of regulation is in their best interests. Moreover, the costs of taking action may be high since there are large costs associated with informing and organising a large group of consumers to take action. Many may not join to obtain the optimum amount of occupational regulation because they think that others may take group action. This is the case if the purchase price of the service were low. As a result consumers would rarely demand occupational licensure, or demand increases in entry requirements once an occupation becomes licensed.

2.3.2 Quality standardisation

One of the potential benefits of regulation is to provide a common body of knowledge or skills within the occupation as well as provide consumers with a more homogenous service than would exist without regulation. Education levels, testing and other forms of background checks provide this standardisation of the job related quality of human resources that are supplied to the occupation. Governmental boards in cooperation with occupational associations have prescribed a set of standard procedures that are appropriate for the occupation, such as the ones in dentistry and for dental hygienists. This further standardises the type of service that is given to consumers**.** A major argument for the licensing of occupations is that it eliminates the downside risk of seeking the services from an occupation. If testing and background checks **"**eliminate charlatans, incompetents or frauds" then consumers may be willing to pay a higher price for the service offered by the regulated occupation. A review of the body of theory from experimental economics and psychology shows that consumers value the reduction in downside risk more than they value the benefits of a positive outcome (Kahneman *et al.*, 1991). This preference by consumers of the status quo or reducing risk of a highly negative outcome has been called "loss aversion" which is an element of "prospect theory" developed by Kahneman and Tversky (1979). For example, as discussed earlier, the utility to society may be greater by minimising the likelihood of a poor diagnosis as a consequence of going to a poor doctor, because the incompetents have been weeded out as a result of licensing. Consequently, the perceived benefits of a nonstandard but potentially highly positive outcome of going to an unlicensed biomedical research scientist still may not be worth it. Using the power of the state to both limit the downside risk of poor quality care yet reduce the possibility of an upside benefit may be a trade off that maximises consumer utility or welfare. Evidence of the acceptance of this tradeoff is the growth of occupational licensing during the past century across virtually all nations that have been studied.

The gains from an unregulated service can be potential benefits from free market competition of lower prices and greater innovation without the constraints of a regulatory body, such as a licensing board. This upside potential gain can be through both the use of nonstandard methods or new research that has not been approved by the licensing agency as appropriate for the service (Rottenberg, 1980). Deviations from prescribed methods of providing a service are discouraged by licensing boards, and may even be found to be illegal. For example, not having a dentist on site is illegal in the US when providing a service such as cleaning of teeth. Dental hygienists generally are not allowed to "practice" without a dentist on site, with the "site" being defined by statute or the dental board. In addition, dental hygienists are not allowed to open offices to compete with

dentists. Although this policy protects against downside losses of finding a major disease that may require immediate attention, it reduces the ability of the hygienist to provide only the service that is useful for the patient. Moreover, there is little leeway for the dental service industry to provide new or innovative services without being found in violation of the licensing laws. It may in some cases be an example of the labour relations concept of "featherbedding," in which dentists are on the premises, but do little work.

Voters, through the political process, often prefer to reduce the downside risk of any service. The outcome of "risk aversion" comes at the expense of having the upside of any service reduced. Consequently, licensing provides consumers with the benefit of perceived higher quality through observed preferences for higher levels of regulation (see Leland, 1979). As discussed earlier, an additional societal cost is the reallocation of income from consumers to practitioners of the licensed occupation as well as lost output. The cost of licensing is a calculus that consumers should take into account as part of their evaluation of this labour market institution relative to others.

2.3.3 Quality signalling

An alternative explanation for the rationale for benefits and costs of attempting to enter an occupation comes from the "club model" which purports to show the rationale for non-profit organisations engaging in exclusive behaviour and having especially high time costs of entry (Iannaccone, 1992). Occupations can limit entry as a method to "signal" quality and to show both those in the occupation and outsiders that individuals are committed to the work of the occupation (Spence, 1973). "Signalling" explains apparent inefficiency: time and money "wasted" to acquire a college degree or "irrational" attachments to honesty, loyalty, or the giving of "inefficient" presents like certificates or licences rather than cash (Frank, 1988). If licensing is only a signal rather than providing true value added, it provides little enhanced quality to consumers.

This in part explains the high entry costs and initiation rights that are often required of licensed occupations as well as the exclusive nature of this form of regulation, where individuals not in the "club" are precluded from working in the field. Further, these time costs can screen out people whose participation in the occupation otherwise would be marginal, while at the same time increasing participation among those who remain, thereby increasing the perceived quality of the individuals in the occupation. Individuals who want to enter an occupation must exhibit the resiliency of the potential shame costs of the stigma of failing an exam and the self-sacrifice of schooling, time spent studying for and taking licensing exams, residency requirements, and oaths of loyalty and honesty (Kandel and Lazear, 1992). In this case individuals with higher ability or smaller opportunity costs of doing other jobs will spend the time and money to become licensed.

A further explanation of the societal benefits and cost of licensing can be found in the theory presented by Hirschman and then applied by Freeman and Medoff to explain how unions can have both a positive "voice effect" on productivity and a negative "monopoly effect" (Hirschman, 1970; Freeman and Medoff, 1984). A similar approach also could be applied to occupational licensing. The monopoly face of licensing is generally presented as the principal outcome of regulation by most economists (Rottenberg, 1980). However, licensing involves member activities to discuss and promote positive aspects of their work experience, disseminate information about how to do the job better, engage in job specific training, promote ethical standards, or devise methods of adjudicating disputes between consumers and producers. Each of these policies have the ability to promote "high performance workplace practices" within the occupation.[7] A third element deals with the extent to which regulation affects the rate of exit from the occupation if the economic or social standing of the work substantially declines. Perhaps the "club model" discussed above requires sufficiently large time commitments upon entry, and this may result in relatively few persons leaving these licensed occupations over time. Unlike unionisation, where employees can lose their job in the unionised setting and find another one in the non-union sector, licensed workers may be more likely to maintain their regulated status throughout their working lives.

2.3.4 Rent capture

Occupational regulation has grown, in part, because it serves the interests of those in the occupation as well as government. Members of an occupation benefit if they can increase the actual or perceived quality and thus the demand for their services, while restricting supply simultaneously. Government officials benefit from the electoral and monetary support of the regulated occupation as well as the support of the general public, whose members think that regulation results in quality improvement, especially when it comes to reducing substandard services. In this case licensing may restrict opportunities and could contribute to structural unemployment thus reducing workforce development and employment outcomes, and reducing the efficiency of the labour market.

For the members of the occupation, obtaining licensing from government is generally the objective, because it imposes state sanctions on new entrants or for those moving in from another political jurisdiction. In the UK this could result in limiting immigration of practitioners from other nations.[8] For the administrators of the professional association, the resulting increase in responsibility and revenue from dues and continuing education

[7] On the other hand, using the government to restrict supply in order to increase prices for the services offered, which in turn increases wages would be the central element of the "monopoly face" of occupational licensing.

[8] EU regulations ensure free movement of workers within the European Union, but occupational entry requirements could limit immigration from non EU countries.

usually results in an increase in pay. Moreover, most licensing provisions require continuing education classes for fees, which raise the revenue of the occupational association. For the occupational association, obtaining licensing legislation means raising funds from members to lobby local or national political leaders particularly the chairs of appropriate legislative committees. In addition, the occupational association often solicits volunteers from its membership to work on political campaigns. With both financial contributions and volunteers, the occupational association has a significant ability to influence legislation, especially when opposition to regulatory legislation is absent or minimal. In the United States, politically active groups have opposed the imposition of new licensing legislation from time to time. These include good government groups and associations of retired workers, who may have to pay higher fees or wait longer in order to obtain a service if regulation is implemented. Occupational licensing may not contribute to good workforce development when captured by members of the occupation.

As mentioned earlier, licensing is assumed to affect demand through controls on entry and this impacts on quality (Benham, 1980). The expectation from economic theory is that licensing may create windfall gains or rents, and that these prospective gains in income provide an important impetus for licensure. The threat of loss of rents is a major reason why removal of licensure is so strongly resisted by members of a licensed occupation. Another benefit is the ability of licensing to provide some hedge against downside risks because of the organisation's ability to reduce competition differentially when conditions are bad (Wheelan,1998). Licensed occupations are able to limit supply in response to market conditions through changing licensing statutes or through extending the required training program for entry or reducing the numbers who pass an entrance exam. For example, Ballou and Podgorsky argue that, by lengthening the period of time that it takes to become a teacher, otherwise qualified applicants seek other unregulated occupations which have fewer legal restrictions resulting in lower qualified individuals with fewer labour market opportunities becoming teachers (Ballou and Podgorsky, 1998).

The "capture theory" of occupational regulation suggests that the occupations often expend considerable resources in an attempt to convince legislators that regulation will benefit the public. It argues that licensing is a response to professionals who seek to protect themselves from competition. If demand for the service is relatively inelastic, then higher prices will lead to higher incomes. Moreover, occupational licensing also could be viewed as a form of career insurance. If licensing reduces competition, members of the regulated occupation are less likely to be forced out, and be trained for another occupation. The prediction from microeconomics is that the lower the elasticity of demand

of the occupation's services, the greater the benefit of regulation to the members of the occupation (Stigler, 1971). Consequently, the theory would predict that the benefits of regulation to dentists, for example, would be greater than for barbers or cosmetologists because the availability of substitutes for dental care, even including those who give themselves root canals, would be lower than for cutting hair.

The demand for regulation by the individuals in these professions is less likely to be affected by the kind of free rider problem faced by consumers. Individuals in the occupations have a greater interest in and knowledge of regulation affecting their line of work than most consumers, and a greater ability to act together. Consequently, the costs of organising behind a type of regulation are relatively less than for consumers, and the benefits to individuals in the occupation are more likely to be higher (Wheelan, 1998). Even though there are incentives for both consumers and producers of the service to demand regulation, consumers are rarely the moving force behind occupational regulation, possibly because of the issues cited above. Members of the occupations generally demand licensing laws at least in part due to the potential benefits of higher pay and control of entry into market for the occupation similar to a union's "closed shop".

A political campaign for regulation, where members tax themselves and apply those funds in the political arena, is likely to be more successful if the consumers are individuals rather than larger institutions like hospitals (Graddy, 1991).[9] Wheelan (1998) suggests that support for both the public interest and rent capture theories discussed above would come from occupations with higher insurance premiums, which indicate greater risk to the public and are more likely to be regulated, and this indicates support for the public interest model. However, the number of members and the organisation's budget, as well as the client type, personal versus institutional, all show support for the rent capture rationale for licensing the profession.

2.4 Summary of the theoretical effects of licensing

The introduction of a 'licence to practice' scheme implies the imposition of a universal and statutorily based entry requirement. This is typically the requirement to pass an examination or to possess a specified qualification. Only those workers who can meet the requirement are eligible to obtain a licence and only those workers who have obtained a licence are legally permitted to carry out the designated tasks for payment.

The introduction of a universal, skills based entry requirement can be expected to raise average skill levels in the occupation, since low quality workers who cannot meet the new

[9] Employers and businesses in the US have tended to oppose licensing, arguing that it will raise costs over and above any increase in productivity.

entry requirement are forced out whilst other low quality workers must engage in job related training in order to increase their human capital to the new minimum standard. The magnitude of the increase in average skill levels will depend upon the size of the gap between the new entry requirement and the average skill levels of incumbents prior to regulation; it will also depend upon the extent to which the new minimum is enforced.

As some workers can be expected to have to increase their skills to meet the new minimum, one can expect to witness an increase in the prevalence of job related training, although any such increase may necessarily begin before the licensing regime is in place. Indeed, it is possible that there may be a spike shortly before the date on which licensing comes into force, with the rate of training falling off afterwards unless there are incentives for licensed workers to invest in further human capital (which would occur in situations where the renewal of a licence was dependent upon the requirement to demonstrate continued professional development).

If the stock of human capital in the occupation rises because of the new entry requirement, then one may also expect the quality of the product or service to increase and thus for wages to rise, as long as consumers are willing to reward the associated increase in product/serve quality by paying higher prices. Yet if prices and wages are free to respond to changes in supply, then the fact that the new entry requirement is likely to restrict the number of workers in the occupation may also drive prices upwards and allow wages to rise. Thus wages may increase as a result of enhanced human capital or because of supply restrictions (so called ‘monopoly effects’).

As indicated above, the introduction of licensing may lead to a fall in employment levels within the occupation, at least in the short term, as low quality workers who cannot meet the new minimum standard are barred from engaging in the now regulated activity. Again, the magnitude of this employment effect will largely depend upon the height of the new entry barrier. In the medium to long term, however, any rise in average wages in the occupation may attract higher quality workers who now see the possibility of a return on their human capital investments. This could increase average skill levels further, whilst also depressing any negative employment effect.

Turning to product market effects, licensing provides individuals with an incentive to invest in the acquisition of occupation specific human capital since they are reassured that they will not face low quality substitutes for their services (Akerlof, 1970; Shapiro, 1986). In this sense, as Humphris *et al*. (2011) argue, occupational licensing resembles the union closed shop. When in the market, high quality producers are further prevented from being driven out by their low price/low quality counterparts, so the average quality of service provided is expected to increase (Caroll and Gaston, 1981). Since skill levels, the

opportunity to practice the occupation and subsequent performance are monitored in these ways, quality of service should improve. In practice however, it is possible that individuals migrate to unlicensed occupations providing similar services and attempt to undercut their licensed counterparts. Under such circumstances, licensing is no guarantee of quality. Similar expectations would hold when the regulator or some other institutional mechanism (e.g. the process for funding medical schools) determine the licensed slots available relative to putative demand and the former is larger than the latter.

However, the effect of regulation on service quality can also be negative. Quality is not only linked to skill but also to quantity supplied. If an increase in quality through better trained practitioners results in a subsequent fall in their supply (due to aspiring practitioners not meeting the entry requirements), the service actually received by the consumer suffers for the following reasons. First, if a decline in the number of available practitioners leads to an increase in price of the product or service, then some consumers might opt for lower quality services. In a context of licensing, such substitutes are confined to ‘do-it-yourself’ services (Friedman, 1962; Kleiner, 2006). A more extreme unintended consequence of licensing could involve the decision not to consume the service at all, which could be a health and safety risk in itself. Such an effect is likely to be more pronounced amongst low income consumers, meaning that any improvement in quality is only felt by those at the middle and upper quartiles of the income distribution (Shapiro, 1986). Overall, the effects of regulation should be analysed not only in relation to improvements in skill levels but also price and availability of services. For example, while one might be receiving a better quality service from a licensed security guard, such effects cannot be realised if such individuals are in short supply and therefore premises and events are understaffed. Finally, as Caroll and Gaston (1981) point out, in competitive industries licensing restricts competition amongst practitioners which in turn reduces the pressure to compete on quality.

Turning to the impact of licensing on prices, if raising the entry requirements via occupational licensing (a) limits the supply of labour to a profession and (b) increases the entry costs for practitioners (e.g. financial investment on education and training), then the effect on the price of the product or service will depend on the following factors. First, the more price inelastic the good, the more scope there is for licensed producers to increase its price. Price elasticity will depend on the price and availability of substitutes and whether these are also subject to licensing. If there is a strong substitution effect with unlicensed products, then producers will be less inclined to increase price. Further, producers will have more scope to increase prices for goods and services that consumers perceive as necessities rather than luxuries. As such, if the good is highly income

inelastic, demand is likely to be relatively unresponsive to price changes. The proportion of income that is devoted to the purchase of the good or service is also an important consideration. The lower the proportion of consumer's income spent on the service, the more scope for licensed producers to increase prices without experiencing a proportionate fall in demand. Second, the effect of licensing on prices will also depend on the ability of consumers to switch to imported products or services from unlicensed or cheaper providers. Generally speaking, this is more likely to be the case with products since services are generally non-exportable in nature (e.g. one's ability to import childcare or a haircut from abroad is restricted).

However, the effect of licensing on prices also depends on the institutional context in question. A number of licensed occupations in the UK are dominated by public sector provision where the government acts as the price maker, while in some EU countries such as France and Greece the government intervenes to set minimum price levels for products and services. When such restrictions are imposed on regulated occupations, then we would expect the impact of licensing on prices to be modest.

2.5 Further supply implications of occupational licensing

A basic microeconomic analysis of licensing argues that regulation restricts entry into one occupation and creates an oversupply in others (Filer *et al.*, 1994). The demand side analysis shown above implies that licensing may impose a "deadweight loss" on consumers. The implications suggest that licensing not only has the effect of raising wages and reducing employment in the regulated occupation but also reducing wages and increasing employment in unregulated occupations similar to models of discrimination first developed by Bergman (1971). Individuals who could have worked in regulated occupations now shift to unregulated ones driving down their wages. The consequences of occupational licensing are not only within the regulated occupation, but also can serve to dampen wage benefits for workers in other occupations. Therefore, comparisons of the labour market effects of licensing also need to examine the effects on unlicensed occupations.

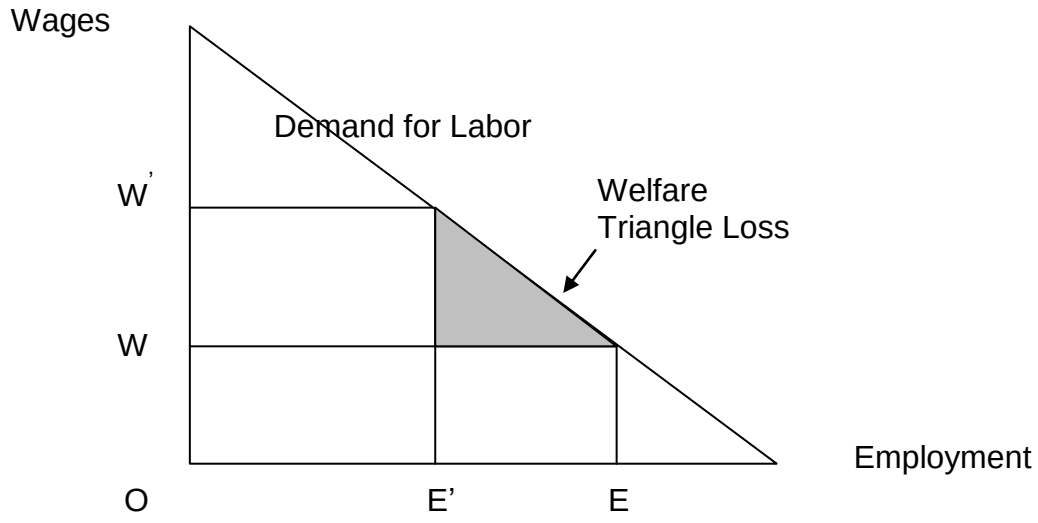
2.6 Macroeconomic Implications

With high levels of unemployment in the UK and in other industrialised nations, one potential drawback of occupational licensing is that it could increase structural unemployment by creating barriers to move to certain service occupations where demand is growing. For example, if there is growing demand for civil engineers or medical technicians, the additional time and money costs of licensing would reduce the ability of the labour market to adjust to growing demand in these fields. Moreover, in fields that are

licensed, workers may be reluctant to move out of those areas when demand is declining, because they are protected from competition by licensing laws and judicial rulings that restrict entry. The ability for an economy and labour market to adjust to new realities may be reduced, and structural unemployment increased (Mortensen and Pissarides, 1994).

Moving further, Figure 2.1 shows the basic underlying modelling approach to the suggestion that licensing results in potential "dead weight losses" to society (Kleiner, 2006, pp. 114-115). Before the implementation of licensing, wages are W and employment is at E. If licensing is implemented across all states for the occupation or if licensing is adopted in a state, then wages increase to W' and employment is reduced to E'. If the service wage and price go up, consumers purchase less of the service. As a result the white rectangle area between W and W' under the curve goes to the practitioners but the shaded triangle area is lost output due to occupational regulation. Within this standard economic model of regulation there are gains to the practitioners through higher wages. However, some who may have been in the occupation may suffer wage loss as a consequence of licensing as consumers find substitutes or engage in "do-it-yourself" remedies. Furthermore, there are likely to be overall losses to society in the form of lost output which is part of the "welfare triangle loss" in Figure1. This loss is the difference between the increased earnings of the practitioners due to licensing and lost employment times their foregone earnings in this figure. An outcome of this potential loss is that licensing results in fewer choices and higher prices for consumers. The full effect of licensing on employment may be mitigated by regulation which increases the quality of the service provided. Nevertheless the impact of licensing would result in lost employment and service output to society.

Figure 2.1 Potential Deadweight Loss from Licensing



Source: Kleiner (2006)

2.7 Alternative modes of regulation

Moving away from licensing, the labour market effects of other forms of regulation are even less clear cut. In particular, none of the alternatives (i.e. certification, accreditation or registration) would be expected to generate economic rents in the context of the models presented in the foregoing discussion.

Registration is the one form of mandatory regulation that we consider in our schema in addition to licensing. Mandatory registration schemes do not impose skill standards and so one would not expect to see many of the effects which may arise through licensing. However, registration schemes do often impose other criteria, such as the requirement to hold a clean criminal record. If these other criteria are positively associated with human capital (or the propensity to invest in human capital), as seems likely, then one may expect some small positive effects on skill levels and on the take up of job related training from the introduction of a registration scheme. There may then be derived effects on wages although, again, one would expect such effects to be small.

Certification and accreditation schemes involve the introduction of voluntary skill standards and so, in the absence of a universal entry barrier, the scale of any effects will ultimately depend upon the degree of demand for certified/accredited workers in the product market. If the level of demand is low, then one may expect that most of the low quality workers who do not meet the new certification standard can continue to find work. One would then expect only small effects on skill levels, wages or employment in the now regulated occupation. However, if demand for certified/accredited workers is high, then one may see effects that are akin to licensing. One might expect any such effects to be stronger in the case of certification than in the case of accreditation, all other things equal, if state involvement in the operation of the certification system entails more thorough vetting of applicants and more rigorous monitoring of standards among certified workers.

Turning to product market effects, one would not necessarily expect registration to be associated with any direct quality effects since such schemes do not impose skill standards to practitioners. However, as we have noted above, such schemes can make stipulations regarding the characteristics of entrants which could in turn be positively related to human capital characteristics (or the propensity to invest in their acquisition). Other things constant, there might be some small effects on quality, while the effect on price would depend, amongst other things, on the restrictiveness of any entry requirements and the value that consumers place on registration as a signal of quality.

On the other hand, minimum skill standards are a key feature of certification and accreditation schemes and as such, one would expect some impact on quality, although the extent of this would depend on the demand for certified/accredited practitioners in the market. Given the voluntary nature of such schemes, the market for such services is also likely to be populated by unlicensed workers, so any effect on prices is likely to depend on the willingness of consumers to pay a premium for the services of certified/accredited professionals.

2.8 From theory to evidence

This chapter has discussed a variety of explanations as to why occupations seek to become regulated. It has also sought to examine the possible impacts of regulation on labour and product markets. A summary of the major design features of occupational regulation and their implications for labour and product market outcomes is provided in Table 2.1 below.

The various theoretical perspectives provide many reasons for introducing regulation of one form or another in a given occupation. However, they also indicate why occupational licensing – or less restrictive forms of regulation such as registration or certification – may have indirect (and sometimes unforeseen) consequences. In particular, there may be important implications for employers, consumers and for workers in adjacent (unregulated) occupations, and these must be considered when examining the case for regulation so as to be able to come to a comprehensive assessment of the potential costs and benefits. Existing experience is a valuable guide, so it is important to examine cases of existing regulation. The next chapter goes on to consider the available empirical evidence.

Table 2.1 Major design features of occupational regulation and their implications

Feature	Implications
Universality	If the new requirements are **mandatory**, they will provide a stronger incentive for human capital investments. However, mandatory requirements are also likely to lead to greater effects on prices, wages and employment (at least in the short term). The impact of **voluntary** requirements is dependent upon the level of demand for certification or accreditation (most notably from consumers).
Level of skill requirement	If the new skill requirements are **similar to existing skill levels** in the occupation, the requirement may only result in the certification of existing skills. If the new skill requirement is considerably **higher than current average skill levels**, a significant proportion of incumbents may not be able to attain the new entry level (and new entrants will take some time to become eligible). Average skill levels may rise in the short term, but at the expense of overall employment levels in the occupation.
Availability of grandfathering rights to incumbents	If grandfathering rights are **available to incumbents** this will ease the implementation of licensing – in particular reducing any negative employment effect. However, if grandfathering rights are **not available to incumbents**, licensing is likely to lead to greater levels of investment in training and greater rates of acquisition of formal qualifications.
Renewal mechanism	If the renewal of any licence/certification/accreditation is **dependent upon continued professional development**, then the regulatory regime is likely to have a positive, ongoing impact on rates of job related training among incumbents. If renewal is **solely dependent upon payment of a renewal fee**, the impact on overall skill levels more likely to be a one off gain seen only at the time of introducing the regulations and there is less to be any continuing effect on job related training among incumbents.

Continued on next page…

Table 2.1 continued

Feature	Implications
Governance regime	If the regulations are governed by one party with particular interests, there is the danger of 'regulatory capture'. The **involvement of all interested parties** (e.g. workers, employers and consumers) can help to ensure that regulations are designed in the public interest. **Periodic reviews** can help to ensure that any regulations remain fit for purpose. If **enforcement is not effective** this will limit the strength of any incentive to invest in human capital, as it will be possible to practice the occupation (or to claim that one is certified/accredited) without having met the prescribed skill standard.
Characteristics of adjacent occupations	The introduction of regulation into one occupation may lead low quality workers to **switch to adjacent occupations** without entry barriers. This may depress wages, prices and quality in the adjacent occupation.
Broader regulatory framework	The impact of regulation on wages, prices and employment depend upon the freedom of the product market to respond to changes in supply and demand. **Competition regulations** (e.g. price controls) can prevent incumbents from exploiting any monopolistic position. However, price limits also risk reducing the incentive to invest in human capital by limiting the likely return.

3 Existing evidence on the impact of occupational regulation

Chapter Summary

- The majority of evidence on the prevalence, operation and impact of occupational regulation originates in the US and mainly concerns licensing.
- According to the latest estimates, at least 20 per cent of the US workforce is subject to licensing and six per cent is certified. The overall conclusions from the US studies are that licensing is associated with a wage premium, a reduction in employment growth and a rise in the cost of goods and services without a corresponding improvement in quality. Mixed results are reported in relation to job related training.
- The limited existing evidence for the UK suggests that licensing is less common in the UK than in the US, although its prevalence has been expanding within low skilled non professional occupations. Existing estimates show that licensing covers 13.5 per cent of the UK workforce.
- The limited case study evidence for the UK provides mixed results with regard to its effect on training and qualifications. Licensing has been found to be associated with a 13 per cent wage premium, although the main beneficiaries are those in high-skilled occupations.
- When compared with other European countries such as Germany, France and Italy, the UK appears to be less restrictive in its approach to regulation especially in relation to post-entry restrictions such as fees and price levels, advertising and business location. However, regulation of low skilled occupations appears to be more widespread in the UK than in many other European countries.

3.1 Introduction

This chapter presents a review of the existing evidence on the prevalence and impact of occupational regulation. The chapter begins with a discussion of the United States, where the evidence is most extensive, and Canada. It then goes on to discuss the limited existing evidence for the UK, before moving on to discuss the regulation of occupations within the European Union more broadly. The focus of the discussion is primarily on occupational licensing, as the available evidence on other forms of regulation is limited in

comparison. However, forms of regulation other than licensing are mentioned where possible.

3.2 The United States and Canada

This section gives an overview of the empirical work on occupational regulation for both the United States (US) and Canada. Since these countries are each other's largest trading partner, and share many of the same industries with a workforce that has similar characteristics, they provide a useful comparison of the influence of occupational regulations. The tradition of research examining the labour institution of occupational licensing has a long and varied history in the US, but the research on Canada is much sparser and focuses on its influence on geographic mobility and its effect on the efficiency of the labour market. In this section of the report we will present the existing literature on the extent of licensing in the US and Canada as well as its influence on wages, employment, mobility, and prices for the US, but focus on wages and mobility for Canada. We provide some concluding comments where we develop some comparisons of the two nations with respect to occupational regulation.

3.2.1 The nature and incidence of occupational regulation in the US

Most occupational licensing in the US is at the state level, since the courts have determined that it is the proper venue for the determination of regulation. However, where there is no licensing at the state level, cities or counties can introduce their own type of licensing. For example, tattoo artists are often not licensed at the state level, and cities or counties will licence them. Taxi drivers are usually licensed at the local level with no state intervention. One legal or policy issue in the US is that there is little reciprocity across political jurisdictions, and governmental agencies in one part of the country will not accept licences from others without retaking substantial parts of the licensing tests or meeting local residency requirements. However, the highest political jurisdiction generally dominates. If a state licences an occupation, local authorities must accept it. In the 1990s the Council of State Governments estimated that more than 800 occupations were licensed in at least one state. In all, more than 1,100 occupations were either licensed, certified, or registered (Brinegar and Schmitt,1992).

Despite limitations in data collection, the state level data show some striking trends. During the early 1950s, less than five per cent of the US workforce was in occupations covered by licensing laws at the state level (Council of State Governments, 1952). That number grew to almost 18 per cent by the 1980s—with an even larger number if federal, city, and county occupational licensing is included. By 2000, the percentage of the workforce in occupations licensed by states was at least 20 per cent, according to data

gathered from the Department of Labor and the 2000 Census (Kleiner, 2006). In contrast, during this period no systematic attempts were made to gather information on licensing or its wage or employment effects at the federal or local level.

As employment in the United States shifted from manufacturing to service industries, which typically have lower union representation, the members of occupations established a formal set of standards that governed members of their occupation. For a professional association, obtaining licensing legislation required them to raise funds from members to lobby the state legislature, particularly the chairs of appropriate committees. In addition, the occupational association often solicits volunteers from its membership to work on legislative campaigns. With both financial contributions and volunteers, the occupational association has a significant ability to influence legislation and its administration, especially when opposition to regulatory legislation is absent or minimal (Wheelan, 1998).

By using the American states to monitor and prevent the potential work effort of unlicensed workers, competition by unlicensed individuals is virtually eliminated through the use of the state's enforcement powers. For example, the work of "hair braiders", which is an unlicensed occupation, has recently been brought under the control of the cosmetology board in Minnesota and the work limited to only licensed cosmetologists or barbers (*Anderson v. Minnesota Board of Barber and Cosmetology Examiners*, 2005). Further, when demand fluctuates for traditional tasks, the board has the ability to expand the regulated work through establishing administrative rules and limiting the work of unregulated workers. Second, the regulatory board, through its administrative procedures of establishing large entry barriers and moral suasion, can reduce the number of openings in schools that prepare individuals for licensed positions. In addition, by adjusting the pass rate on the licensing exam, it can change the number of new entrants from instate or migrants from other states or nations (Tenn, 2001, Pagliero, 2010). Finally, there are legal and policy battles among licensed occupations, such as dentists and dental hygienists, over who can do various tasks; and the legislature or the courts determine the winner, with economic gains to those who are more politically able (Kleiner and Park, 2010).

By 2008, approximately 29 per cent of workers polled in a Westat survey said they were required to have a government issued licence to do their job; a further six per cent said that they held a certification from an agency of the government (Kleiner and Krueger, 2009). Table 3.1 presents figures on the incidence of licensing or certification (by any level of government) among different types of worker, using data from the Westat survey (Kleiner and Krueger, 2009). In Table 3.2 we indicate the prevalence of differing requirements to become licensed in the US. The requirement for a university qualification

is more prevalent than the requirement for a high school qualification. However, occupation specific examinations constitute the most common entry route. It is evident from the table that, in many instances, there are multiple requirements. These sometimes arise because occupations require licences from multiple levels of government in order to do the work – with each level of government setting its own conditions (Kleiner and Krueger, 2009).

Table 3.1 Characteristics of licensed and certified workers in the US

Characteristic	Licensed (%)	Certified (%)
All	28.6	5.8
Gender:		
Male	28.4	6.7
Female	28.7	5.0
Education level:		
Less than high school	14.5	3.9
High school	19.9	5.8
Some college	28.1	5.9
College (BA)	29.2	5.9
College+	44.1	6.2
Race:		
White	29.5	5.8
Hispanic	29.2	5.6
Black	26.3	7.0
Other	23.0	5.1
Age:		
25 or under	12.2	2.7
26-54	30.0	6.2
55 or older	28.9	5.7
Union status:		
Union	44.6	5.0
Non-union	25.7	6.0
Sector:		
Private	24.8	5.9
Public	44.1	5.3
Type of work:		
Provides services	31.2	5.9
Makes things	11.4	5.1
Repairs things	22.4	7.2

Source: Kleiner and Krueger (2009)

Table 3.2 Requirements to become licensed in the US

Education requirement	Licensed workers (%)
College	42.8
High school	31.2
Occupation specific exam	85.0
Continuing education	69.8
Internship	51.1

Source: Kleiner and Krueger (2009)

3.2.2 Wage effects of occupational licensing in the US

Studies of the effects of licensing on wages in the US have, in many ways, paralleled the research methods used to study the effect of unions on wages (Lewis, 1986). These approaches include cross-section estimates, analyses of individuals switching from regulated to unregulated jobs and vice versa over time, and cross-sectional results from within occupation comparisons. The general estimates of cross-sectional studies using Census data of state licensing's influence on wages with standard labour market controls show a range from 10 to 15 per cent for higher wages associated with occupational licensing (Kleiner, 2006). Estimates were developed from the National Longitudinal Survey of Youth (NLSY) from 1984 to 2000 and show the difference in wages between changers from unlicensed to licensed occupations and between those who move from a licensed occupation to an unregulated one. The estimates show that the wage effect of moving from an unlicensed occupation to a licensed one is around 17 per cent higher on average than if one were to move from a licensed occupation to an unlicensed one (Kleiner, 2006). However, this effect varies considerably (from zero to 40 per cent) when one looks within occupational categories (Kleiner and Krueger, 2009).

Although these results suggest that licensing – the toughest form of regulation – matters for wage determination, these estimates are not based on data for the whole of the US workforce. However, one study dealt with many of these problems by developing a national survey of American workers, using many of the same questions asked in the Current Population Survey, which is implemented by the Bureau of Labor Statistics. Kleiner and Krueger (2009) examine whether licensing is associated with higher pay. They augment a standard earnings regression equation to include a dummy variable indicating whether a licence is required for the worker's job. When a dummy variable indicating license status is added to a standard wage equation, having a license is associated with approximately 18 per cent higher gross hourly earnings (an estimate that was statistically significant from zero at the 0.1 per cent level). The cross-sectional effect of licensing is similar in magnitude to the estimated effect of belonging to a union in the

US (see Lewis, 1986), and greater than an additional year of schooling. The regression estimates also include educational attainment, age, self-employment, career experience and its square, union status, and industry and occupation dummy variables.

In order to examine the influence of licensing on the variance in wages in the US, Kleiner and Krueger (2009) examine the mean within-category squared residual from a log of wage regressions in both licensed and unlicensed occupations, controlling for human capital characteristics. They also compare union and non-union earnings as a point of reference, since unions have been shown to reduce variations in wages (Card 1996). They find that the mean wage of licensed and union workers is statistically significantly higher than their corresponding unlicensed and non-union workers. The measure of dispersion of wages among licensed jobs is about the same as unregulated ones, and the difference is not statistically significant from zero. In contrast, they find that unionisation reduces the variance in wages. These results are similar to those found with data from an earlier survey carried out by Gallup in 2006 (see Kleiner and Krueger, 2010), suggesting the robustness of the findings for the role of unions and licensing over time and across different surveys. This indicates, whilst unions reduce wage dispersion in the US, licensing has no effect.

3.2.3 Employment effects of occupational licensing in the US

Some evidence suggests that licensing does restrict the supply of workers in regulated occupations in the US. One application focuses on the comparison of occupations that are licensed in some states and not in others. The occupations examined were librarians (licensed in 19 states), respiratory therapists (licensed in 35 states), and dieticians and nutritionists (licensed in 36 states) from 1990 to 2000 using Census data (Kleiner, 2006). Using controls for state characteristics, the multivariate estimates show that, in the states where the occupations were unlicensed, there was a 20 per cent faster growth rate than in states that did licence these occupations. Another study finds that the imposition of greater licensing requirements for funeral directors is associated with fewer women holding jobs as funeral directors, relative to men by 18 to 24 per cent (Cathles *et al.*, 2010). This gendered employment effect is thought to come about because women are less able (on average) than men to invest the time and financial resources associated with acquiring the qualifications required to satisfy the new licensing requirements.

3.2.4 The interaction of licensing with other characteristics of the US labour market

To the extent that a pattern exists, it appears that occupations that deal directly with customers or patients, or are allowed to work independent of other licensed occupations,

are most likely to receive the largest economic benefits from occupational licensing. For example, dentists, through a reduction in the supply of new entrants into the occupation from 1990 to 2000, received larger pay increases than any other major regulated occupation. Lawyers, through restrictions on interstate mobility also have been able to obtain economic benefits for practitioners (Tenn, 2001). Physicians, by limiting the supply of alternative medicine providers, have also been able to enhance the earnings of the members of their occupation (Anderson e*t al*., 2000).

On the other hand occupations, such as teaching and nursing, have not been able to significantly enhance the earnings in their profession through licensing, perhaps as a consequence of the market structure of their employer. Unlike doctors, dentists and lawyers, nurses and teachers work primarily for large institutions like hospitals or school boards. For nurses and dental hygienists, their work requires the oversight of doctors and dentists. Hospital and school administrators have incentives to reduce costs within their organisation and are likely to put pressure on legislatures to ease licensing restrictions to ensure an ample supply of practitioners. Moreover, for nurses and teachers the primary mode of determining wages, hours and other terms and conditions of employment is through collective bargaining with an employer.

It is also possible that doctors and lawyers have a greater ability than more plentiful occupations to make the demand for their services more inelastic, consistent with the Marshal-Hicks conditions of reducing substitutes.[10]

3.2.5 Price effects of occupational licensing in the US

Most studies of the influence of occupational licensing policies, on the price of the occupation's service in the US, find a positive relationship (see Cox and Foster, 1990; Kleiner 2006), albeit sometimes with no improvement in quality. These include recent studies by Kleiner and Todd for mortgage brokers, which indicate higher prices for mortgages with no influence on quality (Kleiner and Todd, 2009). The existing studies cover policies ranging from restrictions on interstate mobility, such as by limiting reciprocity, to restrictions on advertising and other commercial practices (Shepard, 1978; Bond *et al*., 1980; Kleiner *et al*., 1982). A review of empirical research on licensing found that licensing is associated with consumer prices that are four to 35 per cent higher, depending on the type of commercial practice and location (Kleiner, 2006). Kleiner and Kudrle (2000), for example, found that tougher state level restrictions and more rigorous pass rates for dentists were associated with hourly wage rates. These were 15 per cent

[10] Under the Marshall-Hicks laws of derived demand, individuals in occupations for which there are few substitutes will have a greater ability to raise the price of their services without loss of demand than will workers in occupations for which there are many substitutes.

higher than in states with fewer restrictions, with no measurable increase in observable quality. Similarly, Barker (2007) found that higher state educational standards for real estate brokers "raise broker income without improving the quality of service."

3.2.6 Training effects of occupational licensing in the US

The effect of occupational regulation on skill investment is a topic that has been understudied in the US. However, in a recent study, Klee shows no evidence of a systematic relationship between the stringency of licensing requirements (i.e. the height of the entry requirement) and the incidence of training in professional occupations (2010). Klee analysed accountants, lawyers, cosmetologists and teachers using data provided by Kleiner (2006) and the US Current Population Survey (CPS), taking advantage of differences in licensing policy between states and changes in licensing policy over time. He looked at two alternative indicators of training receipt: (i) whether the CPS respondent is enrolled in a vocational class at the time of the survey interview; and (ii) whether the respondent has engaged in any training to improve their skills at any time since starting their current job. Klee found that the stringency of a licensing regime was unrelated to the probability of enrolment in a vocational class in most of his specifications.[11] However, he did find that more stringent licensing requirements were typically positively related to the propensity of workers to have received training at some point since their current job began.

3.2.7 Occupational licensing in Canada

In this section we provide parallel information on the role of occupational licensing in Canada. As we noted earlier the detail and depth of analysis on occupational regulation is sparse and, in drawing conclusions about the level of regulation, wage effects, employment consequences, mobility and prices, we are generally reliant on a single study in each area, rather than many for the US. Therefore, the ability to draw policy conclusions from the Canadian case is limited because there has been little rigorous analysis and much of it is dated.

The legal structure of occupational licensing in Canada is similar to the US, with the Canadian provinces having the major voice in the determination of: who is regulated; the general education and specific education requirements to work in the occupation; and the fees and continuing education requirements. As in the US, licensing and certification may also be done by different levels of governments, with licensing powers sometimes delegated by provinces to individual municipalities. Licensing covers a variety of occupational groups from lawyers to such trades as electricians, plumbers and hairdressers. In the early 1990s,

[11] In those few specifications where a statistically significant association was identified, it was typically negative.

Gunderson (1993) estimated that almost one-third of the craft workers in production jobs were licensed. It is currently estimated that around one fifth of occupations in Canada are subject to licensing.[12]

One issue that arose in Canada because of the devolved administration of licensing was the issue of inter-province mobility for workers. Out-of-province transfers were commonly subject to admissions criteria which imposed upon experienced professionals the requirement of completing licensing courses and examinations and redoing their apprenticeships regardless of their experience. Differences in the requirements with respect to such factors as education, "intern" training, licensing examinations, and even provincial residency periods could make it costly for migrants to "re-qualify" especially when there is a lack of reciprocity across provinces (Gundersun, 1993). As strongly stated by the Immigration Legislative Review Advisory Group:

> Each province at some stage in its history created bodies that were empowered to regulate access to trades and professions in the province through licensing and registration requirements. These associations have operated in an extremely independent manner, often free of political scrutiny and accountability. Many have used their role as protectors of the health and safety of consumers as a guise to protect the interests of their members through exclusionary entrance requirements. This has made inter-provincial mobility for all Canadians extremely difficult, and has created even greater barriers for immigrants, who are viewed as a threat to the earning power of the members of some professional associations, and as unknown quantities with unknown qualifications by other bodies (1998, p. 36).

Interprovincial mobility was restricted by lack of uniformity in both the requirements for the licence and in the types of trades that are licensed. As well, there was a lack of full reciprocity in recognising the qualifications from other provinces. However, a substantial degree of uniformity has been obtained through the voluntary Red Seal or interprovincial standards program co-ordinated by Employment and Immigration Canada. Reciprocity is obtained through the "mutual recognition" of qualifications across participating provinces for tradespeople who have passed a common exam. The program is generally recognised as a successful vehicle for harmonisation of standards in this important area. However, it is not universal, since not all trades are covered across all provinces.

Gundersun concludes that “the same competitive forces (e.g. global competition, free trade, industrial restructuring, technological change) that are increasing the political pressure to erect further barriers to inter-provincial labour mobility (largely to preserve jobs) also increase the importance of reducing such barriers so as to achieve the restructuring, specialisation and economies of scale that are necessary to create a strong, competitive domestic economy” (Gundersun, 1993).

[12] Estimate from the Canadian government. Published on-line at: http://www.canadabusiness.ca/eng/guide/4175/ [Accessed 1st August 2011].

Removing such barriers to mobility was also the objective of the Labour Mobility Chapter (7) of the Agreement on Internal Trade (AIT) signed in 1994 that came into effect in 1995. That Agreement focused on barrier removal in three main areas: (1) residency requirements; (2) licensing, certification and registration of workers (to ensure that such requirements are related principally to competence, they are published regularly, they do not result in unnecessary delays, and they do not impose fees or other costs that are burdensome); and (3) recognition of occupational qualifications such as through mutual recognition arrangements and reconciliation of occupational standards (Forum of Labour Market Ministers, undated). In 2004, British Columbia and Alberta also agreed to the Trade, Investment and Labour Mobility Agreement (TILMA). That agreement came into force on April 1, 2007 and was fully implemented in April 1, 2009. These agreements have initiated harmonisation work between the provinces and reduced some of the barriers to inter-provincial mobility for workers, although there is anecdotal evidence that workers migrating into Canada have used the laws to their advantage by going to the province with the least stringent requirements in order to become registered and then later moving to their province of choice (Martin, 2011).

A further development in Canada has been the introduction of Fair Registration Acts in some provinces, including Ontario (2006) and Manitoba (2009). The legislation has sought to ensure that licensing practices are fair, impartial, transparent and objective; commissioners have been appointed in the provinces to oversee its operation. A key focus has been on the appropriate recognition of international qualifications held by immigrants.

3.2.8 Levels of occupational licensing in Canada

An estimate in 2006 showed that about 1,725,215 workers were in regulated “occupations and professions” in Canada, representing 11.1 per cent of the labour force. The largest groups, which account for three quarters of the total, are: teachers; nurses; engineers; engineering technicians and technologists; public accountants; physicians; and lawyers (Macmillan and Grady, 2007, p. 3). Almost half of those included are in teaching, the health professions or social work, but no trades are included in their estimates. However, The Forum of Labour Market Ministers estimates that approximately 15 to 20 per cent of workers in Canada work in one of the 51 regulated occupations under the Agreement on Internal Trade (Macmillan and Grady, 2007, p. 3).

3.2.9 The effects of occupational licensing and wages in Canada

There has been only one academic study that focuses on the influence of licensing on wages in Canada, and it is very dated (Muzondo and Pazderka, 1980). The study sample

consisted of 200 observations on mean incomes and other variables pertaining to twenty professional occupations across ten provinces. The observations were selected from the 1971 Census of Canada. The mean incomes show considerable variation, especially across professions, but also across provinces within a given profession. Twelve are licensed (architects, chemical engineers, dentists, industrial engineers, lawyers, mechanical engineers, optometrists, osteopaths and chiropractors, pharmacists, physicians and surgeons, surveyors, veterinarians). Some of the others are certified, meaning that unlicensed persons may practise the profession but may not use the professional designation (nurses, physiotherapists and occupational therapists, agrologists, social workers). The rest are neither licensed nor certified (mathematicians, chemists, economists, geologists). Only males are included in their sample. Two main sources of information were used for their regression analysis. Data on the usual human capital variables were obtained from the published results of the 1971 Census of Canada. Information on anti competitive variables was extracted from provincial acts and regulations and professional codes of ethics, governing the conduct of practitioners. And also from returns to a questionnaire designed by the authors and distributed to provincial professional associations. For specific issues associated with licensing, Muzondo and Pazderka (1980) found that restrictions on advertising had the greatest impact on earnings of all the restrictive practice variables included in their regressions. Individuals in professions which restricted advertising earned 32.8 per cent more than individuals in professions which permitted advertising. They found that having higher fees for licensing was associated with about 10.6 per cent higher earnings. Their analysis was restricted to higher education and earnings professions, and no subsequent analysis has been attempted for other occupations.

We were unable to find any studies that rigorously examine the role that regulation has on employment changes in Canada. However the studies by Gomez and Gunderson (2007) suggest that licensing reduces mobility across provinces and thereby reduces the efficient allocation of labour resources across Canada. They suggest that tougher regulations reduce immigration and reduce outmigration, resulting in a mismatch across provinces and possibly resulting in structural unemployment in the nation.

3.2.10 Summary for the US and Canada

The evidence for the US suggests that, in general, occupational licensing increases the wage of licensed workers and the prices of the services they supply but without any overall improvements in the quality of service or product offered. A similar conclusion was reached in an earlier review of US evidence for the UK Commission (see Stanfield et al., 2009).

From our examination of the Canadian experience, there appear to be many similarities with the US in the methods by which occupations are regulated. One such is that there commonly exist barriers to move across political jurisdictions. The limited studies of wage effects in Canada suggest that licensing raises the earnings of licensed practitioners, as it does in the US. Unfortunately, no studies of employment or price effects are available for Canada to allow direct comparisons on this dimension.

3.3 The United Kingdom

3.3.1 Introduction

This section of the report summarises the current evidence on the nature and impact of occupational regulation in the UK. Although some occupations have a long history of regulation in this country, the evidence base is much less extensive than is the case in the United States. In keeping with the US literature, however, the research evidence for the UK tends to focus on the most restrictive form of regulation, namely occupational licensing. The section begins by describing the development and typical characteristics of occupational regulation in the UK context. It then goes on to review the limited research evidence on the impact of regulation in the UK.

3.3.2 The context and nature of occupational regulation in the UK

Guilds are a deep seated tradition in many UK and European pre-industrial cities and can be considered the precursors of the UK's occupational regulation regime. Such associations of skilled craftsmen were characterised by long, standardised periods of apprenticeships, exclusive rights to produce and trade in certain markets granted by the monarchy or local authorities, as well as tight control over materials and technical knowledge. In the Medieval era, guilds provided a good source of revenue to the state in exchange for control over entry to occupations and monopolistic privileges. With industrialisation and the rise of the factory system in the early 19th century, the dominance of the guilds began to fade. At the same time, the power over legislation relating to occupational entry transferred from the monarch to the courts and, as a result, direct occupational regulation evolved (Rubin, 1980). It was also during this period that

professional occupations began to expand. By the 19th century, and following concerns about potential harm to the public caused by malpractice and poor standards of service, such occupational groups became the first to be subjected to regulation.

The system of regulation that subsequently evolved in the UK has been described as one of '*state sanctioned self–regulation'* (Salter, 2000). Within this model of regulation, professional groups acknowledge their accountability to society but retain the right to oversee the internal governance of their profession. This includes not only control over knowledge and its use, but also market entry and exit, professional training and fee structures. As long as professional groups are effective in delivering services of high standard to the public, continuous state interference has not been deemed necessary. As such, towards the end of the 19th century, the first professional associations began to emerge in the UK.

While some professional bodies were established directly by groups of practitioners (e.g. Institute of Actuaries, British Nurses' Association[13]), others were created by the state but were allowed to operate independently from it (e.g. General Medical Council). The granting of Royal Charters to many practitioner led bodies symbolised their endorsement by the state and signified some degree of government involvement in the affairs of the association (e.g. amendments to the bodies' by laws require approval of the Privy Council). In practice, however, professional bodies retained a high degree of decision making sovereignty in relation to strictly professional issues. While they were relying on the state for some degree of legitimacy, professional bodies were also keen to maintain an arms' length relationship with externally imposed regulation. Amongst the first professional associations to be incorporated by Royal Charter were the Institute of Chartered Accountants (1880) and the Institute of Chartered Surveyors (1881).

Regardless of the diverse processes behind their establishment, the purpose of these various professional bodies was analogous, namely that of promoting professional activities and ensuring that the system of self-regulation was working through the prescription and enforcement of rules and codes of conduct. While professional bodies were central in the self-regulation process, the institution can be better understood as a network comprising of several other supporting institutions such as training colleges and universities. This latter aspect of the system survives until today and comprises an even more sophisticated network of regulatory bodies, professional associations and educational institutions.

For a number of years, the institution of occupational regulation remained stable in terms of its characteristics. The rise and establishment of new professions was soon followed

[13] The predecessor of the Royal College of Nursing.

by professional bodies offering accreditation and certification schemes, while the introduction of direct licensing was reserved for highly skilled service sector professionals, such as air traffic controllers and veterinarians. However, as the UK economy became dominated by service sector occupations, the scope of occupational regulation also had to adjust. Shifts in the composition of jobs (from manufacturing to services) meant that a greater proportion of the population worked in occupations where information asymmetries are more pronounced and the risk of market failure is greater. Concerns regarding consumer protection surfaced and, as a result, occupational regulation requirements were gradually extended to cover a larger number of occupational groups.

While the majority of the new entrants belonged to high skilled professional categories, a notable and gradually growing proportion came from low skilled non-professional occupations. Some recent high profile additions to the list of licensed occupations include security guards (Private Security Industry Act 2001) and employees in the gambling industry (Gambling Act 2005). The Care Standards Act 2000 also introduced training requirements for social care workers in registered care homes, while a registration scheme has been brought in to cover estate agents (Consumers, Estate Agents and Redress Act 2007). However, forms of regulation have also been introduced to cover occupations in the manufacturing sector, notably building and construction, where health and safety risks are high. In 1995, for example, the Construction Skills Certification (CSC) Scheme (an accreditation scheme under our classification) was put in place for construction trades such as roofers, bricklayers, carpenters and glaziers, and possession of a CSC card is now widely acknowledged within the industry as a proof of competence.

During this more recent period, entry criteria have been subject to regular revisions. Professional associations and regulatory bodies have upgraded their educational and qualification requirements. A recent example is youth and community workers whose qualifying training requirements were recently raised from a Diploma to Degree level. Similarly, independent financial advisers will be required to increase their minimum relevant qualification from Level 3 to Level 4 if they wish to continue providing financial advice beyond 1st January 2013. The requirement to provide evidence of engagement in continuous professional development (CPD) as a prerequisite to maintain membership has also been introduced by various professional and regulatory bodies. One example is the General Pharmaceutical Council whose standards require pharmacists and pharmacy technicians to audit their practice and engage in learning activities on a regular basis.

Overall, state sanctioned self-regulation still remains the preferred approach. Accreditation and certification are still predominantly conducted by professional

associations, while licensure is granted by regulatory bodies. These bodies mainly operate national level schemes as opposed to local level ventures; for instance, the General Medical Council is responsible for issuing licences throughout the country and, once licensed, an individual can legally work anywhere within the country, unrestricted by district or county. However, licensing can also be conducted and managed at a local level. For example, local authorities are responsible for granting licences to practice to taxi drivers, market and street traders, beauticians and tattooists.

Recently, a number of professional bodies are becoming increasingly eager to be licensed. The Hairdressing Council, for example, currently operates a voluntary registration regime, but has for many years campaigned for the establishment of statutory requirements.[14] Similarly, for the last 20 years, the British Acupuncture Council has been pursuing the statutory regulation of the profession, but so far it has only achieved the granting of a Royal Charter (from January 2011), which will eventually confer protection of title to its members. The latter case echoes earlier efforts of various other professions allied to medicine to put themselves on a par with the medical profession. For instance, while chiropodists, speech and language therapists, occupational therapists, and medical radiographers working for the NHS have had to be registered to practice the profession since the 1960's, similar requirements for those working in the private sector were only introduced in 2001 and were welcomed by the relevant professional bodies.

Not all regulations governing access to occupations emanate from domestic legislation. Indeed there are growing trends towards: (a) regulating entry into occupations at a European level (e.g. transport); and (b) standardising educational and training requirements across the EU to facilitate labour mobility across member states. With regards to the former, in the case of rail transport, there are now common educational standards that have to be attained for train drivers active in cross border services within the EU (Haas, 2009). Similarly, within the aviation industry, training requirements for mechanics and technicians working in aircraft maintenance have also been standardised and such individuals are now required to hold a European licence (Haas, 2008). With regards to the latter, the First General Systems Directive (89/48/EEC OJ 1989 L19/16) harmonises the requirements for the licensing of professionals across the EU and requires professional associations to provide membership routes for migrant professionals (Evetts, 1999; 2008).

[14] A Private Members' Bill was put before the House of Commons in 1978 seeking to replace the voluntary registration scheme for hairdressers, established in 1964, with a mandatory scheme restricting entry to those who had completed an approved training course and passed an approved examination. The Bill lacked government support and did not succeed. Available at: Hansard 1803-2005 [online] http://hansard.millbanksystems.com/commons/1978/jan/24/hairdressers-registration-amendment [Accessed on 06 April 2011].

3.3.3 The prevalence of occupational regulation in the UK

Despite the long history of occupational regulation in the UK, the current prevalence of such regulation is unclear. While some professional bodies maintain records of membership, aggregate data on the number of occupations and proportion of the workforce that are subjected to some form of regulation is absent. To address this gap, Humphris *et al.* (2011) compiled a breakdown of qualifications and statutory licensing or registration requirements for each one of the non-managerial occupations categorised at Unit Group level of the Standard Occupational Classification (2000). Using this information, they calculated that, in 2008, at least 13.5 per cent of the non-managerial UK workforce required a licence to practice. Their estimates did not include Unit Groups that were only partly covered by licensing requirements (i.e. where some jobs within the Unit Group required licences to practice but others did not). Theirs is thus a lower bound estimate of the incidence of licensing in 2008. Using historical data from the Labour Force Survey, they indicated that the proportion of the workforce that was licensed grew steadily during the period 1997-2008. However, they were unable to determine whether this was due to occupations switching from unregulated to licensed or simply to increases in the size of the workforce within licensed occupations.

With the exception of Humphris *et al.* (2010), the few studies that explore the impact of occupational regulation in the UK are based on case study evidence. The themes explored in these papers are diverse, but broadly representative of the themes found in the more extensive US literature. Below we present a summary of their findings.

3.3.4 Wage effects of occupational licensing in the UK

US studies of the impact of licensing on earnings have commonly focused on highly skilled and highly paid occupations (see Kleiner, 2000 for an exception). In an early paper for the UK, Siebert (1978) investigated the impact of regulation on the earnings of doctors and lawyers (both licensed occupations in the UK). His analysis showed that these occupations appeared to be obtaining a wage premium from licensing when compared with other workers with university degrees. Siebert went on to argue that constant upward shifts in the skill requirements to enter the medical profession, combined with grandfathering clauses to protect existing practitioners, were initiatives designed to economically benefit the profession rather than to upskill practitioners and protect the public. Drawing on his analysis of the institution, Siebert recommended the establishment of an ‘indicative’ register of doctors and their qualifications but one which did not set entry requirements for working within the NHS.

Fernie's (2011) study of security guards is particularly interesting as it is the first study in the UK to explore an occupation with low skill levels. Using data from ASHE for the periods 2005/6 and 2006/7, she found no evidence that the mean percentage change in gross hourly earnings among security guards was any different to other groups in the same Minor group. Fernie's analysis makes several assumptions, not least that the introduction of licensing was the only change that took place within this Minor group and that enough individuals within this unit group became licensed so that any comparisons within their non-licensed counterparts are meaningful. Her analysis also makes no attempt to control for other differences between security guards and their chosen comparators.

Humphris *et al.* (2010) make the first attempt to provide a macro estimate of the wage effect of occupational licensing in the UK. Drawing on data from the Labour Force Survey, the authors find that licensing is associated with approximately 13 per cent higher hourly pay in non-managerial occupations, a higher figure compared to the six per cent wage premium associated with trade union membership (Bryson and Forth, 2010) but one that compares favourably to the 17 per cent wage premium associated with the pre-entry closed shop when the latter was still legal (Stewart, 1995).

Further, Humphris *et al.* show that a licensing wage differential is obtained only by occupations that have high educational and training requirements and not by those occupations with low skills and wages. This indicates an important element of heterogeneity in the impact of licensing on wages, which is not evident from the US literature (which focuses primarily on professional occupations).[15]

3.3.5 Impact on training and skills in the UK

The majority of UK evidence on occupational regulation has focused on its implications for training and skills. Gospel and Thompson (2003) drew on evidence from interviews conducted with employees and managers working within seven social care providers in England, including the eldercare, adult and childcare sectors. Their findings show that the requirement set out by the Care Standards Act 2000 for registered care providers to ensure that all employees receive appropriate training had a direct and positive effect on the training of managers and on the introduction of more formal induction training for care staff. However, the study further found that, although regulation reduced the variability of training by increasing the floor of training, it also reduced the levels of training above and beyond the minimum required by law. The authors concluded by warning of the danger of

[15] It can be added that, by raising the wages of individuals who are already in the upper quartiles of the income distribution, licensing appears to be making a contribution to rising income inequality in the UK. However, the magnitude of its contribution has not been quantified.

'the minimum becoming the new maximum' where training is concerned. Their reasoning was that employers' continued fear of poaching of trained staff remained a considerable barrier to higher levels of investment in training beyond the statutory requirements.

Gospel and Lewis (2010) revisited these work settings in 2008 to assess the extent of any changes in the flow and stock measures of qualifications. Their evidence showed an increase in the number of employees registering and receiving NVQ awards, leading them to conclude that the regulations have had a considerable impact. Further, both management and staff interviewed were supportive of the current regulatory framework and in some cases they even called for strengthening some of the arrangements.

Different conclusions were reached by Fernie (2011) in her study of the introduction of licensing within the private security industry in 2006. Her interviews with various security firms revealed little industry support for the regulation. The low statutory training requirements coupled with considerable scope for non-compliance mean that licensing is viewed as a high administrative burden in exchange for dubious quality outcomes. The study further demonstrates that the low level of training required by the Security Industry Association has become the standard training scheme offered by many firms who used to offer their own, more comprehensive training courses and therefore questions the extent to which the introduction of licensing has addressed the market failures common in the industry. These concerns were voiced in an earlier study by Lister *et al.* (2001). They argued that, as training schemes are typically paid for by individuals, the requirements and standards are kept low to ensure attractiveness to potential entrants. Further, lack of employer involvement in the process diminishes the relevance and transferability of acquired skills to real work contexts, resulting in training being perceived, not as an investment, but merely a necessary condition to obtaining a licence.

Lloyd's (2005) work investigated the introduction in 2002 of an industry-wide certification scheme within the fitness industry whereby individuals could voluntarily enter the Register of Exercise Professionals (REP) at one of three levels of entry (Level 1 - student, Level 2 or Level 3), depending on prior qualifications and certified training. Drawing on interviews with employers and representatives of professional associations in the second year of the Register's operation, Lloyd noted that most of the companies she interviewed had not changed their training practices. Only a minority of companies, whose business model relied on a good reputation for the technical expertise of their staff, had improved their training standards to meet the requirements of the highest entry point in the register (Level 3).

Looking at the impact on the industry as a whole, Lloyd concluded that the industry's self-regulation approach had (at the time) failed to raise training standards and, by

implication, improve the wages and conditions of employees within a sector that is characterised by employment precariousness and high turnover. Lloyd also pointed out that the UK's training requirements were low in comparison to France and Germany, where fitness instructors must hold a professional baccalaureate and degree-level qualifications respectively.

Lloyd's research has not been updated to account for recent developments with the Register, as far as we are aware. However, we understand that the Register has expanded since the time of Lloyd's research and that that the proportion of registrants at Level 3 has increased in the intervening period. An additional level – Level 4 (Specialist Exercise Instructor) – has also been added. The case would thus be worthy of re-investigation.

3.3.6 Impact on employment in the UK

We are aware of no quantitative research on the impact of licensing on employment levels within occupations in the UK. To calculate such an effect, one would need to measure employment growth levels before and after the introduction of licensing, while controlling for other reasons that can account for employment change. Based on estimates from the Annual Survey of Hours and Earnings, Fernie (2011) notes a six per cent increase in the number of individuals employed within the security industry over the period 2005 to 2006 (the period prior to the introduction of licensing laws) suggesting no downward effect of licensing on employment levels during this period. This is the closest a UK study has come to calculating such effects, but given the lack of statistical controls, the above findings should be treated cautiously.

3.3.7 Product market effects in the UK

There is no empirical evidence, as far as we are aware, on the impact of occupational regulation on prices or product/service quality in the UK. In recognition of this substantial evidence gap, a feasibility study was undertaken as part of the broader research project, in order to investigate the opportunities for such research in the UK. In the US, studies of the effect of licensing on price typically use average prices charged for the service or product, while studies of quality typically involve either measures of process and procedures (such as customer complaints, customer ratings, malpractice cases and disciplinary actions), measures of outcomes (such as pupil attainment) or value added proxies (such as substitution effects, access to services and insurance premiums). These measures each have their own limitations, however, and the robustness of any findings ultimately rest on the ability to combine them and control for other explanatory factors.

Various secondary data sources exist in the UK that would enable studies of the product market effects to be undertaken for specific occupations. However, in some cases, any analysis could only be cross-sectional in nature, while in other cases, separate datasets would have to be compiled. Access to some datasets would also need to be granted by the relevant authorities. There are thus some practical limitations to what can be done in the UK. But these are not insurmountable and it would clearly be possible to undertake some research on the product market effects of occupational regulation in the UK. Such research – which may be qualitative or quantitative – would address a clear gap in the available evidence for the UK by indicating the circumstances in which the introduction of occupational regulation can have positive or negative impacts on product markets.

3.3.8 Summary for the UK

To conclude, occupational regulation has a long history in the UK dating back to the Medieval Guilds. However, the institution as we know it today only began to develop towards the end of the 19th century. Recently, the UK has witnessed a steady growth in the number of occupations that require a licence to practice, but the preferred approach remains one of voluntarism and industry imposed training standards. The role of the state broadly remains one of providing legitimacy to professional bodies and interfering only in cases where malpractice is deemed to pose extremely high risks for the public. While some professions are content to preserve their right to self-regulation, others are keener to increase the barriers to entry via the imposition of licensing requirements.

Despite its prevalence, evidence on the outcomes of occupational regulation is in short supply. On the issue of training, there are some cases in which the training requirements recommended or imposed in lower skilled occupations have had some effect in increasing the level of training and qualifications in these sectors, although in other cases they have been too low (or the barriers to access them have been too high) to result in any substantial up skilling of the workforce in question. Nevertheless, in cases where training take up increased (such as the social care sector), it would still be wrong to assume that improvements in productivity and quality of service automatically followed. As Kleiner (2006) notes, whilst successful completion of training and the resulting licence to practice the occupation demonstrates competence, these are not necessarily a good measure of subsequent on the job performance. In the absence of evidence of any such effects, further research in needed to address this issue. Moving on to the labour market outcomes, preliminary research demonstrates that licensing is associated with a wage premium in the UK, but only among the more skilled and better paid occupations. Robust evidence on the employment effects of licensing is currently absent. Moreover, little is

known about labour and product market effects of the other, less restrictive forms of regulation such as accreditation and certification.

3.4 Occupational regulation in other EU Countries

3.4.1 Introduction

In order to gain a better understanding how the UK regulatory regime compares with that of other EU countries, we take two approaches. The first is to use an EU wide survey and an EU wide database to provide some comparative data on the extent of regulation across different countries. The second is to summarise the available (although limited) literature on occupational regulation in three of the larger EU nations: Germany, France and Italy.

3.4.2 Cross EU comparisons

There is no harmonised source of information on occupational regulation in the European Union. However, some comparative information on the extent and nature of regulation for specific professions is provided in a large scale survey undertaken by Paterson *et al*. (2003). The study focuses on the regulatory regimes to which accountants, lawyers, architects, engineers and pharmacists are subject across the EU and differentiates between market entry regulation (qualification requirements, work experience etc.) and conduct regulation (e.g. restrictions on fees or prices, regulation of advertising or location etc.). Conduct regulation is common in some EU countries with such provisions either emanating from national state law, regulations by the European Community or issued by professional bodies.

Table 3.3 presents the total regulation (entry and conduct) indices for each of these professions. The regulation index can vary from 0-12, with higher values representing higher intensity of regulation. The authors consider all values above 5 to represent highly regulated regimes; Austria, Italy, Luxemburg, Germany and France have scores which exceed this figure for most if not all of the surveyed professions. Belgium, Spain and to some extent Portugal have values which average around five points. The most liberal regulatory regimes in the EU with respect to these professions are found in the UK, Sweden (with the exception of pharmacists), the Netherlands, Ireland, Finland and Denmark. The UK's most extensive regulation can be found in the case of pharmacists/ pharmacies although the index is still low compared to other countries.

Table 3.3 Total regulation indices for different professions (EU Member States)

Country	Accountants	Legal	Architects	Engineers	Pharmacists
Austria	6.2	7.3	5.1	5	7.3
Belgium	6.3	4.6	3.9	1.2	5.4
Denmark	2.8	3	0	0	5.9
Finland	3.5	0.3	1.4	1.3	7.0
France	5.8	6.6	3.1	0	7.3
Germany	6.1	6.5	4.5	7.4	5.7
Greece	5.1	9.5	n.a	n.a	8.9
Ireland	3	4.5	0	0	2.7
Italy	5.1	6.4	6.2	6.4	8.4
Luxembourg	5	6.6	5.3	5.3	7.9
Netherlands	4.5	3.9	0	1.5	3
Portugal	n.a	5.7	2.8	n.a	8
Spain	3.4	6.5	4	3.2	7.5
Sweden	3.3	2.4	0	0	12
UK	3	4	0	0	4.1
UK ranking	*12th*	*11th*	*14th*	*13th*	*13th*

Source: Paterson et al. (2003). Rankings added.

We are aware of no equivalent survey covering lower skilled occupations. However, some comparative information can be obtained from the European Commission's 'Database of Regulated Professions in the EU Member States'.[16] The database has been compiled under Directive 2005/36/EC which governs recognition rules for professional qualifications across the Single Market, and indicates the entry requirements which pertain to specific occupations in each Member State, so as to aid the free movement of workers. We have used the database to identify the entry requirements for a range of lower skilled occupations. These include two lower skilled occupations which have become subject to licensing in the UK in the past decade, plus eight lower skilled occupations which are not yet subject to licensing in the UK.

The upper panel of Table 3.4 lists those countries, alongside the UK, which operate licensing systems for Childminders/Nursery Nurses and Security Guards. It shows that Childminders and Nursery Nurses, who are subject to licensing in the UK under the 2006 Childcare Act, also have mandatory skill related entry requirements in ten other European countries. Security Guards on the other hand, who became subject to licensing in the UK in 2003, have mandatory skill related entry requirements in only five other European

[16] The European Commission's database is available at: http://ec.europa.eu/internal_market/qualifications/regprof/index.cfm?fuseaction=home.home.

countries. Among these two lower skilled occupations, the UK is therefore among only a minority of European countries which operate mandatory skill related entry requirements.

Table 3.4 Comparison of entry requirements for lower skilled occupations in EU Member States

Occupations recently subject to licensing in the UK	
Occupation	**Also subject to licensing in:**
Security guard	Sweden, Poland, Malta, France, Finland
Child care worker	Switzerland, Poland, Norway, Luxembourg, Italy, Greece, Germany, Finland, Czech Republic

Occupations not currently subject to licensing in the UK	
Occupation	**Subject to licensing in:**
Railway maintenance and construction workers	Slovenia, Poland
Cooks, Chefs;	Slovenia, Poland, Iceland, Hungary, Portugal
Beauticians;	Cyprus, Belgium, Iceland, Hungary, Slovakia, Italy, Czech Republic, Austria
Plumbers;	Spain, Slovakia, Iceland, Leichtenstein, Hungary, Greece, Germany, France, Czech Republic, Belgium
Motor Mechanics;	Slovakia, Poland, Iceland, Germany, Austria
Food processing workers;	*Processing of milk and dairy products:* Slovenia, Slovakia, Iceland, Czech Republic, Austria *Processing of fruit and vegetables:* Slovenia
Bricklayers;	Hungary, Czech Republic
Estate Agents.	Switzerland, Sweden, Slovenia, Slovakia, Portugal, Poland, Norway, Iceland, France, Denmark, Cyprus, Belgium, Austria

Source: EC Database of Regulated Professions

The lower panel of Table 3.4 lists those countries which operate licensing systems for a variety of other lower skilled occupations that are not currently subject to licensing in the UK. The list of occupations is taken from the UK Commission's recent Policy Review (Cox *et al.*, 2009). It is apparent from the lower panel of Table 3.4 that, in each case, the UK is currently in line with the majority of other European countries in not regulating entry to these occupations. The UK's major competitors, such as France and Germany, do appear in the table however. Germany has skill based entry restrictions for plumbers and motor mechanics, requiring those practicing either occupation to hold a Diploma of Secondary Education, whilst France has entry restrictions for plumbers (who are required to complete a secondary course) and estate agents (for whom the entry requirement is not listed). Those countries which appear most regularly in the table include Slovenia, Poland, Hungary, Czech Republic, Austria and Iceland.

These comparisons are, of course, limited in their scope. However, the information presented here suggests that the UK is among those countries which operate the least restrictive regulatory regimes in respect of professional occupations. In respect of lower skilled occupations, it suggests that the UK has, conversely, entered a minority in recently extending licensing to specific lower skilled occupations such as Security Guards. The UK would also be in the minority if it were to extend licensing requirements to any of the lower skilled occupations considered in the UK Commission's recent Policy Review.

3.4.3 Commentary on specific countries

The section that follows reviews the available literature on the German, Italian and French regulatory regimes.[17] Our aim has been to discuss the prevalence of occupational regulation, provide an overview of the types of occupations that are regulated, look at the evidence of its effect on labour and product markets and comment on whether the trajectory is currently towards more or less regulation. We have been constrained on our ability to cover all these issues in sufficient depth for all three countries by the marked absence of literature that directly and sufficiently addresses these themes.

Germany

If the degree of occupational regulation is depicted as a continuum with professional autonomy at the far left, state sanctioned professional control in the middle and direct state control at the far right, Germany belongs to the latter category. Indeed, as a result of numerous pre and post entry restrictions and a coverage that extends to various low skill occupations, the literature describes the German model of occupational regulation as the most intense and comprehensive amongst all its European counterparts (Garoupa, 2004).

The German system of regulating entry to *craft occupations* dates back to the Guilds. Its present form was imposed by the German Trade and Crafts Code in 1938. The Code (and its subsequent revisions) sets out skills, training and work experience requirements for practicing several crafts such as carpentry, plastering, printing and bookbinding, smiths and locksmith trades, textile processing, baker and butcher trades, interior design and hairdressing.[18] Entry to these occupations involves a dual system of formal vocational training and apprenticeships (undertaken simultaneously) followed by lengthy on the job training provided by a Master. Indeed since 1908, any individual who wanted to train apprentices in one of the regulated professions had to hold a Master Certificate. In 1935 this certificate became the mandatory educational requirement to gain professional

[17] We have only been able to review these papers that are written in English.
[18] Notably, several related trades such as copy and paper production, textile refinement, ice-cream production and beauticians are not regulated.

registration and start a business in that occupation (Prantl and Spitz-Oener, 2009). Obtaining the Master Certificate involves undertaking basic vocational training lasting between 2 to 3 years, followed by several years of work experience. The individual then must acquire the journeyman degree (Gesellenzeit und-brief) and subsequently pass the Master examination (Meister prüfung). The rationale behind this system, which survives intact until today, is to ensure consumer protection through the determination of corresponding technical standards and business skills necessary to practice the relevant occupations.

Turning to the regulation of *professions*, the German system is indicative of the country's tradition of legal corporatism (Dubois *et al*., 2006). The state is responsible for providing a legal framework that grants professional bodies the authority to regulate professional training and conduct. As in the case of the UK, in exchange for monopolistic privileges (i.e. responsibility for professional accreditation) and the ability to play a role in policy setting, such professional bodies act as the main regulatory and administrative body whose responsibility is to ensure the public interest is served. Examples of professions who are covered by such arrangements include the medical profession, lawyers, and tax experts. In order to qualify, individuals need a university degree, followed by work experience and in some cases (e.g. accountants, tax advisers and pharmacists) one also needs to sit a professional exam. Further, membership of a professional body is compulsory in Germany if one is to practice the profession (Paterson *et al.*, 2003). For technical professions such as engineers and architects there are no entry restrictions, but the terms architect and engineering consultant are protected by law and are reserved for those who meet certain requirements. Post entry regulation is also strict with respect to fee structures (e.g. legal fees are determined by the state), advertising and organisational forms that professionals and semi professionals can adopt (e.g. a separation between the diagnosis and the implementation of solutions is common amongst medical and law firms).

Evidence on the incidence and economic impact of regulation is lacking in Germany. The aforementioned European Commission's Regulated Professions database lists 152 regulated occupations. Kleiner (2006) provides some preliminary estimates on the wage effects of licensing for doctors and dentists and finds that despite the high level of regulation present in the German context, the wage premium in licensed occupations relative to comparator non-licensed occupations is much lower than that found in the UK or France. In particular, dentists only make between one and five per cent more from licensing compared to the control group, while the licensing premium for doctors vis-à-vis chemists is less than one per cent. Post entry controls of fees and, by implication, earnings are offered by Kleiner (2006) as one potential explanation. If Kleiner's

hypothesis is correct, this would serve to indicate the potential importance of the broader regulatory framework applying to labour and product markets (particularly competition law) in shaping the effects of occupational licensing.

In a study of regulatory effects, in terms of entry to self-employment and occupational mobility, Plantl and Spitz-Oener (2009) show that occupational regulation reduces the flexibility to react to occupational opportunities that arise within the labour market. High investment in occupation specific training necessary for entry results in individuals being less occupationally mobile. However, the authors point out that this effect is stronger in East Germany (as a result of the economic transition the region has gone through) but can also apply to cases where structural shifts in the economy or drastic technological change necessitate quick workforce adaptation.

According to Dubois *et al*. (2006), a recent trend in the case of medicine and allied professions has been towards shifting from a system of self-governance, which has traditionally granted professional associations disproportionate power in setting and monitoring standards, towards one that grants the state more influence in the process. Kleiner (2006) notes that there has been a reduction in the number of regulated occupations in Germany and, in the case of professions, there has been a move towards the adoption of OECD regulatory policies (Biggar and Wise, 2000). For example, advertising rules have recently been relaxed and informative advertising is now permitted for some professions, such as architects and engineers.

Italy

Entry to occupations in Italy has traditionally been highly regulated. According to Brosio (1997), the current system of occupational regulation dates back to the 19th century and is supported by the Italian Constitution. It broadly resembles the regulatory frameworks found in other countries in that entry to occupations is dependent on attainment of prescribed educational and training requirements and, in many cases, this takes the form of a publicly organised examination followed by a period of practical training.

The institution in its present state comprises of either licensed or certified occupations. Examples of the former include doctors, architects, lawyers, pharmacists, journalists, engineers, accountants and customs personnel. Certification comes with a protection of title and is common amongst technical professions such as beauticians, tourist guides and Alpine guides. To our knowledge, aggregate data on the proportion of occupations that are regulated in Italy does not exist. The closest one can get to some estimates is the aforementioned EC database of Regulated Professions, according to which 146 occupations require some form of minimum training in order to be permitted to practice.

The majority of regulated professions are in medicine, with those aligned to medicine are also well represented. However, the database does not distinguish between licensed and certified occupations, nor does it provide us with an estimate of the percentage of the workforce working within such occupations.

Professional associations in Italy have a long history of lobbying the government for the enactment of stricter entrance criteria and monopoly privileges thereafter. Overall, they appear to be effective in defining the tasks and jobs that are subject to regulation, setting the fees charged by professionals and getting their recommendations endorsed by the state which subsequently incorporates them into legislation. Their role in setting examinations and monitoring entry to the profession is set out by law. Empirical evidence has been sought to examine the implications of this. Bortolotti and Fiorentini's (1997) analysis of the accountancy profession showed a negative relationship between the income of professional groups and approval rates at entrance examinations. The authors conclude that institutional barriers to entry have been effective in raising accountant's income and as a result more occupations have been pressing the government to be granted licensed status. According to Brosio (1997), the end of the 1990s there were just over 50 occupations lobbying to such an effect.

To our knowledge, data on the product and labour market effects of occupational regulation in Italy does not exist. The limited literature that is available has been critical about the excessive barriers governing professional entry and post entry conduct in Italy and has called for a regime that is less rigid and one that strips professional associations of their statutory privileges. Similar concerns have been raised by various consumer groups, and in 2007 the Italian Antitrust Commission re-opened an investigation into the rules limiting competition by the imposition of fixed fee scales and advertising bans.[19] This is not the first time that the Commission has launched an inquiry into the professions over anti competitive agreements, which is indicative of the mounting pressures towards relaxation of the regulatory regime.

France

In common with the UK, Germany and Italy, entry to regulated occupations in France is achieved through educational or vocational training. The government usually approves the curriculum, establishes quality standards and controls education funding. Professional associations are influential in shaping its content but their main role is one of disciplining their members and ensuring continuous professional development (Dubois *et al.,* 2006). However, the restrictions can be severe. For example, local merchants in France have to

[19] The investigation focused on the orders covering architects, lawyers, tax accountants and bookkeepers, workplace consultants, pharmacists, geologists, building surveyors, journalists and freelancers, engineers, doctors and dentists, notaries, industrial technicians and psychologists.

approve the establishment of a new business which results in several licensed occupations such as attorneys, accountants and architects exercising some control over competition within geographical areas (Bertrand and Kramarz, 2001).

Existing analyses of occupational regulation in France have focused on specific occupations (mainly high skilled, professional groups). Within this context, researchers such as Kleiner (2006) have described the French system of occupational regulation as being more restrictive than the ones found in the US and the UK, but less restrictive than the German case. Kleiner (2006) provided some preliminary estimates on the wage effects of occupational licensing for doctors and dentists in France. These occupations were compared to a group of comparable unlicensed occupations. He found that, for doctors and dentists, licensing is associated with a wage premium between 8 and 19 per cent relative to their comparator groups, while no wage effect is found for teachers (a licensed occupation) compared to social workers (an occupation subject to registration). The author concludes that the licensing wage premium impact is lower in France compared to the UK and the US. He cites the greater use of price caps and other conduct restrictions in continental Europe as one possible explanation (Kleiner, 2006, p. 135).

Other research has shown that French licensed occupations behave similarly to those in other countries when the opportunity to capture rents emerges. Avrillier *et al*. (2010) investigated the impact of the abolition of compulsory military service (a means by which many French young men obtained their driving licence until 1997) on the heavily regulated driving school industry in France. Their findings show that the resulting increase in demand for driving licence training had two effects. Areas with many young men witnessed an increase in the number of driving schools but not an increase in total profits. Second, it led to an increase in the wages of driving instructors as a means of discouraging them from establishing their own schools (which would lead to more competition in the market).

3.5 Summary

It will have become clear from the preceding discussion that, although many studies have been conducted into occupational regulation in the United States, with a particular focus on licensing, there is a paucity of evidence on the prevalence, operation and impact of occupational regulations in most EU countries, including the UK. The available evidence suggests that licensing is less common in the UK than it is in the US. However, the position of the UK in relation to other countries in the EU, in respect of its approach to occupational regulation, is not easy to discern. From the available evidence it appears that the UK is less restrictive than many EU countries in its approach to regulating specific professions, such as accountancy and law, but that it may be in a minority if it

continues to extend licensing requirements among lower skilled occupations. Further, conduct regulations such as controls on fees, prices, advertising and location of the business are common amongst some occupations in EU countries and in some cases take very restrictive forms. Such features are not prevalent in the US and the UK.

Clearly the origins and nature of occupational regulation differ across countries within the EU, and this has been evidenced in the glimpses we have obtained of the systems which operate in Germany, Italy and France. However, the available evidence on the operation of occupational regulation within such countries is extremely limited. This makes it impossible to make comparative assessments of the efficacy and impact of licensing in different national contexts within Europe.

The best available evidence on the impacts of licensing remains that which has emerged from the numerous studies in the US and some more recent work in the UK. The overall conclusions from these studies are that licensing typically increases the wage of licensed workers and can also lead to a rise in prices. However studies on prices come exclusively from the US and, in the UK, there is evidence of heterogeneity on the impact of licensing wages, with a licensing wage premium only being evident among workers with high educational and training requirements. Thus, those workers in lower skilled and lower paid occupations are not likely to benefit in terms of wages. There is no consistent evidence of improvements in the quality of service or product offered, while the impact of licensing on individual and workplace productivity remains largely unknown. There is also a substantial evidence gap regarding to the labour and product market impact of other forms of regulation i.e. accreditation, certification and registration.

4 Mapping occupational regulation in the UK

Chapter Summary

- A classification scheme has been devised to identify four principal types of occupational regulation in the UK, namely: licensing; certification; accreditation; and registration. These four types of regulation vary according to whether they involve the use of mandatory skill standards (licensing), voluntary skill standards (certification and accreditation) or mandatory entry requirements that are not explicitly skills based (registration).
- Using the Standard Occupational Classification (2000), a map is compiled at Unit Group level which classifies the types of occupational regulation and provides information about the characteristics and enforcement of these regulations.
- Among the 353 Unit Groups within the Standard Occupational Classification (2000), 82 are licensed, 19 contain jobs for which there is a state based certification scheme and 20 are subject to registration. A further 67 Unit Groups contain jobs for which a recognised, non-governmental accreditation scheme exits. This leaves 165 Unit Groups which are unregulated.
- Some 43 Unit Groups have experienced a switch in regulation status since 2001. These include three Unit Groups which have switched from unregulated to licensing and nineteen Unit Groups which have switched from unregulated to either certification or accreditation.

4.1 Introduction

There exists no comprehensive database which maps the extent and nature of occupational regulation in the UK. The most comprehensive list of regulated occupations is that provided by the UK National Contact Point (UK NCP) as an input to the European Commission's 'Database of Regulated Professions in the EU Member States'.[20] This lists 102 occupations which require licences to practice in the UK. However, it provides few details about the conditions governing regulation for each of these occupations. Compiling a database with comprehensive information on the nature of occupational

[20] The list has been compiled under Directive 2005/36/EC which governs recognition rules for professional qualifications across the Single Market. It only covers occupations requiring a licence to practice. The UK list of regulated occupations is provided at: http://www.ukncp.org.uk/index.asp?page=42. The full EC database is available at: http://ec.europa.eu/internal_market/qualifications/regprof/index.cfm?fuseaction=home.home

regulation in the UK is a necessary first step if one is to estimate the prevalence and impact of occupational regulation (including any variation in impact) (see Stanfield *et al.*, 2009). Accordingly, the project team has sought – through desk research – to map the extent and nature of occupational regulation in managerial, professional and non-professional occupations in the UK.

The mapping has been undertaken at the most detailed level of occupational coding available: the Unit Group level of the *Standard Occupational Classification (2000)*.[21] For each of the 353 SOC(2000) Unit Groups, the project team has sought to establish whether any form of occupational regulation is in place. If this is the case, the project team has sought to compile information on the nature of that regulation and the characteristics of its enforcement. This information has been collated in an MS Excel spreadsheet, the content of which is described in this chapter.

Alternative methods for measuring the extent of occupational regulation have been explored in a feasibility study. The findings are presented in Annex A.

4.2 Classification scheme

Within the mapping spreadsheet, each SOC(2000) Unit Group is classified to one of five categories in respect of its regulated status. The classification scheme that is used to categorise each occupation – and which has been developed specifically for this project – is set out in Table 4.1 below. There are three dimensions upon which the situation in any occupation is judged:

1. Is there legal regulation of the activities of the occupation by the state (either directly or through a delegated administrative body)?

2. *If there is some legal regulation:* does it place any restrictions on the right to practice the occupation (or some component tasks)?

3. Is there any requirement to demonstrate a minimum level of competence?

If the answer to all three of these questions is 'Yes', the occupation is classified as being subject to **licensing**. We include occupations where the licence to practice is obtained at organisation level, as in the cases of restaurants and care homes discussed in Section 1.3.[22] If the first and third questions are answered positively, but there is no restriction on

[21] The *Standard Occupational Classification (2010)* is, strictly speaking, the most up to date classification. However, it is yet to enter common usage; SOC(2010) codes is not expected to appear on the Quarterly Labour Force Survey datasets until 2012, for example (personal communication from ESDS Government Helpdesk).

[22] These occupations are not strictly subject to licensing, since each individual worker does not require a licence to practice. However, they are analogous to licensed occupations in the sense that the state restricts the right to practice to those organisations which can demonstrate that a specific share of their workers meet a prescribed skill standard.

the right to practice, it is classified as being subject to **certification**. If the first and second questions are answered positively, but there is no minimum skill requirement, it is classified as being subject to **registration**. If a minimum skill requirement is the only characteristic, and there is no legal regulation of the activities of the occupation, it is classified as being subject to **accreditation**. Finally, if the answer to each of these three questions is 'No' then an occupation is classified as **unregulated**.

Having classified each SOC(2000) Unit Group to one of these five categories, the mapping exercise then goes on to map the features of occupational regulation which apply within each Unit Group. The fields are described – along with their content – in the following section.

Table 4.1 Classification schema for occupations

		Requirement to demonstrate a minimum degree of competence?	
		No	*Yes*
Any legal regulation by the government (directly or through an appointed agency)?	*No*	**Unregulated** The occupation may be subject to conventions, whereby employers will typically cite minimum entry criteria, but these are not co ordinated, nor do they have any legal basis. *UK example:* retail assistant	**Non-governmental accreditation schemes** Practitioners may apply to be accredited as competent by an accrediting body, which is usually a professional body or industry association. May permit the accredited person to use a specific title or acronym but confers no legal protection of title, nor any legal protection of function. *UK example:* membership of Institute of Chartered Accountants
	Yes, but confers no rights to practice	**Empty cell**	**Certification schemes** There is no legal restriction as to who may carry out the tasks covered by the occupation, but practitioners may apply to be certified as competent by the state (or an appointed agent). This certification may sometimes (but not always) confer legal protection of title. *UK example:* certification by the Hairdressing Council
	Yes, and confers rights to practice	**Registration schemes** Requires registration of personal details. May also make stipulations in areas other than competence (e.g. finance) *UK example:* registration of estate agents	**Licensing schemes** Only those who can demonstrate the specified level of competence may obtain a licence permitting them to undertake the tasks covered by the regulation. *UK example:* licensing of taxi drivers by local authorities

4.3 Overview of the Map of Occupational Regulation

Each of the fields in the mapping spreadsheet is described below. The coding schema makes each field amenable to descriptive analysis; tables containing descriptive statistics are provided in the text.

Regulation status: This field records the form of occupational regulation (if any) which applies to jobs included within the SOC(2000) Unit Group. The classification is set out in the previous section. Some 82 Unit Groups contain jobs that require licences to practice (Table 4.2). A further 19 contain jobs for which there is a state based certification scheme whilst 20 contain jobs that are subject to registration requirements. Some 121 Unit Groups (34 per cent) thus contain jobs that are subject to a form of state regulation.

A further 67 Unit Groups (19 per cent) contain jobs for which there is not state regulation but for which there exists a recognised, non-governmental accreditation scheme. The classification scheme is thus hierarchical, in the sense that accreditation schemes are only recorded in the absence of state based regulation (i.e. where a Unit Group is not already subject to licensing, certification or registration).

This leaves 165 Unit Groups (47 per cent) that are classified as being 'unregulated'. All other fields in the spreadsheet are coded 'N/A' if the Unit Group is coded as 'Unregulated'.

Table 4.2 Regulation status

Regulation status	Unit Groups	Unit Groups
	No.	Col %
Licensing	82	23
Certification	19	5
Registration	20	6
Accreditation	67	19
Unregulated	165	47
Total	*353*	*100*

Base: All SOC(2000) Unit Groups

Source: Map of Occupational Regulation

Coverage: Records whether all jobs that are classified within the Unit Group are subject to regulation or whether regulation only extends to some jobs. One example of partial coverage is SOC(2000) Unit Group 6121 (Nursery nurses), in which licences to practice are not required by those working in the child's home. Around three fifths of Unit Groups that contain at least one regulated occupation (115 out of 188) are comprised *wholly* of regulated occupations, leaving around two fifths (73 out of 188) where the regulations extend only to some job titles within the Unit Group (Table 4.3). Further text fields (not

reported here) record the regulated job titles in cases where only some of the jobs within a Unit Group are regulated.

Table 4.3 Regulation status, by Job coverage within the Unit Group

Regulation status	All job titles	Some job titles	Total
	No.	No.	No.
Licensing	53	29	82
Certification	17	2	19
Registration	5	15	20
Accreditation	40	27	67
Total	*115*	*73*	*188*

Base: All regulated Unit Groups

Source: Map of Occupational Regulation

Any protection of title: Indicates whether state based certification schemes or recognised accreditation schemes lead to some protection of title. An example would be the accreditation scheme offered by the Royal Institute of Chartered Surveyors, which entitles accredited persons to use the protected title of 'Chartered surveyor'. Twelve of the 19 cases of state based certification and 38 of the 67 cases of accreditation confer protection of title (Table 4.4).

Table 4.4 Regulation status, by Availability of protection of title

Regulation status	Yes	No	Total
	No.	No.	No.
Certification	12	7	19
Accreditation	38	29	67
Total	*50*	*36*	*86*

Base: All Unit Groups offering Certification or Accreditation

Source: Map of Occupational Regulation

Level: Records the level at which any regulations apply. In most cases of occupational regulation, the requirements (e.g. to meet a specific skill standard) fall upon individual workers. Examples include doctors, taxi drivers and security guards who are each required individually to be licensed. However, there are some cases in which the requirements fall only upon organisations; the registration scheme for estate agents is one example, in which the registration requirements fall upon firms and sole traders. In some cases, the regulation places requirements on both individuals and organisations. An example would be the licensing of pharmacists, where both individual pharmacists and their premises must be licensed. Among the 188 Unit Groups that are subject to some form of occupational regulation, 156 are subject to regulations that apply to individuals, four are subject to regulations that apply to organisations and 28 are subject to regulations that apply at both levels (Table 4.5).

Table 4.5 Regulation status, by Level at which requirements apply

Regulation status	Individual	Organisation	Both	Total
	No.	No.	No.	No.
Licensing	66	1	15	82
Certification	19	0	0	19
Registration	10	3	7	20
Accreditation	61	0	6	67
Total	*156*	*4*	*28*	*188*

Base: All regulated Unit Groups

Source: Map of Occupational Regulation

Characteristics of enforcement body: Contains information about the nature of the enforcement body. In 55 of the 188 cases of regulation, enforcement is undertaken by a dedicated regulatory body (Table 4.6); examples include the General Pharmaceutical Council and the Architects' Registration Board. In a further 40 cases, it is undertaken by a government agency, such as the Financial Services Authority, which has additional responsibilities besides occupational regulation. In 71 cases, enforcement is undertaken by a professional body such as the Chartered Institute of Marketing or the Association of British Travel Agents. In the remaining cases, enforcement is undertaken either by local authorities (17 cases) or by organisations that are difficult to classify (5 cases).[23] Further text fields (not reported here) record the name and contact details of the enforcement body.

Table 4.6 Regulation status, by Characteristics of enforcement body

Regulation status	Regulatory Body	Govt. Agency	Local Authority	Chartered Prof. Body	Non Chartered Prof. Body	Other	Varies	Total
	No.	No.	No.	No.	No.	No.	No.	No.
Licensing	32	27	15	0	3	1	4	82
Certification	14	5	0	0	0	0	0	19
Registration	8	8	2	0	2	0	0	20
Accreditation	1	0	0	36	30	0	0	67
Total	*55*	*40*	*17*	*36*	*35*	*1*	*4*	*188*

Base: All regulated Unit Groups

Source: Map of Occupational Regulation

Funding of Enforcement Body: indicates whether the enforcement body is funded by the government (as in the case of the General Pharmaceutical Council) or self-funded (as in the case of the Chartered Institute of Marketing). Among the 188 cases of regulation, we record 92 cases in which the enforcement body is government funded and 96 in which it is self-funded (Table 4.7).

[23] Those which are difficult to classify include sports governing bodies which regulate sports coaches and officials (Unit Group 3442) and the National Youth Agency which regulates youth and community workers (Unit Group 3231).

Table 4.7 Regulation status, by Funding of enforcement body

Regulation status	Government funded	Self-funded	Total
	No.	No.	No.
Licensing	69	13	82
Certification	5	14	19
Registration	18	2	20
Accreditation	0	67	67
Total	*92*	*96*	*188*

Base: All regulated Unit Groups

Source: Map of Occupational Regulation

Renewal mechanism: Indicates whether any licence to practice, certification, registration or accreditation must be renewed and, if so, by what mechanism. In 111 of the 188 regulated cases, there is no requirement to renew (Table 4.8). In a further 47 there is a requirement to re-register after a specified period of time but there is no new examination of the person's competence. In the remaining cases, the re-registration process either involves a requirement to demonstrate continuing professional development (17 cases) or involves an examination (10 cases).

Table 4.8 Regulation status, by Renewal mechanism

Regulation status	For Life	Re register	Re register /CPD	Re register /Exam	Total
	No.	No.	No.	No.	No.
Licensing	50	17	7	8	82
Certification	17	2	0	0	19
Registration	11	7	2	0	20
Accreditation	33	21	8	2	67
Total	*111*	*47*	*17*	*10*	*188*

Base: All regulated Unit Groups

Source: Map of Occupational Regulation

Month and year of commencement: These fields indicate the date on which each instance of occupational regulation came into force. Some date back to the 19th century whereas, in 52 Unit Groups (such as 9241 – Security Guards), regulation commenced since 2000 (Table 4.9). These recently regulated occupations include 15 Unit Groups that are now subject to licensing, six that now have certification schemes, 15 that are now subject to registration and 16 that now have accreditation schemes. A further text field (not reported here) records the statutory instrument through which instances of licensing or state based certification have been established.

Table 4.9 Regulation status, by Year of commencement

Regulation status	Before 1950	1950-1979	1980-1989	1990-1999	2000-2010	Don't know	Total
	No.	No.	No.	No.	No.	No.	No.
Licensing	21	14	3	16	15	13	82
Certification	0	1	12	0	6	0	19
Registration	0	2	1	0	15	2	20
Accreditation	12	8	6	18	16	7	67
Total	*33*	*25*	*22*	*34*	*52*	*22*	*188*

Base: All regulated Unit Groups

Source: Map of Occupational Regulation

The date of commencement is not known in 22 of the 188 cases of regulation; these are typically cases in which the occupation has been regulated for some considerable time. It should be noted that we have only attempted to code the month of commencement if the year of commencement was 2001 or later, as these are the cases that can be identified in our analysis of the Quarterly Labour Force Survey 2001-2010. We have been successful in identifying the month of commencement for around two thirds of these cases.

Rationale for regulation: In this field we have attempted to code the reasons for the introduction of regulation. Seven different reasons have been identified, with more than one reason being coded in many cases. The most common coded reason is 'protection of the public' (124 of 188 cases), followed by 'demonstration of competence' (54 cases) (Table 4.10). It should be noted that this is often a subjective judgement, based upon information published by the enforcement body or correspondence with those bodies.

Table 4.10 Regulation status, by Reasons for regulation

Regulation status	Protect public	Demon-strate compet-ence	Health and safety	Upskill prof-ession	Gain prof-essional recognition	Adherence to codes of conduct	Establish /maintain industry standards	Total
	No.	No.	No.	No.	No.	No.	No.	No.
Licensing	75	16	7	0	0	5	0	82
Certification	12	1	12	0	6	0	0	19
Registration	19	0	0	0	1	1	0	20
Accreditation	18	37	12	14	3	7	3	67
Total	*124*	*54*	*31*	*14*	*10*	*13*	*3*	*188*

Base: All regulated Unit Groups

Source: Map of Occupational Regulation

Entry requirements (qualifications): The text field records the nature of any educational or vocational qualifications that are required as a condition of becoming

licensed, certified or accredited.[24] The coded field goes on to classify these qualifications to one of five categories based on their correspondence to the National Qualifications Framework (NQF).[25] The most common requirement (65 cases) is for a qualification at NQF Level 4-6 (comprising Level 4 NVQs, teaching qualifications and first degrees) (Table 4.11). There is one case in which (Unit Group 3131 - IT Operations Technician) in which the relevant accreditation scheme (run by the Chartered Institute for IT) does not prescribe an entry route based on attainment of qualifications but, instead, requires all applicants to demonstrate relevant work experience. In some other cases, entrants are required to pass examinations that are specific to the occupation and which do not map across to the NQF in an obvious way; this situation applies in 13 Unit Groups (including Unit Group 3132 - police officers) and these cases are coded "Don't know". Entry requirements are highest for professionals, as one might expect (see Table 4.12).

Table 4.11 Regulation status, by NQF level of entry qualification

Regulation status	None required	Below level 2	Level 2	Level 3	Level 4-6	Level 7-8	Don't know	Total
	No.	No.	No.	No.	No.	No.	No.	No.
Licensing	0	20	11	6	32	2	11	82
Certification	0	0	7	0	2	10	0	19
Accreditation	1	2	19	9	31	3	2	67
Total	*1*	*22*	*37*	*15*	*65*	*15*	*13*	*168*

Base: All Unit Groups with Licensing, Certification or Accreditation

Source: Map of Occupational Regulation

[24] This field is not relevant in the case of registration, since registration does not involve qualification-based entry requirements.

[25] The coding was undertaken through reference to the table on pp.107-8 of the Labour Force Survey User Guide (Volume 5: LFS Classifications). This table shows the correspondence between specific educational and vocational qualifications (as coded on LFS variable HIQUAL8) and five levels of the NQF. See: http://www.statistics.gov.uk/downloads/theme_labour/Vol5_2009.pdf

Table 4.12 SOC(2000) Major Group, by NQF level of entry qualification

Regulation status	None required	Below level 2	Level 2	Level 3	Level 4-6	Level 7-8	Don't know	Total
	No.	No.	No.	No.	No.	No.	No.	No.
Managers and senior officials	0	1	7	0	9	1	2	20
Professionals	0	0	0	0	24	13	0	37
Assoc Prof and Technical	1	2	1	9	24	1	7	45
Admin and Secretarial	0	1	0	0	2	0	0	3
Skilled trades	0	4	11	4	4	0	3	26
Personal service	0	0	5	2	1	0	1	9
Sales and customer service	0	1	0	0	0	0	0	1
Process, plant and machine operatives	0	11	8	0	0	0	0	19
Elementary	0	2	5	0	1	0	0	8
Total	*1*	*22*	*16*	*15*	*63*	*15*	*13*	*168*

Base: All Unit Groups with Licensing, Certification or Accreditation

Source: Map of Occupational Regulation

Type of qualification: Indicates whether the entry requirement is in the form of an educational qualification (e.g. a first degree) or a vocational qualification (e.g. an NVQ). In a small number of cases (seven in total) entry may be granted through either route (as in the case of teachers who may become eligible for Initial Teacher Training either by obtaining a first degree in a relevant subject or by obtaining a vocational qualification). The remaining cases are split between educational (67 cases) and vocational qualifications (80 cases) (Table 4.13). Requirements for educational qualifications are typically at a higher level than requirements for vocational qualifications, as one would expect.

Table 4.13 NQF level of entry qualification, by Type of qualification required

Regulation status	Educational	Vocational	Either	Total
	No.	No.	No.	No.
Below level 2	0	22	0	22
Level 2	0	36	1	37
Level 3	1	14	0	15
Level 4-6	52	7	6	65
Level 7-8	14	1	0	15
Total	*67*	*80*	*7*	*154*

Base: All Unit Groups where entry qualification required and known

Source: Map of Occupational Regulation

Entry requirement (work experience): Records the number of years of work experience that are required in addition to the qualifications noted above, in order to attain the licence/certificate/accreditation. In 131 of the 168 cases, no additional work experience is required (Table 4.14). The longest requirement is for ten years of work experience, which is a condition of becoming accredited as a Chartered Chemist (Unit Group 2111) or a Chartered Biologist (Unit Group 2112). There are a small number of cases in which the requirement for work experience varies across jobs within the same Unit Group and these are coded separately; one example is Electronic Engineers (Unit Group 2124).

Table 4.14 Regulation status, by Years of experience required

Regulation status	None	1-2 years	3-4 years	5+ years	Varies	Total
	No.	No.	No.	No.	No.	No.
Licensing	75	3	1	0	3	82
Certification	13	0	0	0	6	19
Accreditation	43	13	5	5	1	67
Total	*131*	*16*	*6*	*5*	*10*	*168*

Base: All Unit Groups with Licensing, Certification or Accreditation

Source: Map of Occupational Regulation

Other entry requirement: Records any other entry requirements. These may include a competence test (e.g. health and safety test), a criminal records check or a medical examination. Such additional entry requirements applied to 102 of the 188 regulated Unit Groups. They are most common in cases of licensing (Table 4.15).

Table 4.15 Regulation status, by Any other entry requirement

Regulation status	Yes	No	Total
	No.	No.	No.
Licensing	53	29	82
Certification	9	10	19
Registration	11	9	20
Accreditation	29	38	67
Total	*102*	*86*	*188*

Base: All regulated Unit Groups

Source: Map of Occupational Regulation

Grandfathering rights: In the case of licensing, this field records whether or not those persons who were already practising the occupation when licensing was first introduced were automatically granted licences to practice by virtue of their existing work experience. For example, some Psychologists (Unit Group 2212) were afforded grandfathering rights when a licensing system was introduced by the Health Professions Council in 2009. However, those who were practising professions allied to medicine in the private sector, such as physiotherapists in private clinics (Unit Group 3221), were not awarded such

rights when the licensing of such professions was extended to cover private sector practitioners in 2002. Grandfathering rights have been awarded to incumbents in a minority of Unit Groups subject to licensing.

In cases of accreditation or certification, the field indicates whether job holders who do not possess the prescribed entry qualifications may obtain certification or accreditation by demonstrating that they have a specified period of relevant work experience. Experience-based routes are available in a majority of cases of certification or accreditation (Table 4.16).

Table 4.16 Regulation status, by Availability of grandfathering rights

Regulation status	Yes	No	Total
	No.	No.	No.
Licensing	27	55	82
Certification	14	5	19
Registration	0	20	20
Accreditation	35	32	67
Total	*76*	*112*	*188*

Base: All regulated Unit Groups

Source: Map of Occupational Regulation

Geographical coverage: Indicates the geographical scope of the regulation. In 185 of the 188 cases, regulation extends to cover jobs throughout the United Kingdom (Table 4.17). However, the accreditation scheme for toymakers (one part of Unit Group 5499) extends only to cover jobs in Britain, whereas the accreditation scheme for Legal secretaries (Unit Group 4212) extends only to jobs in England and Wales (Table 4.16).

Table 4.17 Regulation status, by Geographical coverage

Regulation status	UK	GB	England & Wales	Scotland	Total
	No.	No.	No.	No.	No.
Licensing	81	0	0	1	82
Certification	19	0	0	0	19
Registration	20	0	0	0	20
Accreditation	65	1	1	0	67
Total	*185*	*1*	*1*	*1*	*188*

Base: All regulated Unit Groups

Source: Map of Occupational Regulation

Changes in coverage since 2001: Indicates whether the coverage of the regulations has changed in the last decade and, if so, whether coverage has extended to all jobs in the Unit Group or whether coverage remains partial. Coverage has extended to all jobs in seven cases, whereas it has extended to cover more jobs (but not all) in a further five cases (Table 4.18). One example of the former is Unit Group 3221 (Physiotherapists); all

job holders in this Unit Group must now hold a licence to practice. An example of the latter is Unit Group 3229 (Therapists not elsewhere classified); the range of jobs that require a licence to practice has increased in this Unit Group but there remain some jobs which do not require licences.

Table 4.18 Regulation status, by Any change in coverage since 2001

Regulation status	Extended to all jobs	Extended to more jobs	No	Don't know	Total
	No.	No.	No.	No.	No.
Licensing	6	3	68	5	82
Certification	0	0	19	0	19
Registration	0	2	18	0	20
Accreditation	1	0	64	2	67
Total	*7*	*5*	*169*	*7*	*188*

Base: All regulated Unit Groups

Source: Map of Occupational Regulation

Changes in skill requirements since 2001: Indicates whether the skill requirements laid down by the relevant regulation have changed in the last decade. This is known to have occurred in 14 cases (Table 4.19). One example is Unit Group 2442 (Social workers) who now require an honours degree rather than a diploma.

Table 4.19 Regulation status, by Any change in skill requirements since 2001

Regulation status	Yes	No	Don't know	Total
	No.	No.	No.	No.
Licensing	11	67	4	82
Certification	0	19	0	19
Registration	0	20	0	20
Accreditation	3	63	1	67
Total	*14*	*168*	*5*	*188*

Base: All regulated Unit Groups

Source: Map of Occupational Regulation

Switcher since 2001: Indicates whether the regulation status of the Unit Group has changed since 2001. This has occurred in 43 cases. These include twelve cases in which the Unit Group has become subject to licensing for the first time since 2001. Table 4.20 categorises all switching Unit Groups, according to the nature of the change in regulation status, and also provides some examples; a full list of switching Unit Groups is provided in Annex B. This field defines the population from which the subset of occupations is chosen for the 'difference-in-differences' analysis reported in Chapter Six.

Table 4.20 Switches in regulation status since 2001

Nature of switch	Unit Groups	Example
	No.	
No change	145	
Yes, from certification to licensing	7	SOC 2442: Social Workers (2005)
Yes, from unregulated to licensed	5	SOC 9241: Security Guards and Related Occupations (2003)
Yes, from unregulated to certification	6	SOC 3443: Fitness Instructors (2002)
Yes, from unregulated to accreditation	16	SOC 5232: Vehicle Body Builders and Repairers (2006)
Yes, from unregulated to registration	9	SOC 3544: Estate Agents and Auctioneers (2008)
Total	*188*	

Base: All regulated Unit Groups

Source: Map of Occupational Regulation

4.4 Additional notes and caveats

There are a small number of additional points to note in respect of the mapping exercise, by way of qualification.

First, as noted above, SOC(2000) Unit Groups often comprise more than one job title and so situations do arise in which the individual job titles that are included within a single Unit Group are subject to different regulatory arrangements. In some cases, all job titles are regulated but are subject to regulation of different forms. In other cases, all job titles are subject to the same form of regulation (say, accreditation) but the nature of the regulation

may differ between jobs. In these cases, there are different regulatory situations covering different jobs (and hence multiple enforcement agencies and multiple entrance requirements). One example is Unit Group 5499, where there are separate accreditation schemes for toymakers and wigmakers (other job titles in this Unit Group, such as blind makers, are unregulated). We have coded the most restrictive form (i.e. the stricter form of regulation or the higher entry requirement). This is a necessary simplification for the purposes of the statistical analysis.

Finally, it should also be noted that occupations are coded as 'licensed' by default when the state is the sole employer and imposes a single mode of entry with a skills based entry requirement. Examples include fire service personnel and paramedics. In such cases, there are no other means of practising the occupation other than by successfully adhering to the skills requirement laid down by the relevant state body. Such occupations thus have the characteristics of licensed occupations although the enabling statutory instrument may be difficult to identify.

4.5 Summary

The preceding discussion has outlined the main characteristics of the first comprehensive map of occupational regulation in the UK. It has also provided a descriptive overview of the regulatory characteristics applying within each occupation (defined at SOC(2000) Unit Group level). The database enables estimates of the prevalence of each form of occupational regulation to be compiled, and these are provided in the next chapter of this report. It also enables estimates of the impact of occupational regulation to be derived; these are presented in Chapter Six.

5 The prevalence of occupational regulation in the UK

Chapter Summary

- The classification arising from the Map of Occupational Regulation has been applied to the Quarterly Labour Force Survey in order to provide estimates of the prevalence of occupational regulation in the UK for the period 2001-2010.
- The estimates indicate that at least 14 per cent of all jobs in the UK are subject to licensing. At least three per cent have the option of certification, whilst at least 10 per cent have the option of accreditation. At least two per cent are subject to registration requirements. The true figures are likely to be higher, as precise estimates cannot be obtained for jobs belonging to Unit Groups where only some tasks are regulated. In total, at least 28 per cent of all jobs in the UK are covered by one of the four types of regulation, although the true figure is likely to be at least one third and may be as high as fifty per cent.
- The most reliable estimates indicate that the share of all jobs that are subject to regulation has risen by five percentage points over the period 2001-2010. This growth represents the combined effect of employment growth in occupations that were regulated in 2001 and the extension of regulation to occupations which were unregulated in 2001.
- Professional occupations are the most likely to be regulated followed by Process, plant and machine operatives. Sales occupations, Skilled trades, Personal service occupations and Elementary occupations are the least likely to be regulated.
- Regulated jobs are more likely to be held by men than by women. Those in the licensing and accreditation groups tend to be older, on average, than other groups, which may be related to the time investment that is sometimes needed in order to gain the qualifications or work experience that is required under a licence to practice or an accreditation.

5.1 Introduction

The mapping exercise discussed above provides a comprehensive picture of the patterns of occupational regulation within different occupations in the UK. However, it also provides a basis for estimates of the prevalence of occupational regulation to be derived. Such estimates are presented in this section of the report, using data from the UK's Quarterly Labour Force Survey (QLFS). The QLFS is a sample survey of households living at private addresses. It is conducted by the Office of National Statistics in Britain and by the Central Survey Unit of the Department of Finance and Personnel in Northern Ireland. The survey provides many of the UK's official statistics on the labour market.

The QLFS contains no questions on licences to practice or other forms of occupational regulation. However, it does contain SOC(2000) Unit Group codes for all main and second jobs held by employees and self-employed persons in the survey. It is thus possible to match the SOC(2000) Unit Group data that has been compiled in the mapping exercise to the equivalent Unit Group codes that are present for each job in the QLFS. This enables each job to be classified according to the regulatory characteristics of the Unit Group to which it belongs. One can then obtain an estimate of the percentage of all jobs that are accounted for by Unit Groups requiring licences to practice, for example.

The QLFS has a number of other advantages for this purpose. First, it provides a large sample of workers – roughly 90,000 each year once the records for unique respondents have been pooled across the four quarters in each calendar year. Any estimates are thus subject to very small sampling errors; a variety of sub group analyses are also feasible. Second, it offers SOC(2000) Unit Group codes for each quarter since April-June 2001; this makes it possible to use the information collected in the mapping exercise on the date of introduction of each regulatory arrangement to chart the growth of occupational regulation over the past decade. Third, the survey has good quality control mechanisms (by virtue of its use to produce many National Statistics) and so can be relied upon to produce robust population estimates.

5.2 Methodology

We pool the observations from successive quarters in each calendar year to produce annual datasets spanning the period 2001-2010. The annual dataset for 2001 is based on only three quarters of data, due to the non availability of SOC(2000) Unit Group codes in the Jan-March quarter of that year. The 2010 annual dataset is also based on only three quarters of data, as the July-September quarter was the latest available from the Economic and Social Data Service at the time of writing. The complete pooled dataset thus comprises 38 quarters from April 2001 to September 2010.

The estimation sample comprises those respondents who report that they are either an employee or are self-employed at the time of the survey (i.e. those in paid work, not on government schemes). Data are extracted on main and second jobs, so that the estimates represent the proportion of all jobs that are characterised by different forms of regulation (rather than the proportion of all workers). This avoids any potential biases which may arise from differences in the prevalence of occupational regulation between main jobs and second jobs.

As the classification of job is applied at SOC(2000) Unit Group level, there is the potential for measurement error in cases where only some of the jobs that are classified to a particular Unit Group are subject to regulation. Some of this potential measurement error can be avoided in instances where it is possible to pinpoint regulated workers through the characteristics of their employing organisation. There are two specific cases:

- Those workers within SOC(2003) Unit Groups 1225, 1239, 4123, 6211, 9226 and 9229 who are required to be licensed under the Gambling Act (2005) are taken to be those whose employing organisations are classified to Class 92.00 of the *Standard Industrial Classification (2007)*, which identifies organisations involved in 'Gambling and betting activities'
- Those within SOC(2003) Unit Groups 1174 and 9241 who are required to be licensed under the Private Security Industry Act 2001 are taken to be those who either are self-employed or are directly employed by organisations classified to Class 80.10 of the *Standard Industrial Classification (2007)*, which identifies organisations involved in 'Security and investigation activities'.

In both cases, any job within these Unit Groups which did not meet these criteria was classified as unregulated.

Any job observed in the survey at a point in time before its Unit Group became subject to regulation is also classified as unregulated at that time. The introduction of the Health Professions Act 2001 extended licensing to cover therapist jobs outside the National Health Service within SOC(2003) Unit Groups 3213, 3214, 3215, 3221, 3222, 3223 and 3229 from February 2002. Any private sector jobs in these Unit Groups are thus classified as unregulated before this date.[26]

There remain many Unit Groups in which regulation does not extend to all constituent jobs and in which it is not possible to distinguish between those jobs which are regulated and those which are not. This restriction means that it is necessary to produce two estimates for the prevalence of each type of regulation: an upper bound estimate which

[26] This is only possible for main jobs; there is no public/private sector code for second jobs in the QLFS.

assumes that all jobs within such Unit Groups are subject to regulation; and a lower bound estimate which assumes that none of the jobs in such Unit Groups are subject to regulation. This serves to identify the range within which the true estimate of the prevalence of regulation lies.

Finally, it should be noted that the SOC based classification provides estimates of the percentages of jobs that are subject to different forms of regulation; it does not provide estimates of the percentages of workers who have been successful in any applications for licences, certificates and so on. So in the case of mandatory requirements such as licensing and registration, this approach gives estimates of the percentages of jobs that are *subject to these mandatory forms of regulation*. It cannot account for any non-compliance on the part of workers. In the cases of certification and accreditation, it gives estimates of the percentages of jobs in which workers *have the option of applying to be certified or accredited*. It does not indicate the percentages of workers who have actually applied to be certified or accredited, nor does it indicate the percentages of workers who have been successful in any such applications.

5.3 The prevalence of occupational regulation in 2010

Upper and lower bound estimates of the prevalence of each form of occupational regulation in 2010 are presented in Table 5.1. The upper bound estimates indicate that: up to 31 per cent of all jobs require licences to practice; up to three per cent have the option of state certification; up to six per cent require registration; and up to 19 per cent have the option of accreditation. The lower bound estimates indicate that: at least 14 per cent of all jobs require licences to practice; at least three per cent have the option of state certification; at least two per cent require registration; and at least 10 per cent have the option of accreditation. These estimates imply that the overall percentage of jobs that are covered by state based regulation of some form (whether licensing, certification or registration) lies between 40 per cent and 19 per cent. The percentage of jobs that is ‘unregulated’ lies between 40 per cent and 72 per cent.

Table 5.1 Regulation status in 2010

Regulation status	Upper bound	Lower bound
	Col %	Col %
Licensing	31	14
Certification	3	3
Registration	6	2
Accreditation	19	10
Unregulated	40	72
Total	100	100
Base	*152,191*	*152,191*

Base: All employee and self-employed jobs

Source: QLFS Jan-Sept 2010

These ranges are considerable in the case of licensing and accreditation. However, we have identified those Unit Groups which contribute most to the range of uncertainty for each of these two forms of regulation (i.e. those which contribute most to the percentages in column two of Table 5.2). We have then gone on to identify the various job titles that are classified to each of these Unit Groups and, in this way, it is possible to make a judgement as to whether the minority or majority of jobs in each of these 'key' Unit Groups are likely to be subject to the regulation that is coded. In most cases, we judge that only a minority of the jobs in these Unit Groups are subject to the regulation.[27] Accordingly, we judge that the true incidence of licensing is closer to 14 per cent than 31 per cent and that the true incidence of accreditation is closer to 10 per cent than 19 per cent. The percentage of unregulated jobs is thus considerably closer to 72 per cent than 40 per cent.

Table 5.2 Regulation status of Unit Group in 2010, by Job coverage within the Unit Group

Regulation status of Unit Group	All job titles	Some job titles	N/A	*Base*
	Cell %	Cell %	Cell %	*No.*
Licensing	14	17	0	*48,206*
Certification	3	1	0	*5,107*
Registration	2	4	0	*8,661*
Accreditation	10	10	0	*28,970*
Unregulated	0	0	40	*61,247*
Total	28	32	40	*152,191*
Base	*42,948*	*47,996*	*61,247*	

Base: All employee and self-employed jobs

Source: QLFS Jan-Sept 2010

[27] For example, we judge that the only a minority of sales retail assistants (Unit Group 7111) are involved in food sales roles, which are covered by the training requirements laid down in the Food Safety Act 1990.

5.4 The changing incidence of occupational regulation

As noted earlier, it is possible to utilise the information from the mapping exercise on the date at which each regulatory arrangement commenced in order to classify jobs as either regulated or unregulated (as appropriate), depending upon the year in which the job is observed in the survey. A particular Unit Group may thus be coded as unregulated in one year, but regulated the year after. This makes it possible to chart the changing incidence of regulation over the past decade, since 2001.

If we rely on the upper bound estimates of the prevalence of regulation, we find that the percentage of jobs subject to licensing requirements has risen from 23 per cent to 31 per cent between 2001 and 2010, whilst the percentage of unregulated jobs has fallen from 55 per cent to 40 per cent over the same period (Table 5.3). However, if we rely on the lower bound estimates, which we consider to be more accurate, we find that the percentage of jobs subject to licensing requirements has risen from 12 per cent in 2001 to 14 per cent in 2010, whilst the percentage of unregulated jobs has fallen from 77 per cent to 72 per cent (Table 5.4).

Table 5.3 Regulation status (upper bound), by Year (2001-2010)

Year	Licensing	Certif.	Regist.	Accred.	Unreg.	Total	Base
	Row %	Row %	Row %	Row %	Row %	Row %	*No.*
2001	23	3	3	16	55	100	*194,246*
2002	24	3	3	17	53	100	*256,066*
2003	24	3	3	17	53	100	*246,129*
2004	24	3	3	18	52	100	*238,278*
2005	27	3	3	18	49	100	*234,886*
2006	30	3	3	19	45	100	*229,230*
2007	29	3	5	20	43	100	*228,249*
2008	30	3	5	20	42	100	*224,196*
2009	31	3	6	20	41	100	*211,034*
2010	31	3	4	20	40	100	*152,191*

Base: All employee and self-employed jobs

Source: QLFS Apr 2001 - Sept 2010

Table 5.4 Regulation status (lower bound), by Year (2001-2010)

Year	Licensing	Certif.	Regist.	Accred.	Unreg.	Total	Base
	Row %	Row %	Row %	Row %	Row %	Row %	*No.*
2001	12	2	2	7	77	100	*194,246*
2002	12	2	2	8	76	100	*256,066*
2003	13	2	2	8	76	100	*246,129*
2004	13	2	2	8	76	100	*238,278*
2005	13	2	2	9	74	100	*234,886*
2006	14	2	2	10	73	100	*229,230*
2007	13	2	2	10	72	100	*228,249*
2008	14	2	2	10	72	100	*224,196*
2009	14	3	2	10	72	100	*211,034*
2010	14	3	2	10	72	100	*152,191*

Base: All employee and self-employed jobs

Source: QLFS Apr 2001 - Sept 2010

Although the rise in licensing on the 'lower bound' measure is relatively small in magnitude, it is nonetheless statistically significant at the one per cent level because of the large sample sizes.[28] Further investigation shows that around half of the two percentage point growth in licensing, since 2001 on this measure, has come about because of the extension of licensing requirements to Unit Groups that were previously unlicensed; the remaining half can be attributed to a higher rate of employment growth among licensed occupations than among non-licensed occupations over the past decade.

5.5 The prevalence of occupational regulation by job type

The availability on the Quarterly Labour Force Survey of a variety of characteristics of each job, in addition to its occupational classification, makes it possible to explore the prevalence of occupational regulation among various different types of job. In doing so, we continue to rely on the 'lower bound' measure of regulation status, as we consider this to be the best available. However, tables which instead apply the upper bound measure of regulation status are provided in Annex C, so that comparisons can be made.

Using the lower bound measure, we find that 33 per cent of self-employed jobs belong to regulated Unit Groups, compared with 27 per cent of employee jobs (Table 5.5). Self-employed jobs are therefore more likely to be regulated than employee jobs. The difference lies in the greater prevalence of accreditation opportunities among self-employed jobs (15 per cent of self-employed jobs belong to Unit Groups with accreditation schemes, compared with nine per cent of employee jobs).

[28] The increased availability of certification, from two per cent of jobs in 2001 to three per cent in 2010, is also statistically significant at the one per cent level, as is the rise in accreditation, from seven per cent of jobs in 2001 to 10 per cent in 2010.

Table 5.5 Regulation status in 2010 (lower bound), by Employment status

Employment status	Licensing	Certif.	Regist.	Accred.	Unreg.	Total	Base
	Row %	Row %	Row %	Row %	Row %	Row %	*No.*
Employee	14	3	2	9	73	100	*129,530*
Self-employed	14	3	2	15	67	100	*22,643*
All	14	3	2	10	72	100	*152,173*

Base: All employee and self-employed jobs

Source: QLFS Jan-Sept 2010

A comparison between SOC(2000) Major Groups is more striking however (Table 5.6). Professional occupations are the most likely to be regulated (76 per cent are subject to some form of regulation using our lower bound measure); professional occupations are also the most likely to be subject to licensing, as one would expect from the discussion in Chapter Three. The group which is next most likely to be subject to regulation is Process, plant and machine operatives (58 per cent); this group includes taxi drivers, HGV drivers and others requiring transportation licences. In contrast, fewer than 10 per cent of jobs are regulated in those Major Groups which comprise of Administrative and secretarial occupations, Personal service occupations and Elementary occupations.[29]

Table 5.6 Regulation status in 2010 (lower bound), by SOC(2000) Major Group

SOC(2000) Major Group	Licensing	Certif.	Regist.	Accred.	Unreg.	Total	Base
	Row %	Row %	Row %	Row %	Row %	Row %	*No.*
Managers and senior officials	6	0	3	12	78	100	*23,241*
Professionals	40	13	0	22	24	100	*21,102*
Assoc Prof and Technical	26	4	5	10	55	100	*22,485*
Admin and Secretarial	0	0	4	3	94	100	*17,147*
Skilled trades	2	0	0	21	77	100	*15,771*
Personal service	0	0	0	2	98	100	*13,831*
Sales and customer service	0	0	0	0	100	100	*11,027*
Process, plant and machine operatives	51	6	0	1	42	100	*10,054*
Elementary	0	0	0	7	93	100	*17,533*
All	14	3	2	10	72	100	*152,191*

Base: All employee and self-employed jobs

Source: QLFS Jan-Sept 2010

The prevalence of regulation in Skilled trades is perhaps of particular interest, given the tradition of Guilds discussed in Section 3.3.1; 23 per cent of workers in Skilled trades are subject to regulation using the lower bound measure, with the vast majority of these

[29] Note that we are using our lower bound measure here, which counts all partially-regulated Unit Groups as unregulated.

working in occupations with voluntary accreditation schemes.[30] Skilled trades do, however, include a number of occupations (e.g. chefs, electricians and motor mechanics) where only some of the activities covered by the Unit Group are subject to regulation. The prevalence of regulation is therefore substantially higher under the upper bound measure, as it is for Managers and senior Officials, Personal service occupations and Sales occupations (see Table C.6 in Annex C for details).

There are small variations in the prevalence of regulation across the different regions of the UK. The percentage of regulated jobs is lowest in the North East and the West Midlands; in both regions it stands at 26 per cent (Table 5.7). This contrasts with a figure of 33 per cent in London. London has the highest incidence of regulation because of the relatively high prevalence of registration (a function of the concentration of financial jobs in the City) and the relatively high prevalence of jobs covered by accreditation schemes. Table 5.8, which reports on occupational regulation by the former Learning and Skills Council areas, indicates that five per cent of all jobs in Central London are subject to registration requirements.

Table 5.7 Regulation status in 2010 (lower bound), by Region of workplace

Government Office Region	Licensing	Certif.	Regist.	Accred.	Unreg.	Total	Base
	Row %	Row %	Row %	Row %	Row %	Row %	*No.*
North East	14	3	1	8	74	100	*6,490*
North West	15	3	1	9	72	100	*17,535*
Yorks and The Humber	14	3	1	9	73	100	*13,625*
East Midlands	15	3	1	8	73	100	*11,066*
West Midlands	14	3	1	9	74	100	*12,963*
East of England	14	3	1	10	71	100	*13,608*
London	14	2	4	12	67	100	*17,255*
South East	13	3	2	10	73	100	*19,952*
South West	13	3	1	9	73	100	*13,559*
Wales	15	2	1	9	72	100	*6,624*
Scotland	15	3	1	9	72	100	*13,255*
Northern Ireland	17	2	1	10	70	100	*5,593*
All	14	3	2	10	75	100	*151,525*

Base: All employee and self-employed jobs

Source: QLFS Jan-Sept 2010

[30] Examples include carpenters, painters and bricklayers.

Table 5.8 Regulation status in 2010 (lower bound), by LSC area

LSC area	Licensing	Certif.	Regist.	Accred.	Unreg.	Total	Base
	Row %	Row %	Row %	Row %	Row %	Row %	*No.*
County Durham	13	4	1	9	73	100	*2,878*
Northumberland	16	3	0	9	71	100	*2,152*
Tees Valley	14	3	1	8	73	100	*3,756*
Tyne & Wear	13	2	1	9	74	100	*6,697*
Cheshire/ Warrington	13	3	2	10	73	100	*6,065*
Cumbria	15	4	0	9	71	100	*3,297*
Greater Manchester	15	3	1	10	71	100	*14,953*
Lancashire	14	3	1	9	73	100	*8,882*
Greater Merseyside	16	2	1	9	71	100	*7,700*
Humberside	14	4	1	8	74	100	*5,598*
North Yorkshire	15	2	2	8	73	100	*5,129*
South Yorkshire	14	2	1	9	74	100	*7,607*
West Yorkshire	13	3	2	10	72	100	*13,861*
Derbyshire	14	3	1	9	73	100	*6,383*
Leicestershire	14	2	1	9	73	100	*6,151*
Lincolnshire/ Rutland	16	3	0	7	73	100	*4,781*
Northampton-shire	13	2	2	10	72	100	*4,837*
Nottinghamshire	15	3	1	9	72	100	*6,424*
Birmingham & Solihull	15	2	1	9	73	100	*6,034*
Coventry & Warwickshire	13	3	2	9	73	100	*5,192*
Herefordshire & Worcestershire	13	4	1	9	73	100	*4,758*
Shropshire	15	3	1	8	73	100	*2,792*
Staffordshire	14	2	1	9	74	100	*7,012*
The Black Country	15	2	1	8	73	100	*5,154*
Bedfordshire and Luton	13	3	1	10	74	100	*3,724*
Cambridgeshire	14	3	1	11	72	100	*5,153*
Essex	14	3	3	10	70	100	*9,859*
Hertfordshire	12	3	2	14	69	100	*6,842*
Norfolk	14	3	2	8	73	100	*5,149*
Suffolk	12	3	1	10	73	100	*4,836*
Central London	14	2	5	13	65	100	*6,917*
East London	14	2	3	11	70	100	*9,615*

Continued on next page

Table 5.8 continued

LSC area	Licensing	Certif.	Regist.	Accred.	Unreg.	Total	Base
	Row %	Row %	Row %	Row %	Row %	Row %	*No.*
North London	16	2	2	11	70	100	*4,677*
South London	15	3	3	13	68	100	*7,123*
West London	13	2	2	12	71	100	*6,328*
Berkshire	12	3	2	12	71	100	*5,372*
Sussex	13	2	2	10	73	100	*9,477*
Hampshire/ Isle of Wight/ Portsmouth/ Southampton	13	3	2	10	72	100	*11,080*
Kent/Medway	13	2	2	9	74	100	*9,319*
Oxon/Bucks/Milton Keynes	13	3	2	11	72	100	*8,563*
Surrey	14	3	3	12	68	100	*6,769*
West of England	14	3	1	11	70	100	*6,771*
Bournemouth/ Dorset/Poole	14	3	1	9	73	100	*4,338*
Devon & Cornwall	13	2	1	9	74	100	*9,403*
Gloucestershire	12	5	1	10	72	100	*3,718*
Somerset	13	3	1	8	75	100	*3,330*
Wiltshire & Swindon	13	4	2	10	72	100	*4,601*
All	14	3	2	10	72	100	*301,057*

Base: All employee and self-employed jobs in England

Source: QLFS Jan 2009 - Sept 2010

Table 5.9 goes on to indicate the prevalence of each form of regulation within each Section of the *Standard Industrial Classification (2007)*. It indicates the relatively high prevalence of registration in Section K (Finance), where 25 per cent of all jobs are subject to registration requirements. Industries with high shares of licensed jobs are: Section H (Transport and storage), where 40 per cent of jobs are subject to licensing; Section P (Education) where 31 per cent of jobs are licensed; Section Q (Health and social work) where 29 per cent are licensed; and Section O (Public administration and defence) where 24 per cent of jobs require licences. In addition to these industry sectors, Section M (Professional, scientific and technical activities) also has a relatively high incidence of regulation, since licensing, certification schemes and accreditation are each prevalent in this industry.

Table 5.9 Regulation status in 2010 (lower bound), by Industry

SIC(2007) Section	Licensing	Certif.	Regist.	Accred.	Unreg.	Total	Base
	Row %	Row %	Row %	Row %	Row %	Row %	*No.*
A: Agriculture, forestry and fishing	3	0	0	0	96	100	*2,012*
B: Mining and quarrying	4	19	0	14	64	100	*553*
C: Manufacturing	4	10	1	7	78	100	*14,903*
D: Electricity, gas	3	16	1	11	70	100	*896*
E; Water supply, sewerage, waste	15	6	0	6	72	100	*999*
F: Construction	2	5	0	31	62	100	*11,214*
G: Wholesale, retail, repair of vehicles	6	0	0	3	89	100	*20,645*
H: Transport and storage	40	1	1	6	52	100	*7,470*
I: Accommodation and food services	13	0	0	15	71	100	*7,459*
J Information and communication	1	1	0	23	74	100	*4,889*
K: Financial and insurance activities	1	0	25	14	60	100	*5,667*
L: Real estate activities	1	0	1	5	94	100	*1,467*
M: Prof, scientific, technical activ.	9	10	2	21	58	100	*9,526*
N: Admin and support services	5	1	1	11	83	100	*6,950*
O: Public admin and defence	24	2	1	8	65	100	*10,220*
P: Education	31	1	0	4	64	100	*17,223*
Q: Health and social work	29	0	2	3	66	100	*20,870*
R: Arts, entertainment and recreation	1	4	0	9	85	100	*4,132*
S: Other service activities	3	1	0	7	89	100	*3,957*
All	14	3	2	10	72	100	*151,052*

Base: All employee and self-employed jobs

Source: QLFS Jan-Sept 2010

Table 5.10 provides a further insight into the industrial distribution of regulation as it indicates the prevalence of each form of regulation in those industry sectors which form the footprints for each of the Sector Skills Councils (SSCs).[31] Those SSC sectors with the

[31] The SSC network was established following the creation of the Sector Skills Development Agency (SSDA) in 2001. The SSDA licensed SSCs in accordance with specific criteria. Each SSC had to state what footprint area it intended to cover,

highest incidence of regulated jobs are: GoSkills (passenger transport); Skills for Health; and Skills for Justice. In each case, at least half of all jobs in sectors covered by these SSCs are subject to some form of regulation. Those SSC sectors with the lowest incidence of regulated jobs are Asset Skills (property, planning, cleaning and parking), Lantra (land based and environmental industries) Creative and Cultural Skills, Skillset (also creative industries) and Skillsmart Retail.

Table 5.10 Regulation status in 2010 (lower bound), by Sector Skills Council

SIC(2007) Section	Licensing	Certif.	Regist.	Accred.	Unreg.	Total	Base
	Row %	Row %	Row %	Row %	Row %	Row %	*No.*
Asset Skills	1	0	0	4	95	100	*3,737*
Cogent	4	18	1	8	69	100	*2,769*
ConstructionSkills	2	9	0	34	54	100	*10,793*
Creative and Cultural Skills	1	1	0	14	85	100	*1,907*
E-skills UK	1	2	0	25	72	100	*3,527*
Energy and Utility Skills	10	11	0	8	71	100	*1,903*
Financial Services Skills Council	1	0	22	18	59	100	*7,094*
GoSkills	55	1	0	6	38	100	*3,350*
Government Skills	9	2	1	10	78	100	*7,410*
IMI	5	1	0	9	85	100	*2,786*
Improve Ltd	12	2	0	3	83	100	*2,238*
Lantra	5	1	0	3	91	100	*3,613*
Lifelong Learning UK	27	1	0	7	65	100	*10,074*
People 1st	12	0	0	17	71	100	*8,499*
Proskills UK	4	5	1	10	80	100	*2,722*
SEMTA	3	14	0	8	75	100	*8,319*
Skills for Care and Development	9	0	0	3	88	100	*10,198*
Skills for Health	46	0	3	3	48	100	*11,463*
Skills for Justice	58	0	0	5	37	100	*3,005*
Skills for Logistics	22	1	1	5	71	100	*7,341*
SkillsActive	2	8	0	7	83	100	*2,715*
Skillset	2	1	0	13	83	100	*3,234*
Skillsmart Retail	6	0	0	2	92	100	*14,365*
SummitSkills	0	6	0	5	89	100	*2,425*
Unclassified - no lead SSC	20	1	1	10	68	100	*16,128*
All	14	3	2	10	72	100	*151,615*

Base: All employee and self-employed jobs

Source: QLFS Jan-Sept 2010

based on SIC codes (and in some cases related occupations based on SOC codes). The footprints are accurate as at November 2010.

5.6 The characteristics of job holders in regulated Unit Groups

The Labour Force Survey may also be used to explore the characteristics of job holders in regulated Unit Groups and, thus, to compare the characteristics of job holders covered by one form of regulation with the characteristics of those covered by another. We focus here on the demographic characteristics of job holders within the different groups (other characteristics such as qualifications and wages are considered in Chapter Six). We continue to use the lower bound indicator of regulation status, this being our preferred measure; tables using the upper bound measure are again provided in Annex C.

One finds that regulated jobs are more likely to be held by men than by women, with the certification group very strongly biased towards men (87 per cent of job holders in this group are male) (Table 5.11). Those in the licensing group tend to be older, on average, than other groups (Table 5.12), which may be related to the time investment that is sometimes needed in order to gain the qualifications or work experience that is required under a licence to practice. Those in the licensing group are also less likely to be white than the average (Table 5.13), but are a little more likely to have a disability than those in the other regulated groups (Table 5.14). The differences on these last two items are, however, fairly small.

Table 5.11 Gender of job holder, by Regulation status of Unit Group in 2010 (lower bound)

Regulation status of Unit Group (lower bound)	Male	Female	Total	Base
	Row %	Row %	Row %	*No.*
Licensing	52	48	100	*21,863*
Certification	87	13	100	*4,097*
Registration	55	45	100	*2,413*
Accreditation	69	31	100	*14,575*
Unregulated	50	50	100	*109,243*
All	53	47	100	*152,191*

Base: All individuals in employee and self-employed jobs

Source: QLFS Jan-Sept 2010

Table 5.12 Age of job holder, by Regulation status of Unit Group in 2010 (lower bound)

Regulation status of Unit Group (lower bound)	16-19	20-29	30-39	40-49	50-59	60+	Total	Base
	Row %	Row %	Row %	Row %	Row %	Row %	Row %	*No.*
Licensing	0	15	26	29	22	8	100	*21,863*
Certification	1	20	25	26	20	8	100	*4,097*
Registration	0	18	29	28	18	7	100	*2,413*
Accreditation	2	22	25	25	18	7	100	*14,575*
Unregulated	5	21	20	26	19	9	100	*109,243*
All	4	20	22	26	20	8	100	*152,191*

Base: All individuals in employee and self-employed jobs

Source: QLFS Jan-Sept 2010

Table 5.13 Ethnic group of job holder, by Regulation status of Unit Group in 2010 (lower bound)

Regulation status of Unit Group (lower bound)	White	Mixed	Asian or Asian British	Black or Black British	Chinese	Other	Total	Base
	Row %	Row %	Row %	Row %	Row %	Row %	Row %	*No.*
Licensing	88	1	6	3	0	2	100	*21,847*
Certification	92	1	3	1	1	1	100	*4,094*
Registration	89	1	7	2	1	1	100	*2,413*
Accreditation	93	1	4	2	0	1	100	*14,565*
Unregulated	91	1	4	2	0	1	100	*109,182*
All	91	1	5	2	0	1	100	*152,101*

Base: All individuals in employee and self-employed jobs

Source: QLFS Jan-Sept 2010

Table 5.14 Disabled status of job holder, by Regulation status of Unit Group in 2010 (lower bound)

Regulation status of Unit Group (lower bound)	DDA and work-limiting disabled	DDA disabled only	Work-limiting disabled only	Not disabled	Total	Base
	Row %	Row %	Row %	Row %	Row %	*No.*
Licensing	5	6	3	86	100	*21,863*
Certification	4	6	2	88	100	*4,097*
Registration	3	7	2	88	100	*2,413*
Accreditation	4	6	3	87	100	*14,575*
Unregulated	6	6	3	85	100	*109,243*
All	6	6	3	85	100	*152,191*

Base: All individuals in employee and self-employed jobs

Source: QLFS Jan-Sept 2010

5.7 Conclusions

This chapter has presented new estimates of the prevalence of occupational regulation, derived using data from the UK's Quarterly Labour Force Survey (QLFS). The fact that only parts of some Unit Groups are covered by regulation means that one obtains upper and lower bound estimates of the prevalence of regulation. The upper bound estimates indicate that:

- up to 31 per cent of all jobs require licences to practice;
- up to three per cent have the option of state certification;
- up to six per cent require registration; and
- up to 19 per cent have the option of accreditation.

The lower bound estimates indicate that:

- at least 14 per cent of all jobs require licences to practice;
- at least three per cent have the option of state certification;
- at least two per cent require registration; and
- at least 10 per cent have the option of accreditation.

Those Unit Groups which contribute most to the range of uncertainty are ones in which only a minority of the jobs are likely to be subject to the regulation. Accordingly, we judge that the true incidence of licensing is closer to 14 per cent than 31 per cent and that the true incidence of accreditation is closer to 10 per cent than 19 per cent. The percentage of unregulated jobs is thus much closer to 72 per cent than 40 per cent. The percentage of jobs subject to licensing requirements rose over the decade between 2001 and 2010.

Professional occupations are the most likely to be regulated, and the most likely to be subject to licensing. They are followed by Process, plant and machine operatives – a group which includes taxi drivers, HGV drivers and others requiring transportation licences. A majority of jobs in each of these Major Groups is subject to some form of regulation on our lower bound measure. In contrast, only a small minority of jobs are estimated to be regulated (in any form) within those Major Groups which comprise of Sales occupations, Skilled trades, Personal service occupations and Elementary occupations.

Turning to demographic characteristics, regulated jobs are more likely to be held by men than by women, with the certification group very strongly biased towards men (87 per cent of job holders in this group are male). Those in the licensing and accreditation groups tend to be older, on average, than other groups, which may be related to the time

investment that is sometimes needed in order to gain the qualifications or work experience that is required under a licence to practice or an accreditation. Those in the licensing group are also less likely to be white than the average, but are a little more likely to have a disability than those in the other groups.

6 Assessing the impact of regulation on qualification levels, training and wages in the UK

Chapter Summary

- Using data from the Quarterly Labour Force survey, a cross-sectional analysis has been undertaken to compare levels of qualifications, wages and rates of job related training between workers in regulated and unregulated occupations, while controlling for other individual and job characteristics.
- Among Professional occupations and Associate Professional and Technical occupations, qualifications, wages and the take up of job related training are found to be higher among workers in licensed jobs than among workers in unregulated jobs.
- No consistent patterns are identified among other occupational groups or for other types of regulation. This suggests that there may be unobserved differences between regulated and unregulated workers in these instances.
- A difference-in-differences methodology is employed to identify the causal relationship between occupational regulation and labour market outcomes. The analysis focuses on five occupations which experienced a change in their regulation status over the period 2001-2010, namely security guards; care workers; social care managers; childcare workers and automotive technicians.
- The analysis identifies an increase in the wages amongst security guards and a rise in qualification levels and job related training among care workers. The latter is part of anticipation effects which were also observed in the case of care managers who were subject to the same legislation. No evidence of any labour market effects of regulation is found for childcare workers and automotive technicians.
- Although data constraints do not enable firm conclusions to be made, it is plausible that the impact of occupational regulation is stronger when entry requirements are higher or are more extensively applied.

6.1 Introduction

It will have been apparent from the preceding chapters of this report that one may expect occupational regulation to impact upon a number of labour market outcomes, including skill levels, the prevalence of job related training, wages and employment levels. However, it will also have been apparent that the empirical evidence for such effects in the UK is very limited. Robust quantitative evidence is in particularly short supply.

The supply of empirical evidence on the labour market effects of occupational regulation is more plentiful in the US. However, the US evidence tends to be concentrated on employment and wage effects, with very little evidence on the impact of regulation on skills (Klee, 2010, is one notable exception). The US evidence is also almost exclusively focused on occupational licensing – the most restrictive form of regulation – with comparatively little research having been carried out to examine the impact of voluntary arrangements such as certification or accreditation. Moreover, it is not clear that any relationships observed for a specific occupation in the US labour market would *necessarily* carry over to the labour market in the UK. Whilst there is some overlap in the types of occupations which are subject to licensing in the two countries, and some similarities in the broader institutional contexts, there are also important differences between US and UK in the scope and operation of licensing which may affect the nature of any associated outcomes.[32]

The increase over the past decade in the proportion of all jobs in the UK, that are subject to some form of occupational regulation, heightens the need for more robust evidence on the labour market effects of such regulation. Fortunately, the extension of regulation to cover occupations that were not previously regulated in the UK (such as security guards and care workers) also provides opportunities for the robust identification of any such effects.

In this chapter of the report, we present the results of a quantitative analysis which compares labour market outcomes among groups of employees who are subject to different forms of occupational regulation (including those in occupations which are unregulated). In common with the analysis presented in the previous chapter, this analysis is based on data from the Quarterly Labour Force Survey.

We first report cross-sectional analyses in which we examine the extent to which any raw differences in wage levels, qualifications and the take up of job related training between workers in regulated and unregulated occupations persist after controlling for

[32] These include governance arrangements and the nature of the labour market.

compositional differences.[33] In other words, if workers in licensed occupations earn higher wages than workers in unregulated occupations, do these differences persist after controlling for demographic characteristics and other job characteristics? Such analyses help us to gain a better understanding of the nature of regulated jobs and how they differ (in cross-section) from unregulated jobs. In summary, the raw differences in wages and so on between regulated and unregulated jobs are not always explained away by other observable worker characteristics. Some differences remained unexplained.

This could indicate that regulation has an independent, causal effect on labour market outcomes. However, the pattern of results is not uniform across occupational groups and is not always in line with theoretical expectations. Accordingly, there may also be unobservable factors at work which are confounding our attempts to identify a causal effect of occupational regulation through cross-sectional analysis. Specifically, occupational regulation is not randomly assigned. Instead, there are often particular reasons why one occupation is subject to regulation and another may not (see Chapter Three). Such non random and unobserved factors are difficult to account for in a cross-sectional analysis.

We employ a difference-in-differences (DiD) approach in an attempt to resolve this identification problem. In the absence of the random assignment of occupational regulation, we use the extension of occupational regulation to specific occupations over the period 2001-2010 as a form of 'natural experiment'. We examine the wage differential (say) between the workers in a soon to be regulated occupation (the treatment group) and the workers in similar unregulated occupation (the comparison group). We then examine whether the magnitude of that differential changes after the treatment group becomes regulated. By assuming that the pre-treatment differential would have been maintained if the treatment had not occurred, the DiD analysis aims to provide a robust estimate of the causal impact of regulation.

We focus on five occupations which saw either the introduction of regulation or a change in the type of regulation over the period 2001-2010, namely: security guards; care workers; social care managers; childcare workers; and automotive technicians.[34] We find some effects which can plausibly be attributed to the introduction of occupational regulation. However, these are not universal. The nature of the regulation – and the context within which it is introduced – seem important in determining outcomes.

[33] Unregulated occupations are chosen as the reference category throughout as this represents the 'default' state in the absence of any intervention by the state, employers or workers.
[34] A full list of those 43 Unit Groups which changed regulation status between 2001 and 2010 is provided in Annex B.

6.2 Data

Our analysis rests, first, on the SOC(2000) Map of Occupational Regulation that was described in Chapter Four. This Map of Occupational Regulation provides our indicators of the regulatory status of each SOC(2000) Unit Group.

Our data on workers and jobs comes from the Quarterly Labour Force Survey (QLFS). The QLFS is a sample survey of households living at private addresses, conducted by the Office of National Statistics in Britain and by the Central Survey Unit of the Department of Finance and Personnel in Northern Ireland. The survey provides many of the UK's official statistics on the labour market. The QLFS provides a large sample of workers (around 55,000 each quarter). It collects data on main and second jobs and includes both employee jobs and self-employed positions.

Following the practice outlined in the previous chapter, the SOC(2000) Unit Group data from the Map of Occupational Regulation has been matched to each job observed in the Quarterly Labour Force Survey between April 2001 and September 2010. This enables each job to be classified according to the regulatory characteristics of the Unit Group to which it belongs, at the time at which it is observed.

6.3 Methods

Cross-sectional analysis

We are able to use our augmented QLFS dataset to identify regulated jobs and, thereafter, to identify whether regulated jobs differ from unregulated jobs in terms of the average skill levels of job holders, the propensity to engage in job related training and average wage levels, after controlling for a range of demographic and job characteristics. This cross-sectional analysis is conducted for all jobs observed in the QLFS in 2010.

Skill levels are measured by the level of the highest qualification attained since birth. We employ the LEVQUAL variable in the QLFS which maps qualifications to one of six categories (including 'no qualifications') by reference to the National Qualifications Framework (see, for example, Table 4.11).[35] The propensity to engage in job related training is measured by the ED4WK variable in the QLFS which identifies whether the respondent has taken part in any "education or any training connected with [their] job, or a job that [they] may be able to do in the future" within the four weeks prior to the survey interview. A second indicator, derived from the NEWQUL variable which is available only in the April-June quarter of each year, identifies education or training that will "lead to a

[35] The six categories are: No qualifications; Below Level 2; Level 2; Level 3; Level 4-6; Level 7-8. The classification schema is provided on pp. 107-8 of Volume 5 of the QLFS User Guide. See: http://www.esds.ac.uk/doc/6632%5Cmrdoc%5Cpdf%5Clfs_user_guide_vol5_classifications2009.pdf

qualification". Finally, wages are measured as gross weekly earnings in the survey reference week (QLFS variable GRSSWK) divided by actual hours of work in the reference week (TTACHR).[36]

Any observed differences in these labour market 'outcomes' may represent the effects of regulation, but they may equally also represent differences in group composition which are unrelated to regulation. For example, group A may have higher skills and wages than group B simply because job holders in the former group are older, on average, than those in the latter group. Differences may also be attributable to differential rates of unionisation (see Bryson and Forth, 2010) or differences in the proportions of public sector jobs (see Disney and Gosling, 2008), for example. We control for such compositional differences through cross-sectional regression analyses. These regressions control for the following sets of factors:

- **Demographic characteristics:** gender; ethnicity; disability; marital status; number of dependent children.
- **Human capital:** age; qualifications.
- **Job characteristics:** main or second job; tenure; whether full time or part time; whether permanent or temporary; union membership; pay set by collective bargaining.
- **Employer characteristics:** industry sector; workplace size; private or public sector; region.
- **Survey characteristics:** whether proxy respondent; month of interview.

The cross-sectional regression analysis of highest qualification employs an ordered probit estimator, whilst the analysis of job related training uses a probit estimator. The analysis of wage levels is conducted via ordinary least squares.[37]

The analysis is confined to data from 2010 so as to avoid any complications which arise from changes in the identity of the regulated groups over time. The only switch in regulation status which took place in the period January – September 2010 was the introduction of accreditation for garage managers (SOC 1232) in May 2010.[38] The cross-sectional analysis therefore does nothing to exploit the time dimension in the QLFS data. However, this dimension is used explicitly in the difference-in-differences analysis.

[36] In accordance with standard practice, we set wage values to missing if the reported hourly rate for the job (HOURPAY) exceeds £100 per hour.
[37] We take the natural logarithm of the wage value prior to regression. We include a variable among our controls which identifies cases in which the respondent reports that their wage in the reference week differs from its normal level (UGRSSWK, available for main jobs only).
[38] By comparison, eight SOC Unit Groups saw a switch in regulation status in 2009.

Difference-in-differences analysis

We use difference-in-differences (DiD) analysis to evaluate the impact of switches in regulation status on skill levels, job related education and training, wages and employment. A formal exposition of the approach is provided by Blundell and Costa-Dias (2009).

The DiD approach is operationalised within a regression framework in which one dummy variable is used to distinguish those occupations which see a switch in regulation status (the 'treated' occupations) from those which have not (the 'non-treated'), and another dummy variable is used to distinguish the period in which the regulations apply (the 'treatment period') from the preceding period in which no regulations apply. The treatment effect is captured by an interaction effect between the treatment dummy and the dummy which identifies the post-treatment period. In variants of this basic approach, the 'treated'/'non-treated' indicator can be interacted with a variable which indicates the passage of time since the change in regulation status; this allows one to establish changes over time in the size of the treatment effect.

The DiD approach is superior to the before-after estimator because counterfactual outcomes are proxied with an appropriate comparator group who are 'like' the treatment group except that they do not experience the switch in licensing status.[39] If one can reasonably assume that macro effects (such as the business cycle) affect outcomes for both treated and comparators in a similar fashion, then it is possible to use the DiD approach to net these 'common trends' out of any estimates of the treatment on outcomes (something that cannot be done with a before-after estimator).[40]

Our choice of 'treatment' groups is dictated to a large extent by practicality. First, we require the occupation to switch its regulation status at some point in the observation period, i.e. between April 2001 and September 2010. There are 43 such SOC(2000) Unit Groups. However, we also require the switch to have occurred towards the middle of our observation period, so that we have a number of periods either side of the switch in which to observe both pre-and post-treatment behaviour. We also require the treatment group to be of a reasonable size, so that estimates can be obtained with a fair degree of precision. This narrows down the possible selection. Among the available occupations which met these criteria, we have then chosen to focus primarily (although not exclusively) on switches which involve a move to licensing, since that is the form of

[39] The assumption is that switches in status are exogenous. It is possible that there may be endogenous factors at work however (e.g. lobbying activity by incumbents). This is a necessary caveat.
[40] Of course, any uncommon trends (factors other than the introduction of regulation which might begin to influence one group and not the other during the observation period) have the potential to compromise the identification of the treatment effect if they affect the outcome of interest.

regulation which we expect to have the most noticeable effects.[41] We have also chosen to focus primarily on lower skilled occupations since we are aware that such occupations are of particular interest to the UK Commission.

Our chosen treatment groups are as follows:

- Private security guards (SOC 9241), who saw the introduction of licensing in April 2003;
- Social care managers (SOC 1184 and 1185), who switched from certification to licensing in April 2005;
- Care workers (SOC 6115), a quota of whom (at least 50% in each residential care home) were required after April 2005 to hold an appropriate NVQ in order for the home to meet a set of mandatory National Minimum Standards for care homes;
- Childcare workers (SOC 6121-6124), who switched from certification to licensing in March 2007;
- Automotive technicians (SOC 5232, 5234, 8135) who saw the introduction of an accreditation scheme in June 2006.

The comparison group in each case is taken to be those occupations within the same SOC(2000) Major Group who remain unregulated throughout the whole of the observation period (2001-2010). The comparison groups have been defined at Major Group level so as to ensure that each comparison group possesses broadly similar job requirements to the treatment group whilst also offering a healthy sample size. The exception to this rule is the DiD analysis of automotive technicians, in which we define the comparison group more tightly as comprising SOC(2000) Unit Groups 5212-5216, 5221-5223, 5233 and 8132, in recognition of the considerable heterogeneity within SOC Major Group 5 in particular.

The DiD analysis focuses solely on jobs within England, so as to avoid the complications introduced by the different times at which some regulations have been enacted in Scotland and Northern Ireland. The set of control variables are equivalent to those used in the cross-sectional analysis. However, in a departure from the cross-sectional analysis, each of the DiD analyses utilises ordinary least squares because of the problems associated with the use of the DiD approach in nonlinear specifications (see Blundell and Costa-Dias, 2009, pp. 583-6).

[41] We include switches from an unregulated state to licensing and switches from certification to licensing.

General comments about estimation

The sets of control variables used in the analyses are standard in the literature (see Blanchflower and Bryson, 2010, and Bryson and Forth, 2010, in respect of the analysis of wages using the QLFS; see Jones *et al.*, 2010, in respect of analysis of job related training). We obtain patterns of coefficients across these control variables which accord with expectations, based on theory and previous research. The regression models thus appear to be well specified.

It is notable, however, that some of the control variables listed in Section 3.2.1 above may be endogenous with respect to the regulatory status of a job. Specifically, it is possible that working hours, contractual status and the longevity of job tenure may be affected by the regulatory status of a job. Such effects could spill over to lifestyle choices such as marital status and numbers of children. By including these specific controls we may inadvertently net out some of the effect of licensing on a dependent variable such as wages. We therefore run our regressions with and without these specific controls, in order to examine the sensitivity of the results. In practice, the impact is small. The comparative results are explicitly presented in the section which reports the DiD analysis, but they are omitted from the section which reports the cross-sectional analysis for reasons of limited space.

In respect of wages, it will be noted that we control for qualifications, which may themselves have been acquired in order to meet a regulatory requirement. However, their inclusion in the base specification is justified on the basis that most qualifications are obtained prior to labour market entry.[42] By including qualifications within the base specification, we interpret the impact of regulation on wages as being net of any effect which results in the job holder moving to a higher level on the qualifications scale. It thus represents any upskilling which does not result in movement to the next level on the qualifications scale, plus any monopoly effect of regulation in restricting labour supply.

All analyses are conducted at the level of the job and utilise the survey weights provided in the QLFS.[43] We use a robust variance estimator to account for the non-independence of observations which results from the panel element of the QLFS whereby a selected individual may appear in the survey for up to five successive quarters. As noted earlier, the total sample size is around 55,000 workers per quarter. However the samples available for the analysis of wages comprise around 22,000 workers per quarter since income questions are asked only in the first and the final quarter of a person's time within

[42] One would ideally wish to be able to separate the two.
[43] The approach is thus based on repeated cross-sections of individuals. See Blundell and Costa-Dias (2009: 583). First and second jobs are given equal weight (i.e. there is no weighting to adjust for differences in hours between jobs); we do, however, include full/part-time status among our control variables.

the sample; the samples available for the analysis of job related training which leads to a qualification is also restricted since the question on whether training leads to a qualification is asked only in the April-June quarter of each year.

The analysis of employment levels differs from the analysis of the other outcomes considered here. It is not possible to examine employment levels within the cross-sectional framework because the impact of regulation is identified within that framework through SOC(2000) Unit Group. It is, therefore, not possible to separate the probability of residing in a SOC(2000) Unit Group from the regulation status of that group. Equally, the analysis of employment does not fit directly within the DiD framework when operationalised at job level because, in an analysis of employment, the treatment dummy is the natural dependant variable. However, by taking this treatment dummy as the dependant variable it is possible to use a simplified version of the DiD framework for the analysis of employment in which one estimates the probability of a job holder being employed within the treatment group, as opposed to the comparison group, and examines changes in this probability before and after treatment after controlling for other factors.[44]

Measurement issues

In respect of measurement issues, it should be noted first that we do not observe whether an individual job holder possesses a licence to practice (or equivalently, whether they have registered under a mandatory registration scheme). Instead, we observe only that they are working in an occupation where a mandatory requirement is present. Any non-compliance will therefore introduce measurement error and bias our estimated coefficients downwards. More importantly, in instances where only some of the workers within a Unit Group are required to obtain a licence or to register, we do not observe which workers are required to do so; and in instances of certification or accreditation, where compliance is voluntary, we do not observe which individual workers have obtained the appropriate certification or accreditation. Again, this will bias downwards any estimated effects of being licensed/registered/certified/accredited. Our estimates can be more appropriately thought of as estimates of the effect of working in an occupation where a particular form of regulation applies, when compared with employment in a similar occupation that is unregulated.

It is also important to bear in mind the hierarchical nature of our classification schema for occupational regulation, whereby certification and registration schemes are only mapped within those occupations where no licensing system is place, and accreditation schemes

[44] We include a linear control for the year of interview. The dummy variable identifying the treatment period thus identifies whether there is a change in the general time-trend between the pre-and post-treatment periods.

are only mapped within those occupations that have no other form of regulation (licensing, certification or registration). We find that it is rare for a Unit Group to be subject both to licensing and certification/registration.[45] However, some of those Unit Groups that are subject to state based forms of regulation also have accreditation schemes which are run by occupation or industry groups; one example is Chartered Secretaries (SOC 1131) who are required to register with the Financial Services Authority but who also have an accreditation scheme available to them, operated by the Institute of Chartered Secretaries and Administrators. As noted above (and in Section 4.3), such accreditation schemes only appear within our 'regulation status' classification variable if the Unit Group is not subject to any state based form of regulation.[46] This has implications for the interpretation of any coefficients: any estimated impact of accreditation should be thought of as the effect (when compared with the base case of no regulation) of belonging to an occupational group which has no state regulation, but which does have an accreditation scheme. It should not be thought of as the effect of introducing accreditation, on average, to any occupation. Of course, this feature of our classification schema also has implications for the interpretation of any estimates of the prevalence of accreditation.

6.4 Preliminary observations about the nature of occupational regulation in the UK

Chapter Five of the report provided an overview of the incidence and nature of occupational regulation in the UK, based upon the Map of Occupational Regulation, which has been compiled as part of the broader project. That overview illustrated two important issues for the empirical analysis which follows. The first is the heterogeneity in the form of occupational regulation as it is evident in the UK. The second is the change over the time in the prevalence of different forms of regulation.

6.4.1 Heterogeneity in forms of occupational regulation

The SOC(2000) classification contains a total of 353 Unit Groups. The Map of Occupational Regulation records that a total of 82 Unit Groups are subject to licensing, 19 are subject to certification and 20 are subject to registration requirements. Accordingly, some 121 of the 353 Unit Groups are subject to some form of state based regulation. A further 67 are not subject to state based regulation but have a recognised accreditation scheme which is available to at least some workers within the Unit Group. This leaves a total of 165 Unit Groups which are not subject to any of these four forms of occupational regulation.

[45] This could logically only apply if some jobs were subject to licensing, whilst others were subject to certification or registration.
[46] Such schemes are mentioned occasionally in the Comments field in the mapping spreadsheet, but we have not sought to map such schemes in a systematic manner. This could be done, but would require additional resources.

In 115 of the 188 Unit Groups where we record some form of occupational regulation, it is universally applicable to all job tasks or roles which are classified to that Unit Group. Examples include teachers (SOC 2314 and 2315) and nurses (SOC 3211). In the remaining 73 cases, the regulation covers only some of the activities which are classified to the Unit Group (e.g. in SOC 5314 plumbers and heating engineers are only regulated if they are installing gas appliances; in SOC 7111 sales and retail assistants are only regulated if they are handling food). There is therefore some heterogeneity, in that some regulations apply universally throughout a Unit Group whereas others do not. In practice, one can identify nine separate categories as indicated in Table 6.1.

Table 6.1 Regulation status of the SOC(2000) Unit Group in 2010, by Job coverage within the Unit Group

Regulation status	All activities in Unit Group	Some activities in Unit Group	N/A	Total
	No.	No.	No.	No.
Licensing	52	29	-	81
Certification	19	2	-	21
Registration	5	15	-	20
Accreditation	39	27	-	66
Unregulated	-	-	165	165
Total	*115*	*73*	*165*	*353*

Base: All SOC(2000) Unit Groups

Source: Map of Occupational Regulation

There is also considerable heterogeneity in terms of entry requirements. Obtaining a licence to practice, for example, may require possession of a qualification at NQF Level 4 or above (as is the case for most medical professions, which typically require a Level 6 qualification) or may require a qualification at NQF level 2 or below (as in case of security guards). In respect of licensing, it is notable that entry requirements are typically lower where the regulation covers only some of the activities coded to a particular Unit Group (see Table 6.2).

Table 6.2 Regulation status, by NQF level of entry qualification

Regulation status	None required	Below level 2	Level 2	Level 3	Level 4-6	Level 7-8	Don't know	Total
	No.	No.	No.	No.	No.	No.	No.	No.
Licensing for all activities	0	14	3	3	26	1	5	52
Licensing for some activities	0	6	8	3	5	1	6	29
Certification for all activities	0	0	6	0	3	10	0	19
Certification for some activities	0	0	1	0	1	0	0	2
Accreditation for all activities	1	2	11	4	17	3	1	39
Accreditation for some activities	0	0	8	5	13	0	1	27
Total	*1*	*22*	*37*	*15*	*65*	*15*	*13*	*168*

Base: All SOC(2000) Unit Groups subject to licensing, certification or accreditation

Note: Registration is excluded because of the absence of qualification based entry requirements

Source: Map of Occupational Regulation

One implication of the patterns evident in Table 6.2 is that, although each type of occupational regulation has some representation at both higher and lower levels of the occupational hierarchy, different types of occupational regulation are clustered at different points. This is made clear in Table 6.3, which shows individual Unit Groups, and Table 6.4, which applies the Map of Occupational Regulation to the QLFS and which thus accounts for differences in the prevalence of each Unit Group within the economy at large. For instance, 'licensing for all activities' is heavily concentrated among Professional and Associate Professional occupations (Table 6.3).

Table 6.3 Regulation status, by SOC(2000) Major Group (Base: Unit Groups)

Regulation status	Mgrs & Snr Officials	Profs	Assoc Prof & Tech	Admin & Secret	Skilled trades	Pers Servs	Sales & Cust Service	Proc, Plant & Mach	Elem-entary	Total
	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
Lic. for all activities	6	13	21	0	3	0	0	9	0	52
Lic. for some activities	5	0	6	0	5	6	1	2	4	29
Cert. for all activities	0	10	4	0	0	0	0	5	0	19
Cert. for some activities	0	0	1	0	0	1	0	0	0	2
Reg. for all activities	1	0	2	2	0	0	0	0	0	5
Reg. for some activities	3	0	1	2	0	4	3	0	2	15
Acc. for all activities	6	10	8	2	10	1	0	1	1	39
Acc. for some activities	3	4	5	1	8	1	0	2	3	27
Unregulated	21	9	25	17	28	10	7	23	25	165
Total	*45*	*46*	*73*	*24*	*54*	*21*	*11*	*42*	*35*	*353*

Base: All SOC(2000) Unit Groups

Source: Map of Occupational Regulation

Table 6.4 Regulation status, by SOC(2000) Major Group (Base: jobs)

Regulation status	Mgrs & Snr Officials	Profs	Assoc Prof & Tech	Admin & Secret	Skilled trades	Pers Servs	Sales & Cust Service	Proc, Plant & Mach	Elem-entary	Base
	Row %	Row %	Row %	Row %	Row %	Row %	Row %	Row %	Row %	No.
Lic. for all activities	7	40	28	-	2	-	-	24	-	21,863
Lic. for some activities	12	-	6	-	16	25	25	3	13	26,343
Cert. for all activities	-	66	20	-	-	-	-	14	-	4,097
Cert. for some activities	-	-	19	-	-	81	-	-	-	1,010
Reg. for all activities	31	-	45	24	-	-	-	-	-	2,413
Reg. for some activities	23	-	3	6	-	62	5	-	1	6,248
Acc. for all activities	19	32	15	3	22	2	-	-	8	14,575
Acc. for some activities	19	12	12	19	28	1	-	3	7	14,395
Unregulated	17	6	15	21	7	3	7	5	19	61,247
Total	*15*	*14*	*15*	*11*	*10*	*9*	*7*	*7*	*12*	*152,191*

Base: All employee and self-employed jobs

Source: QLFS Jan-Sept 2010

Going into more detail, it is apparent that:

- Unit Groups with **'Licensing for all activities'** predominantly comprise professional or associate professional jobs requiring qualifications at NVQ Level 4-6 (around 60 per cent of the jobs classified to this form of regulation fit these criteria), whilst the remainder mostly comprise driving jobs requiring qualifications at NVQ Level 2 or equivalent.
- Unit Groups with **'Licensing for some activities'** predominantly comprise skilled jobs (chefs, mechanics), personal service workers (care workers, teaching assistants) and sales workers requiring NVQ Level 2 qualifications or lower.
- Unit Groups with **'Certification for all activities'** mostly comprise professional jobs in which certification requires possession of NVQ Level 7-8 qualifications (as in the case of engineers) or Level 4-6 qualifications (as in the case of architects), along with some associate professional jobs (e.g. fitness instructors) and process operatives (e.g. in chemicals) where the requirement is for NVQ Level 2.
- Unit Groups with **'Certification for some activities'** primarily comprise hairdressers (who require NVQ Level 2) or science and engineering technicians (who require NVQ Level 4-6).
- Unit Groups with **'Registration for all activities'** mostly comprise of higher level occupations, with 76 per cent of jobs falling in SOC(2000) Major Groups 1 and 3, whereas Unit Groups with **'Registration for some activities'** are more widely spread across the occupational hierarchy, albeit with some concentration in SOC Major Group 6 by virtue of the registration requirements for childminders.
- Unit Groups with **'Accreditation for all activities'** or **'Accreditation for some activities'** are spread across the occupational hierarchy, albeit with a bias towards more highly skilled groups. Prominent examples include the accreditation schemes for marketing and sales managers, software professionals, construction trades and tyre/exhaust/windscreen fitters.

This heterogeneity is a challenge for the cross-sectional analysis in particular. Pooled regressions which include jobs from across the occupational hierarchy are unlikely to elicit meaningful results if the entry requirements for a single type of regulation vary greatly across different Unit Groups. Given the patterns outlined above, it is more appropriate to estimate regressions in which we control for the broad skill requirements of particular jobs in a very explicit way. We have no direct measure of these skill requirements. But skill requirements typically have a degree of homogeneity within each

SOC Major Group.[47] Consequently, we run separate cross-sectional regressions within each SOC Major Group. This approach bears similarities with the approach taken in earlier research by Kleiner (2006, pp. 75-7).

We are not able to include all nine regulation categories within the regressions for each SOC Major Group. The 'Assoc Professional and Technical Occupations' group (SOC Major Group 3) is the only one in which all eight forms of regulation are present (see Tables 6.3 and 6.4 above). However, the restriction will enable us to obtain cleaner comparisons between non-regulated jobs and regulated jobs, as the jobs entered into one regression will all be at a broadly similar skill level.

We follow a similar principle in the DiD analysis by confining our comparison groups to jobs within the same SOC Major Group.

6.4.2 Changes in occupational regulation over time

Section 6.2 alluded to the fact that a number of Unit Groups changed their regulatory status over the period 2001-2010. This has been a major factor driving the expansion in the proportion of all regulated jobs over the decade. Table 6.5 shows the prevalence of each of the nine categories of regulation each year between 2001 and 2010. The most significant growth is in the percentage of all jobs classified to Unit Groups where there is at least some licensing: this figure grew from 23.3 per cent in 2001 to 31.4 per cent in 2010. The final row shows that, had there been no changes in regulation status over the period, the percentage of jobs in licensed Unit Groups would have risen to only 24.7 per cent. Most of the growth is attributable to the introduction of licensing to occupations that were previously unregulated (notable cases include security guards, care workers and childcare workers). A classification of 'switchers' is provided in Table 4.20.

[47] The exception is, perhaps, Managers and Senior Officials, where the skill requirements (in terms of formal qualifications at least) are low for some Unit Groups (e.g. publicans and restaurant mangers) and high for others (e.g. financial managers).

Table 6.5 Regulation status (upper bound), by Year (2001-2010)

Year	Lic All	Lic Some	Cert All	Cert Some	Reg All	Reg Some	Acc All	Acc Some	Unreg	Base
	Row %	Row %	Row %	Row %	Row %	Row %	Row %	Row %	Row %	No.
2001	12.1	11.2	2.0	0.7	1.6	1.4	7.2	9.2	54.7	194,246
2002	12.3	11.4	2.2	0.7	1.6	1.5	7.6	9.4	53.4	256,066
2003	12.6	11.6	2.1	0.7	1.7	1.4	7.9	9.3	52.9	246,129
2004	12.7	11.5	2.1	0.7	1.5	1.4	8.1	9.5	52.4	238,278
2005	13.1	13.7	2.2	0.7	1.7	1.4	8.6	9.7	48.9	234,886
2006	13.5	16.1	2.3	0.7	1.6	1.5	10.0	9.4	44.9	229,230
2007	13.3	16.0	2.3	0.7	1.8	3.2	10.1	9.6	42.3	228,249
2008	13.5	16.3	2.3	0.6	1.6	3.8	10.1	9.5	41.7	224,196
2009	14.0	17.0	2.6	0.7	1.6	4.0	10.0	9.6	40.5	211,034
2010	14.1	17.3	2.7	0.7	1.7	4.0	9.8	9.6	40.0	152,191
2010*	13.4	11.3	2.2	0.7	1.7	1.5	7.8	9.1	52.4	152,191

** Assuming that regulation status is 'frozen' over the period 2001-2010*

Base: All employee and self-employed jobs

Source: QLFS Apr 2001 - Sept 2010

As noted in Section 6.2, such changes in regulation status over time are difficult to accommodate within the cross-sectional regressions, unless one is to estimate regressions for many different time periods. The cross-sectional analysis thus focuses purely on the situation in 2010. However, changes in regulation status over time are explicitly utilised in the DiD analysis.

6.5 Results of the cross-sectional analysis

This section presents the results of our cross-sectional analysis of the QLFS in which we measure the raw differences in qualifications, job related training and wages between workers in regulated and unregulated occupations and examine whether these differences persist after controlling for compositional differences between these groups of workers.

The results for each outcome of interest (qualifications, job related training and wages) are presented consecutively. In each case, we first present a table showing the average level of the particular outcome variable for workers in occupations with each of the eight forms of regulation discussed earlier, along with the average level among workers in unregulated occupations. We then present a table of coefficients from a regression analysis containing no control variables; this serves to indicate the magnitude and statistical significance of any differences which may be apparent between regulated and unregulated workers in the first table.[48] Finally, we present a table of coefficients from a

[48] The regressions could be re-specified in order to compare one type of regulation with another. However, this is not done here. Unregulated occupations are taken as the reference category throughout.

regression analysis containing the full set of control variables discussed in Section 6.22; this indicates whether the raw differences persist after controlling for the composition of the various groups. In each table we present separate results for each of the nine SOC(2000) Major Groups. The results of a pooled analysis containing all SOC Major Groups are also presented for completeness.

6.5.1 Level of Highest Qualification

The discussion in Chapter Two indicated that each of the four main types of regulation (licensing, certification, registration and accreditation) has the potential to raise average skill levels within an occupation. However, it also indicated that such an effect is most likely to arise from a situation in which all workers in a Unit Group are subject to a mandatory skill based requirement via universal licensing, and that it is least likely to arise in the case of registration.

If the introduction of regulation does lead to an increase in skill levels within an occupation, one would expect this to lead, in some cases, to an increase in the average level to which incumbents are qualified. One might thus expect the highest qualifications of individuals in regulated occupations to be at a higher level, on average, than those of workers in unregulated occupations.

The analysis of qualification level employs a six category variable which identifies whether the worker's highest educational or vocational qualification is:

- at the equivalent of NQF Level 4 or above;
- at the equivalent of NQF Level 3;
- a trade apprenticeship (around half of which are at NVQ Level 3, with the remainder at NVQ Level 2);
- at the equivalent of NQF Level 2; or
- below NQF Level 2.
- A final category identifies workers with no qualifications.[49]

In order to give a general indication of the differences in qualification levels between the nine categories of regulation and between the nine SOC Major Groups, we compute the mean value on this six category variable when coded from 1 (No qualifications) to 6 (NQF Level 4 or above). Table 6.6 presents these mean values and shows, for example, that the average qualification level of a Professional whose occupation is unregulated is lower

[49] QLFS variable LEVQUAL. For the coding schema see: http://www.esds.ac.uk/doc/6632%5Cmrdoc%5Cpdf%5Clfs_user_guide_vol5_classifications2009.pdf

than a Professional whose occupation is licensed for all activities, but higher than a Professional whose occupation is certified for all activities. We do not present the full categorical breakdown on our six-category qualification variable for reasons of brevity. Within none of the nine SOC Major Groups are those workers in unregulated occupations in fact the least qualified on average.

Table 6.6 Mean of qualification index, by Reg. status and SOC(2000) Major Group

Regulation status	Mgrs & Snr Officials	Profs	Assoc Prof & Tech	Admin & Secret	Skilled trades	Pers Servs	Sales & Cust Service	Proc, Plant & Mach	Elem-entary	All
	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean
Lic. for all activities	4.9	6.9	6.2		3.9			3.8		5.8
Lic. for some activities	5.0		5.8		4.6	5.1	4.4	3.7	3.8	4.7
Cert. for all activities		6.2	5.8					4.0		5.8
Cert. for some activities			5.6			4.9				5.0
Reg. for all activities	5.4		5.9	4.8						5.5
Reg. for some activities	5.8		5.4	4.8		5.3	4.2		4.0	5.4
Acc. for all activities	5.7	6.4	6.0	4.7	4.6	5.0		3.9	4.8	5.6
Acc. for some activities	5.8	6.4	5.8	5.0	4.6	4.3		4.2	3.7	5.2
Unregulated	5.7	6.6	5.8	4.8	4.9	4.5	4.7	4.0	3.8	5.0
All	5.6	6.6	5.9	4.9	4.6	5.0	4.5	3.9	3.8	5.2
Base	*22,654*	*20,216*	*21,131*	*16,391*	*15,426*	*13,057*	*10,187*	*9,836*	*15,902*	*144,800*

Base: All employee and self-employed jobs

Source: QLFS Jan-Sept 2010

Tables 6.7 and 6.8 present the results of our regression analyses of qualification levels; Table 6.7 presents the results of the analysis without control variables, whilst Table 6.8 presents the results of the analysis where compositional differences between the various groups are controlled for. A positive coefficient indicates that workers in occupations to which a particular type of regulation applies are more highly qualified, on average, than workers in unregulated occupations. Negative coefficients indicate that they are less highly qualified than workers in unregulated occupations. Asterisks are used to identify coefficients which are statistically significant from zero; if a coefficient is without asterisks then the coefficient is not estimated with sufficient precision for us to be confident that a positive or negative relationship truly exists within the population at large.

The patterns discussed in respect of Table 6.6 are necessarily replicated in Table 6.7, which presents the regression coefficients from simple ordered probit regressions, containing no additional control variables other than the nine category regulation status variable. In only a minority of instances are workers in regulated occupations more highly

qualified, on average, than workers in unregulated occupations. These are: Professional and Associate Professional occupations where licensing is present for all activities; Personal Service and Elementary occupations where licensing is present for some activities; Personal Service occupations where certification is available for some activities; Managerial and Personal Services occupations where registration is available for some activities; Associate Professional, Personal Service and Elementary occupations where accreditation is available for all activities; and Managerial, Administrative/Secretarial and Process/Plant/Machine Operative occupations where accreditation is available for some activities. The only SOC Major Group in which workers in the majority of regulatory classes are more highly qualified than unregulated workers is Personal Service occupations.

Table 6.7 Qualification level: ordered probit coefficients (without controls), by SOC(2000) Major Group

Regulation status (Ref. Unreg)	Mgrs & Snr Officials	Profs	Assoc Prof & Tech	Admin & Secret	Skilled trades	Pers Servs	Sales & Cust Service	Proc, Plant & Mach	Elem-entary	All
Lic – all	-0.510**	0.554**	0.377**		-0.675**			-0.076*		0.582**
	(11.40)	(10.84)	(12.34)		(6.97)			(2.02)		(38.18)
Lic – some	-0.449**		-0.003		-0.190**	0.385**	-0.185**	-0.163**	0.061*	-0.167**
	(14.23)		(0.07)		(5.56)	(9.43)	(6.01)	(2.75)	(2.09)	(15.97)
Cert – all		-0.568**	-0.039					0.037		0.554**
		(11.05)	(0.69)					(0.56)		(20.03)
Cert – some			-0.177			0.181**				-0.022
			(1.39)			(3.44)				(0.66)
Reg – all	-0.181**		0.042	0.005						0.337**
	(3.32)		(0.77)	(0.08)						(10.38)
Reg – some	0.103*		-0.299*	-0.035		0.472**	-0.299**		0.188	0.256**
	(2.12)		(2.52)	(0.46)		(5.31)	(2.97)		(0.71)	(7.99)
Acc – all	0.002	-0.382**	0.139**	-0.086	-0.227**	0.352**		-0.069	0.648**	0.385**
	(0.06)	(7.87)	(3.40)	(1.16)	(6.64)	(3.20)		(0.35)	(12.91)	(25.55)
Acc – some	0.095**	-0.308**	0.026	0.122**	-0.173**	-0.169		0.178**	-0.022	0.134**
	(2.77)	(4.90)	(0.58)	(3.66)	(4.85)	(0.83)		(2.72)	(0.47)	(9.19)
Base	*22,645*	*20,211*	*21,126*	*16,382*	*15,410*	*13,056*	*10,184*	*9,831*	*15,890*	*144,735*

*Notes: t-statistics in parentheses; ** = significant at 1% level, * = significant at 5% level.*

Base: All employee and self-employed jobs

Source: QLFS Jan-Sept 2010

The regressions reported in Table 6.7 take no account of compositional differences. Once compositional differences are controlled for, only one positive and statistically significant coefficient remains within the Personal Services Major Group: the coefficient associated with workers in occupations where some activities are licensed (see Table 6.8). The magnitudes of the remaining coefficients in this Major Group have reduced in size, such that they are no longer statistically significant from zero. However, most of the other

statistically significant coefficients in Table 6.7 retain the same sign and remain significant from zero. It is therefore the case that the qualification levels of regulated workers in most of the SOC Major Groups remain different from those of unregulated workers in the same Major Group after controlling for compositional differences. However, the sign of these differences is often contrary to expectations. Even if one focuses solely on a comparison between workers in universally licensed occupations and their counterparts in unregulated occupations, one finds a mixture of coefficients that are variously positive (for Professionals and Associate professionals) and negative (for Managers, Skilled trades and Process operatives). Consequently, whilst the results for professionals and associated professionals accord with expectations, there is no consistent pattern across the Major Groups, even within this type of regulation. This suggests that at least some of the estimates may be confounded by unobserved factors.

Table 6.8 Qualification level: ordered probit coefficients (with controls), by SOC(2000) Major Group

Regulation status (Ref. Unreg)	Mgrs & Snr Officials	Profs	Assoc Prof & Tech	Admin & Secret	Skilled trades	Pers Servs	Sales & Cust Service	Proc, Plant & Mach	Elem-entary	All
Lic – all	-0.380**	0.614**	0.243**		-0.674**			-0.165**		0.162**
	(6.40)	(10.44)	(6.55)		(6.76)			(3.48)		(8.50)
Lic – some	-0.117**		-0.044		-0.058	0.374**	-0.051	-0.176**	0.038	-0.064**
	(2.90)		(0.88)		(1.34)	(6.76)	(1.36)	(2.70)	(1.22)	(4.68)
Cert – all		-0.312**	0.039					0.086		-0.166**
		(4.20)	(0.65)					(1.24)		(5.07)
Cert – some			-0.039			-0.027				0.025
			(0.30)			(0.32)				(0.57)
Reg – all	-0.260**		0.159*	0.124						-0.082*
	(3.75)		(2.25)	(1.81)						(2.26)
Reg – some	0.129*		-0.372**	-0.158		0.218	-0.188		-0.056	0.076*
	(2.53)		(3.10)	(1.93)		(1.93)	(1.78)		(0.17)	(2.21)
Acc – all	0.028	-0.187**	0.132**	-0.065	-0.178**	0.124		-0.020	0.370**	0.035*
	(0.73)	(2.88)	(3.13)	(0.78)	(4.32)	(0.97)		(0.10)	(6.60)	(1.99)
Acc – some	0.188**	-0.116	0.053	0.182**	-0.089*	-0.154		0.210**	0.102	0.069**
	(5.25)	(1.54)	(1.11)	(5.23)	(2.13)	(0.77)		(2.59)	(1.32)	(4.30)
Base	*22,480*	*20,110*	*20,973*	*16,250*	*15,226*	*12,950*	*10,050*	*9,722*	*15,669*	*143,430*

*Notes: t-statistics in parentheses; ** = significant at 1% level, * = significant at 5% level.*

Base: All employee and self-employed jobs

Source: QLFS Jan-Sept 2010

6.5.2 Recent job related training

A further set of indicators relating to human capital investment measure the rate of take up of job related training, and the rate of take up of training that leads to the acquisition of a qualification. Both are binary indicators and so can be used to identify the proportions of workers in different types of occupation that are engaging in job related training.

One necessary caveat to this analysis is that any universal licensing system which requires all incumbents to meet a specified skill standard prior to entry into the occupation will require any skills training to have taken place before the worker is observed within the licensed occupation, unless there are grandfathering rights. Nevertheless, some licensing systems require continual professional development as a condition of licence renewal, and this may be expected to raise training levels, all other things equal. Moreover, voluntary systems (i.e. certification and accreditation) do not set occupational entry requirements and so, as long as any relevant training can be carried out alongside paid work, one may expect to see positive associations between these types of regulation and rates of job related training.

Average rates of take up of job related training are presented in Table 6.9. Probit coefficients, indicating the statistical significance of any differences between the regulated categories and unregulated workers, are shown in Table 6.10. Again, there are a mixture of positive, negative and zero coefficients and these remain broadly intact after controlling for compositional differences (see Table 6.11). Licensing is shown to be positively associated with the take up of job related training among Professionals, Associate Professionals and Personal Service workers. However, it is negatively associated with take up among Process/Plant/Machine Operatives and has no association for Managerial workers, Skilled trades, Sales/Customer Service workers and those in Elementary occupations. The only SOC Major Group in which more than one form of regulation is positively associated with the take up of job related training is Major Group 3 (Associate Professional and Technical occupations).

Table 6.9 Percentage of workers receiving job related training in past four weeks, by Reg. status and SOC(2000) Major Group

Regulation status	Mgrs & Snr Officials	Profs	Assoc Prof & Tech	Admin & Secret	Skilled trades	Pers Servs	Sales & Cust Service	Proc, Plant & Mach	Elem-entary	All
	Cell %	Cell %	Cell %	Cell %	Cell %	Cell %	Cell %	Cell %	Cell %	Cell %
Lic. for all activities	11	27	27		8			5		20
Lic. for some activities	10		22		8	20	10	7	8	13
Cert. for all activities		13	17					7		13
Cert. for some activities			11			15				14
Reg. for all activities	14		19	6						14
Reg. for some activities	11		8	12		11	6		7	10
Acc. for all activities	11	14	14	10	5	8		2	14	11
Acc. for some activities	10	13	12	10	8	4		7	6	10
Unregulated	11	20	14	10	9	13	11	9	6	11
All	11	20	18	10	7	18	11	6	7	13
Base	*22,654*	*20,216*	*21,131*	*16,391*	*15,426*	*13,057*	*10,187*	*9,836*	*15,902*	*144,800*

Base: All employee and self-employed jobs

Source: QLFS Jan-Sept 2010

Table 6.10 Job related training in past four weeks: probit coefficients (without controls), by SOC(2000) Major Group

Regulation status (Ref. Unreg)	Mgrs & Snr Officials	Profs	Assoc Prof & Tech	Admin & Secret	Skilled trades	Pers Servs	Sales & Cust Service	Proc, Plant & Mach	Elem-entary	All
Lic – all	0.006	0.238**	0.466**		-0.061			-0.304**		0.414**
	(0.10)	(6.44)	(15.61)		(0.43)			(5.34)		(27.23)
Lic – some	-0.045		0.305**		-0.036	0.259**	-0.037	-0.096	0.113*	0.138**
	(1.05)		(5.96)		(0.70)	(5.37)	(0.85)	(1.05)	(2.40)	(9.37)
Cert – all		-0.273**	0.147*					-0.109		0.120**
		(5.54)	(2.07)					(1.06)		(3.73)
Cert – some			-0.114			0.068				0.180**
			(0.81)			(0.81)				(2.79)
Reg – all	0.163*		0.200**	-0.275**						0.179**
	(2.36)		(3.20)	(2.61)						(4.33)
Reg – some	-0.018		-0.293	0.111		-0.093	-0.328*		0.042	-0.021
	(0.29)		(1.49)	(1.07)		(0.81)	(2.44)		(0.09)	(0.49)
Acc – all	-0.012	-0.216**	0.014	-0.028	-0.330**	-0.299		-0.643	0.431**	0.024
	(0.28)	(4.91)	(0.29)	(0.21)	(5.39)	(1.67)		(1.55)	(5.60)	(1.19)
Acc – some	-0.052	-0.251**	-0.078	0.022	-0.057	-0.665*		-0.141	0.001	-0.050*
	(1.15)	(4.29)	(1.43)	(0.47)	(1.08)	(2.57)		(1.25)	(0.01)	(2.44)
Base	*22,647*	*20,211*	*21,126*	*16,384*	*15,413*	*13,056*	*10,184*	*9,833*	*15,891*	*144,745*

*Notes: t-statistics in parentheses; ** = significant at 1% level, * = significant at 5% level.*

Base: All employee and self-employed jobs

Source: QLFS Jan-Sept 2010

Table 6.11 Job related training in past four weeks: probit coefficients (with controls), by SOC(2000) Major Group

Regulation status (Ref. Unreg)	Mgrs & Snr Officials	Profs	Assoc Prof & Tech	Admin & Secret	Skilled trades	Pers Servs	Sales & Cust Service	Proc, Plant & Mach	Elem-entary	All
Lic – all	0.128	0.114**	0.199**		0.005			-0.249**		0.157**
	(1.54)	(2.70)	(5.20)		(0.03)			(3.01)		(7.68)
Lic – some	0.090		0.255**		0.057	0.160*	0.081	-0.114	0.023	0.062**
	(1.70)		(4.66)		(0.90)	(2.51)	(1.53)	(1.10)	(0.45)	(3.18)
Cert – all		-0.314**	0.228**					-0.080		-0.016
		(4.61)	(3.01)					(0.74)		(0.43)
Cert – some			-0.107			-0.100				0.021
			(0.78)			(0.88)				(0.31)
Reg – all	0.091		0.207*	-0.329**						0.031
	(1.06)		(2.49)	(3.02)						(0.68)
Reg – some	0.020		-0.075	-0.006		-0.213	-0.174		-0.217	-0.043
	(0.31)		(0.39)	(0.05)		(1.57)	(1.25)		(0.53)	(0.97)
Acc – all	0.039	-0.280**	0.008	0.127	-0.239**	-0.121		-0.516	0.035	-0.059*
	(0.81)	(4.99)	(0.18)	(0.92)	(3.41)	(0.62)		(1.16)	(0.39)	(2.56)
Acc – some	0.025	-0.354**	-0.064	0.105*	0.063	-0.765**		-0.120	-0.006	-0.009
	(0.53)	(5.31)	(1.13)	(2.15)	(1.01)	(2.78)		(0.87)	(0.05)	(0.40)
Base	*22,482*	*20,110*	*20,973*	*16,252*	*15,228*	*12,932*	*10,041*	*9,717*	*15,655*	*143,439*

*Notes: t-statistics in parentheses; ** = significant at 1% level, * = significant at 5% level.*

Base: All employee and self-employed jobs

Source: QLFS Jan-Sept 2010

Tables 6.12 to 6.14 go on to present the equivalent analyses for the binary indicator of take up of job related training that leads to the acquisition of a qualification. Such training is necessarily a subset of the job related training examined in Tables 6.9 to 6.11. Those workers who have not undertaken any training at all in the past four weeks continue to score zero on the binary indicator, rather than being dropped from the analysis.

The pattern of results is in fact similar to that discussed above. One again finds a mixture of positive, negative and zero coefficients, although fewer of these remain statistically significant from zero after controlling for compositional differences – particularly within the Associate Professionals group (see Tables 6.13 and 6.14). After controlling for differences in composition, licensing is shown to be positively associated with the take up of qualification targeted training only among workers in Elementary occupations.[50] It is negatively associated with qualification targeted training among Professionals. Other forms of regulation are positively associated with training in specific Major Groups, but with no consistent pattern across the occupational hierarchy.

[50] The coefficients for workers in Associate Professional and Sales occupations where some activities are licensed are positive but only statistically significant only at the 10 per cent level (Table 6.14).

Table 6.12 Job related training in past four weeks that leads to a qualification, by Reg. status and SOC(2000) Major Group

Regulation status	Mgrs & Snr Officials	Profs	Assoc Prof & Tech	Admin & Secret	Skilled trades	Pers Servs	Sales & Cust Service	Proc, Plant & Mach	Elem-entary	All
	Prop.	Prop.	Prop.	Prop.	Prop.	Prop.	Prop.	Prop.	Prop.	Prop.
Lic. for all activities	0.04	0.07	0.08		0.06			0.03		0.06
Lic. for some activities	0.04		0.10		0.04	0.10	0.07	0.03	0.05	0.07
Cert. for all activities		0.05	0.10					0.04		0.06
Cert. for some activities			0.04			0.11				0.10
Reg. for all activities	0.03		0.09	0.02						0.05
Reg. for some activities	0.03		0.06	0.04		0.11	0.02		0.00	0.04
Acc. for all activities	0.04	0.05	0.05	0.04	0.02	0.01		0.00	0.11	0.05
Acc. for some activities	0.02	0.06	0.06	0.06	0.05	0.00		0.03	0.03	0.05
Unregulated	0.03	0.08	0.05	0.03	0.04	0.07	0.05	0.04	0.03	0.04
All	0.03	0.06	0.07	0.04	0.04	0.09	0.06	0.03	0.04	0.05
Base	*22,654*	*20,216*	*21,131*	*16,391*	*15,426*	*13,057*	*10,187*	*9,836*	*15,902*	*144,800*

Base: All employee and self-employed jobs

Source: QLFS Apr-Jun 2010

Table 6.13 Job related training in past four weeks that leads to a qualification: probit coefficients (without controls), by SOC(2000) Major Group

Regulation status (Ref. Unreg)	Mgrs & Snr Officials	Profs	Assoc Prof & Tech	Admin & Secret	Skilled trades	Pers Servs	Sales & Cust Service	Proc, Plant & Mach	Elem-entary	All
Lic – all	0.170	-0.105	0.182**		0.222			-0.198*		0.174**
	(1.46)	(1.49)	(3.02)		(0.96)			(1.97)		(5.64)
Lic – some	0.146		0.330**		0.008	0.173*	0.163*	-0.130	0.227**	0.254**
	(1.75)		(3.46)		(0.08)	(2.02)	(2.10)	(0.74)	(2.81)	(9.39)
Cert – all		-0.262**	0.323**					-0.044		0.161**
		(2.77)	(2.61)					(0.25)		(2.67)
Cert – some			-0.189			0.258*				0.439**
			(0.58)			(1.96)				(4.39)
Reg – all	0.054		0.285*	-0.263						0.133
	(0.34)		(2.46)	(1.27)						(1.63)
Reg – some	0.054		0.031	0.068		0.246	-0.528		N/a	0.017
	(0.42)		(0.09)	(0.32)		(1.36)	(1.83)			(0.21)
Acc – all	0.123	-0.262**	0.018	0.081	-0.233*	-0.709		N/a	0.680**	0.048
	(1.37)	(3.15)	(0.21)	(0.42)	(2.08)	(1.78)			(5.89)	(1.26)
Acc – some	-0.118	-0.139	0.067	0.245**	0.105	N/a		-0.146	0.004	0.051
	(1.14)	(1.30)	(0.67)	(2.91)	(1.11)			(0.69)	(0.03)	(1.33)
Base	*7,522*	*6,637*	*6,873*	*5,433*	*5,146*	*4,202*	*3,312*	*3,257*	*5,209*	*47,638*

*Notes: t-statistics in parentheses; ** = significant at 1% level, * = significant at 5% level.*

N/A = coefficient not estimated because category predicts success / failure perfectly

Base: All employee and self-employed jobs. Source: QLFS Apr-Jun 2010

Table 6.14 Job related training in past four weeks that leads to a qualification: probit coefficients (with controls), by SOC(2000) Major Group

Regulation status (Ref. Unreg)	Mgrs & Snr Officials	Profs	Assoc Prof & Tech	Admin & Secret	Skilled trades	Pers Servs	Sales & Cust Service	Proc, Plant & Mach	Elem-entary	All
Lic – all	0.260	-0.251**	0.039		0.246			-0.102		0.013
	(1.48)	(3.00)	(0.50)		(0.94)			(0.69)		(0.32)
Lic – some	0.138		0.208		0.018	0.072	0.172	-0.325	0.257**	0.082*
	(1.27)		(1.96)		(0.14)	(.)	(1.76)	(1.70)	(2.69)	(2.20)
Cert – all		-0.192	0.358**					-0.035		0.073
		(1.43)	(2.68)					(0.18)		(1.03)
Cert – some			-0.032			0.093				0.177
			(0.10)			(.)				(1.56)
Reg – all	0.069		0.575**	-0.280						0.156
	(0.36)		(4.02)	(1.27)						(1.79)
Reg – some	0.111		0.292	0.059		0.130	-0.273		N/a	0.068
	(0.81)		(0.79)	(0.26)		(.)	(0.83)			(0.77)
Acc – all	0.147	-0.285**	0.057	0.095	-0.300*	-0.380		N/a	0.335*	0.003
	(1.42)	(2.62)	(0.61)	(0.43)	(2.17)	(.)			(2.25)	(0.07)
Acc – some	-0.085	-0.216	0.079	0.281**	0.061	N/a		-0.044	-0.213	0.088*
	(0.81)	(1.72)	(0.76)	(3.04)	(0.51)			(0.17)	(0.67)	(2.11)
Base	*7,299*	*6,576*	*6,824*	*5,219*	*5,072*	*4,153*	*3,161*	*3,011*	*5,049*	*47,233*

*Notes: t-statistics in parentheses; ** = significant at 1% level, * = significant at 5% level.*

N/A = coefficient not estimated because category predicts success / failure perfectly

Base: All employee and self-employed jobs

Source: QLFS Apr-Jun 2010

6.5.3 Wages

The final outcome to be examined in the cross-sectional analysis is gross hourly wages. This outcome can necessarily be examined for employees only, in contrast to each of the previous outcomes which could be examined for combined samples of employees and self-employed workers. The expectation (outlined in Chapter Two) is that licensing may lead to a rise in wages as a result either of human capital effects or as a result of restrictions on labour supply. Any increases in average human capital which arise from other forms of regulation may also serve to raise wages in comparison with non-regulation, however the effects are not expected to be as large or as widespread as in the case of licensing.

Table 6.15 presents mean gross hourly wage levels among workers in each category of regulation within each of the nine SOC Major Groups. Workers in unregulated occupations are the lowest paid, on average, in only two of the SOC Major Groups: Professionals and Administrative and Secretarial, although in the latter case the average

wages of workers in unregulated occupations are not significantly different from those of workers in occupations where some activities are subject to registration or occupations where all activities may be accredited (Table 6.16). Within Skilled trades, the average wages of workers in unregulated occupations are in fact higher than those of any regulated group before one attempts to control for any compositional differences.

Table 6.15 Gross hourly wages (£ per hour), by Reg. status and SOC(2000) Major Group

Regulation status	Mgrs & Snr Officials	Profs	Assoc Prof & Tech	Admin & Secret	Skilled trades	Pers Servs	Sales & Cust Service	Proc, Plant & Mach	Elem-entary	All
	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean
Lic. for all activities	14.54	18.86	16.17		7.62			9.67		15.45
Lic. for some activities	13.25		15.08		9.77	8.57	6.91	7.97	6.88	8.74
Cert. for all activities		17.78	13.38					10.83		15.72
Cert. for some activities			12.35			6.79				8.42
Reg. for all activities	21.24		20.45	11.18						18.34
Reg. for some activities	22.61		13.47	10.67		7.21	8.62		6.30	16.88
Acc. for all activities	18.71	19.20	14.85	11.17	10.73	8.85		8.08	6.33	15.60
Acc. for some activities	20.09	19.38	14.28	11.51	10.52	10.38		11.46	8.63	14.40
Unregulated	18.26	17.24	13.76	10.49	11.81	9.13	8.14	10.09	7.72	11.84
All	18.14	18.57	14.96	10.70	10.70	8.58	7.42	9.79	7.49	12.55
Base	*5,074*	*4,449*	*4,869*	*4,314*	*2,367*	*2,970*	*2,767*	*2,160*	*4,012*	*32,982*

Base: All employee and self-employed jobs

Source: QLFS Jan-Sept 2010

Table 6.16 Natural log of gross hourly wages: OLS coefficients (without controls), by SOC(2000) Major Group

Regulation status (Ref. Unreg)	Mgrs & Snr Officials	Profs	Assoc Prof & Tech	Admin & Secret	Skilled trades	Pers Servs	Sales & Cust Service	Proc, Plant & Mach	Elem-entary	All
Lic – all	-0.356**	0.097**	0.166**		-0.449**			-0.050*		0.269**
	(6.85)	(3.97)	(9.60)		(9.73)			(2.38)		(27.00)
Lic – some	-0.328**		0.063		-0.216**	-0.031	-0.166**	-0.230**	-0.094**	-0.272**
	(12.13)		(1.67)		(8.99)	(1.18)	(10.85)	(7.36)	(5.83)	(34.04)
Cert – all		0.069*	-0.024					0.042		0.320**
		(2.41)	(0.57)					(0.99)		(17.37)
Cert – some			-0.040			-0.315**				-0.345**
			(0.92)			(5.51)				(7.43)
Reg – all	0.164**		0.361**	0.101**						0.438**
	(3.88)		(8.04)	(3.17)						(16.76)
Reg – some	0.142**		-0.051	0.042		-0.160**	0.050		-0.116**	0.261**
	(3.08)		(0.43)	(1.02)		(2.74)	(0.94)		(3.18)	(7.90)
Acc – all	0.042	0.136**	0.081**	0.031	-0.112**	0.034		-0.223	-0.155**	0.273**
	(1.63)	(5.19)	(3.29)	(0.57)	(3.69)	(0.52)		(1.66)	(6.98)	(21.89)
Acc – some	0.108**	0.126**	0.047	0.106**	-0.140**	0.132		0.121	0.134**	0.202**
	(4.30)	(3.57)	(1.71)	(5.78)	(5.34)	(1.12)		(1.85)	(4.76)	(17.13)
Base	*4,867*	*4,296*	*4,702*	*4,153*	*2,269*	*2,897*	*2,693*	*2,111*	*3,926*	*31,914*

*Notes: t-statistics in parentheses; ** = significant at 1% level, * = significant at 5% level.*

Base: All employee and self-employed jobs

Source: QLFS Jan-Sept 2010

Once control variables are introduced to account for compositional factors, some of the differences apparent in Table 6.16 are reduced and become non-significant: this is the case for most of the coefficients among Professionals and Skilled trades (Table 6.17). The resulting pattern of coefficients is far from uniform. However, it broadly indicates that the wages of licensed workers are higher than those of unregulated workers within Professional occupations and Associate Professional occupations, whilst they are typically lower than those of unregulated workers in other SOC Major Groups. There are no statistically significant differences between the wages of workers in certified occupations and those of workers in unregulated occupations. Some significant differences are found between the wages of workers in registered and accredited occupations and those of workers in unregulated occupations, and where such differences are found they are all positive; however, there is no consistent pattern to these associations across the SOC Major Groups.

Table 6.17 Natural log of gross hourly wages: OLS coefficients (with controls), by SOC(2000) Major Group

Regulation status (Ref. Unreg)	Mgrs & Snr Officials	Profs	Assoc Prof & Tech	Admin & Secret	Skilled trades	Pers Servs	Sales & Cust Service	Proc, Plant & Mach	Elem-entary	All
Lic – all	-0.033	0.109**	0.091**		-0.205**			-0.073**		0.038**
	(0.64)	(4.53)	(4.81)		(4.12)			(3.23)		(3.79)
Lic – some	-0.084**		0.069*		-0.022	-0.057	-0.038*	-0.115**	-0.040*	-0.036**
	(3.08)		(2.26)		(0.76)	(1.94)	(2.37)	(3.74)	(2.49)	(4.47)
Cert – all		-0.062	-0.012					0.070		-0.028
		(1.63)	(0.37)					(1.89)		(1.71)
Cert – some			-0.042			-0.028				-0.026
			(0.98)			(0.42)				(0.77)
Reg – all	0.053		0.231**	0.033						0.098**
	(1.27)		(5.54)	(1.09)						(4.54)
Reg – some	0.116**		-0.086	0.001		0.088	-0.037		0.029	0.069**
	(3.05)		(0.62)	(0.04)		(1.41)	(0.73)		(0.70)	(2.72)
Acc – all	0.032	-0.001	0.051*	-0.015	-0.025	-0.135		-0.090	0.045	0.025*
	(1.35)	(0.04)	(2.32)	(0.28)	(0.86)	(1.83)		(0.65)	(1.75)	(2.53)
Acc – some	0.116**	-0.000	0.014	0.079**	-0.022	0.236		0.050	0.086*	0.064**
	(5.35)	(0.01)	(0.60)	(4.72)	(0.86)	(1.96)		(0.85)	(2.23)	(6.90)
Base	*4,857*	*4,289*	*4,687*	*4,144*	*2,263*	*2,882*	*2,682*	*2,108*	*3,911*	*31,823*

*Notes: t-statistics in parentheses; ** = significant at 1% level, * = significant at 5% level.*

Base: All employee and self-employed jobs

Source: QLFS Jan-Sept 2010

If one were to draw any tentative conclusion from the cross-sectional analysis of wages it would be that there may be some evidence that licensing raises wages among Professional and Associate Professional occupations. This is at least consistent with the positive associations seen among Professionals and Associate Professionals in respect of qualifications and job related training in Tables 6.8 and 6.11. It is also consistent with previous evidence for the UK (Humphris *et al.*, 2010; discussed in Section 3.18) which indicated that the wage premium from licensing in the UK is restricted to workers in the upper half of the earnings distribution. However, the negative coefficients on licensing within all other occupational groups suggest that there are unobservable factors at play (e.g. the interaction with other labour market characteristics, as discussed in section 3.2.4), which we are unable to account for in this cross-sectional framework (with the data available from the QLFS).

The uneven patterns of results that have been discussed earlier in this chapter in respect of qualification levels and the take up of job related training would support a similar conclusion in respect of those labour market outcomes.

6.6 Results of the difference-in-differences analysis

This section presents the results of our DiD analysis, in which we utilise switches in regulation status among a selected set of occupations as a means of identifying the causal impact of occupational regulation. We focus on five occupations which saw either the introduction of regulation or a change in the type of regulation over the period 2001-2010, namely: security guards; care workers; social care managers; childcare workers; and automotive technicians. The rationale for focusing on these occupations was set out in Section 6.3, along with a description of the DiD methodology.

The results for each occupation are presented consecutively. For each occupation, we provide a short summary of the nature of the regulatory switch before going on to present the results of the analyses of qualifications, job related training, wages and employment. It is important to note that the choice of outcomes here is driven by the focus of this study; raising qualification levels (say) may not necessarily have been a motivation (or a primary motivation) for the introduction of regulation in each case.

6.6.1 Private security guards

The provisions for a licensing system covering workers who provide private security services were made as part of the Private Security Industry Act 2001. The Act stipulated that anyone who carries out manned guarding, vehicle immobilisation or key holding must possess a licence, although in-house security guards were exempt. In order to obtain a licence, an applicant must be aged 18 or more, hold an appropriate qualification (equivalent to NVQ level 2) and pass a criminal record bureau and other fit and proper person checks. The licensing requirements first came into force in April 2003. Further details on the industry and the development of the licensing system are provided by Fernie (2011).

We identify the treatment group as those holding jobs classified to SOC(2000) Unit Group 9241 (Security Guards and Related Occupations). However, because of the exemption for in-house security guards, we exclude from the treatment group all those workers who are directly employed by organisations outside of SIC(2007) Group 80.1 (Security and Investigation Activities). After making this exclusion, we consider that almost all of the jobs in our treatment group will be subject to licensing from April 2003 onwards. The exceptions are private detectives, who are not subject to licensing, but we expect their numbers to be very small.

We form a comparison group from all other Unit Groups in SOC(2000) Major Group 9 (Elementary occupations) which remained unregulated throughout the period 2001-2010.

The sample of security guards numbers around 630 each year, whilst the sample of jobs in the comparison group numbers around 14,500 each year.

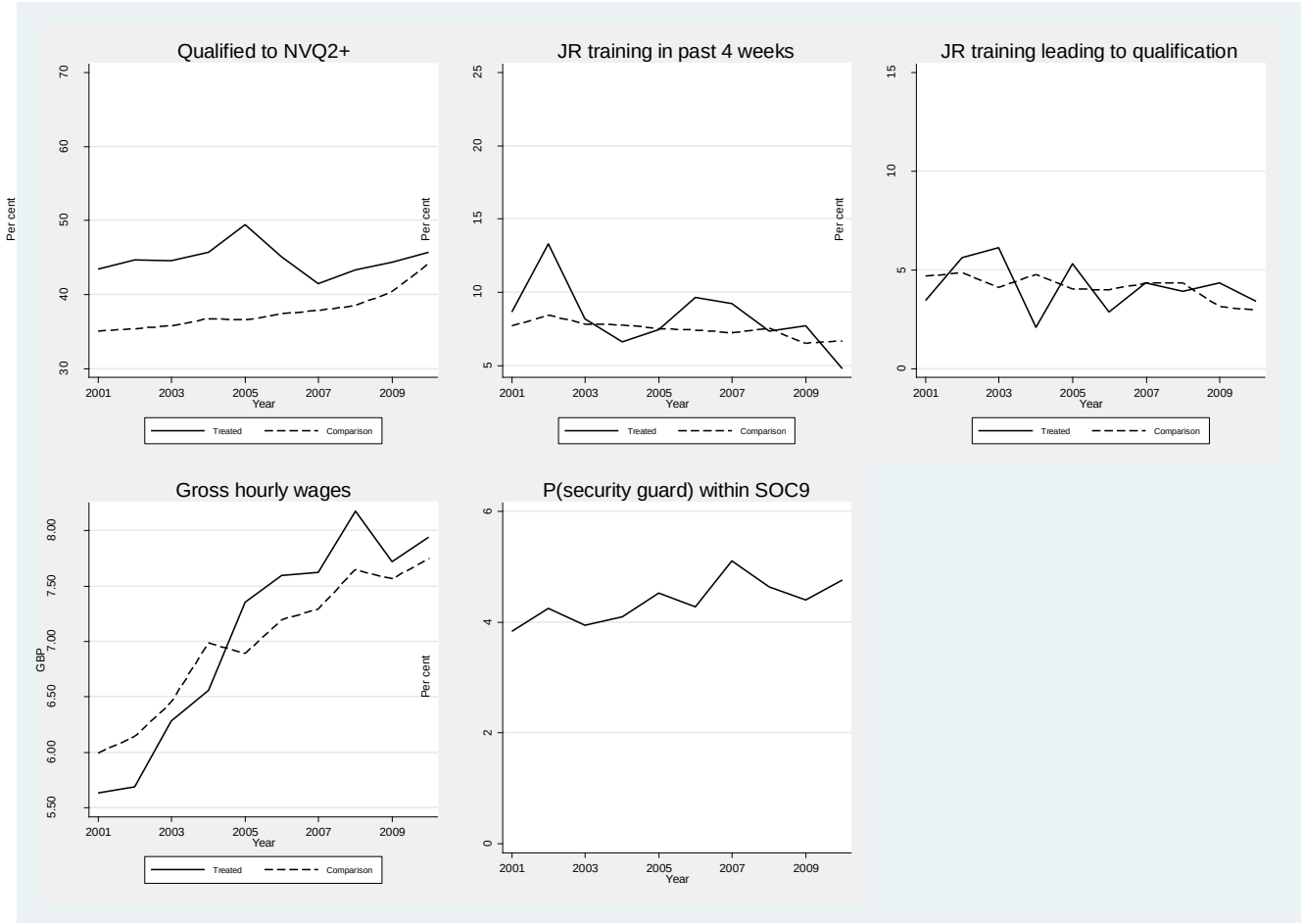
Figure 6.1 shows the raw, unadjusted labour market outcomes for the treatment and comparison group over the period 2001-2010. The figure contains five charts showing, respectively:

- the percentage of jobs held by workers with qualifications at NVQ Level 2 or above;
- the percentage of jobs held by workers who engaged in job related training in the four weeks prior to their QLFS interview;
- the percentage of jobs held by workers who engaged in job related training which would lead to a qualification;
- average gross hourly wages; and
- the percentage of all jobs in the treatment group.

If there were to be a clear and unambiguous effect from the introduction of the licensing system in April 2003, one might expect to see some change in the differential between the treatment and comparison groups as one moves from the pre-treatment period (i.e. before April 2003) to the post-treatment period (i.e. after April 2003). However, such an effect may not be easy to discern from the charts if it is relatively small, or if the pattern is obscured by other factors. Accordingly, Table 6.18 presents formal tests in which any such 'treatment effect' would appear as a statistically significant coefficient on the interaction term in the DiD regression model. Table 6.18 presents three specifications for each dependent variable: (1) has no control variables; (2) controls for the set of factors outlined in Section 6.2.2, minus those potentially endogenous factors discussed there; (3) controls for the full set of factors, including these potentially endogenous items.

Beginning with the analysis of qualification levels, which focuses on the percentage of jobs in the treatment and comparison groups held by workers who are qualified to NVQ Level 2 or above, one sees no obvious treatment effect in the chart. There is an increase in the percentage of qualified workers between 2004 and 2005, but this falls back in 2006 and 2007 to a level below that which was seen in the pre-treatment period. The coefficient on the interaction term in the DiD regression is negative, but is not statistically significant from zero in any of the three specifications. The introduction of licensing in April 2003 therefore appears to have had no obvious impact on qualification levels among security guards.

Figure 6.1 Labour market outcomes for security guards and comparison group, 2001-2010



Base: All employee and self-employed jobs in treatment and comparison groups (except for wages – employee jobs only)

Source: QLFS Apr 2001 – Sept 2010

Table 6.18 Difference-in-differences estimates for security guards

	Qualification level			Job related training			Job related training for qualification			Gross hourly wages			Employment		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Treated group	0.09 **	0.173 **	0.187 **	0.034 **	0.042 **	0.044 **	0.014	0.014	0.021	-0.022	-0.075 **	-0.102 **			
	3.84	6.97	7.55	3.00	3.78	4.01	1.06	1.07	1.65	-0.94	-3.09	-4.19			
Treatment period	0.03 **	0.032 **	0.034 **	-0.007 **	-0.01 **	-0.009 **	-0.007 **	-0.010 **	-0.010 **	0.168 **	0.165 **	0.161 **	-0.010	0.002	0.003
	5.95	6.72	7.07	-3.45	-4.67	-4.44	-2.68	-4.11	-3.91	30.18	31.61	31.25	-0.30	0.58	1.01
Interaction	-0.027	-0.023	-0.02	-0.028 *	-0.024 *	-0.023	-0.014	-0.009	-0.008	0.063 *	0.067 *	0.064 *			
	-1.01	-0.84	-0.76	-2.24	-1.98	-1.93	-0.98	-0.61	-0.6	2.38	2.54	2.42			
Base															

*Notes: t-statistics below coefficients; ** = significant at 1% level, * = significant at 5% level.*

(1) no additional control variables; (2) restricted set of control variables; (3) full set of control variables

Base: All employee and self-employed jobs in treatment and comparison groups (except for wages – employee jobs only)

Source: QLFS Apr 2001 - Sept 2010

Moving on to job related training, there is a clear increase in the incidence of job related training in 2002; the year preceding the introduction of the licensing requirement. The incidence of training then falls back to its 2001 level after the regulations are in force. This suggests an anticipation effect, alluded to in Section 6.4.2, whereby incumbents are required to engage in training prior to the introduction of the mandatory requirement. The spike in 2002 yields a negative coefficient on the interaction term in the DiD regression but, if this is truly an anticipation effect, then the DiD provides a misleading estimate of the treatment effect due to mis specification of the treatment period. It seems probable that a positive treatment effect would be identified if one were to specify the treatment period as beginning in 2001, when the legislation was enacted.

It is perhaps surprising, given the pattern of job related training, that no equivalent spike was seen in chart one, however it could be that many security guards do not consider the mandatory Level 2 Award as a "qualification" in the language of the QLFS.[51] This notion is supported by the fact that no similar spike is seen in chart three. The regressions further indicate no positive impact of licensing on the incidence of 'training for qualifications' among security guards.

The fourth chart in Figure 6.1 shows average gross hourly wages. Having experienced a common trend in the period 2001-2003, the wages of security guards overtake those of the comparison group in the post-treatment period. The regression analysis estimates a wage premium of six per cent for security guards arising from the introduction of licensing. This seems unlikely to represent a monopoly effect arising from any restriction in the supply of security guards, since the employment equations show no significant change in the probability of being a security guard after the introduction of licensing. It seems more likely to represent a human capital effect which is not being picked up in the qualifications measure.

In summary, the introduction of licensing for security guards appears to have resulted in an increase in wage levels. It also appears to have led to an increase in job related training, albeit one that was short lived and which appears to have largely been in anticipation of the introduction of the mandatory skill requirement. We find no impact on employment. We also find no impact on qualification levels, although it seems possible that the results on qualifications may be subject to measurement error.

The analysis focuses solely on the situation in England so as to avoid complications arising from the later introduction of licensing in Scotland (November 2007) and Northern

[51] The question NEWQUL asks, "Will the education or training that you have been doing in the last 4 weeks lead to a qualification, a credit towards a qualification or neither?". There is no prompt for the respondent to include vocational awards as well as educational qualifications.

Ireland (December 2009). However, it could be profitable to extend the analysis to these countries once more years of post-treatment data become available, or to look for possible spillover effects in those regions within the current observation period.

6.6.2 Care workers

The provisions for a new regulatory system covering residential care homes in the social care sector were made as part of the Care Standards Act 2000. The Act introduced a number of regulations governing the sector, including a requirement by April 2005 for at least 50 per cent of care staff in care homes to possess an NVQ Level 2 qualification in Care or Health and Social Care.[52] Further details are provided by Gospel and Lewis (2011).

The regulations thus introduced a system of licensing for care homes which had direct implications for skill levels within the sector, by imposing a quota for the proportion of care workers within each care home who should meet a specified skill standard. One would expect this to have influenced skill levels within the sector, although the fact that only a subset of all care workers were required to reach the proscribed skill standard suggests that the effects are likely to have been less pronounced than if each individual care worker had been required to obtain a licence to practice. We identify the treatment group as those holding jobs classified to SOC(2000) Unit Group 6115 (Care Assistants and Home Carers), making the necessary restriction that the industry sector of the employing organisation is classified to SIC(2007) Division 87 (Residential Care Activities) or 88 (Social Work Activities Without Accommodation).[53] After making this exclusion, we consider that, from April 2005 onwards, all of the jobs in our treatment group will be located within establishments that were covered by the new licensing system, with around half of these jobs needing to adhere to the new skill standard.

We form a comparison group from care workers working outside of SIC(2007) Divisions 87 and 88, plus all other Unit Groups in SOC(2000) Major Group 6 (Personal service occupations) which remained unregulated throughout the period 2001-2010. The sample of care workers numbers around 3,100 each year, whilst the sample of jobs in the comparison group numbers around 2,600 each year.

Figure 6.2 presents charts showing the raw, unadjusted labour market outcomes for the treatment and comparison group over the period 2001-2010. Table 6.19 presents the results of the DiD regression analyses. The charts and the regression results suggest that

[52] The explicit requirement for an NVQ Level 2 qualification was, however, dropped in 2010 as part of a revision of the standards governing social care. Under the provisions of the Health and Social Care Act 2008 (Regulated Activities) Regulations 2010, care workers are now required only to be "suitably qualified, skilled and experienced".
[53] This serves to exclude the many care assistants working hospitals, for example.

levels of qualifications and rates of job related training have risen among care workers relative to their comparators between the pre-and post-treatment periods. This accords with the findings of Gospel and Lewis (2011). The DiD analyses indicate that the differential between care workers and their comparators in the percentage with qualifications at NVQ Level 2 or above has risen by around 16 percentage points, whilst the differential in the percentage engaging in job related training has risen by around 2 percentage points. Nevertheless, it is quite apparent from the charts that any differential trend does not begin around April 2005 but appears to extend back at least to the beginning of our observation period in 2001. Again, one suspects that there may have been some substantial anticipation effect, given that the legislative provisions were in place as early as July 2000.

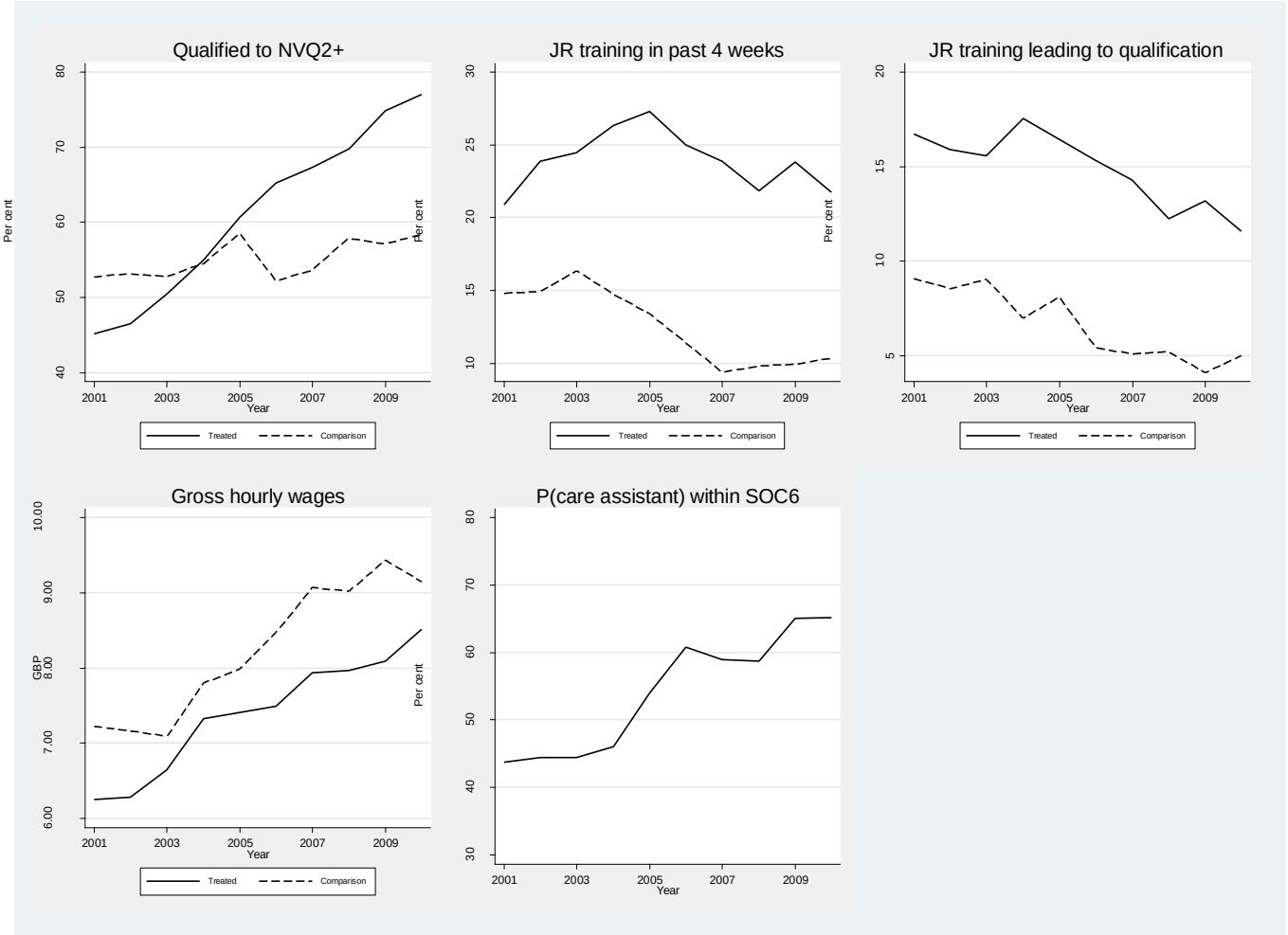
It is surprising, given the scale of the changes in qualification levels and the take up of job related training, that no equivalent changes are seen in the percentage of workers engaging in training that leads to a qualification. This again makes us suspect that some vocational qualifications may be missed by this particular measure.[54]

Moving on to wages, the regression analysis finds no effect of licensing on wage levels among care workers. This is noteworthy given the evident upskilling within the sector.[55] It could be that local authorities and the NHS have sufficient monopsony power in this product market to prevent the licensing requirements from generating the price increases that would allow wages to rise. However, we are unable to subject this hypothesis to any formal testing with the available data.

Finally, in respect of employment, it certainly appears that the introduction of licensing has not harmed the employment prospects of care workers: indeed, the proportion of all SOC6 jobs held by care workers has risen by around 12 percentage points between the pre-and post-treatment periods. We are wary of attributing this increase to the licensing system, however, since it seems more plausible that it may represent an increase in the demand for social care provision arising from an ageing population.

[54] This suspicion gains further justification in Section 6.5.3.
[55] Gospel and Lewis argue that there have been real increases in skill levels, rather than the licensing provisions having simply prompted the certification of existing skills (2011: 11-12).

Figure 6.2 Labour market outcomes for care workers and comparison group, 2001-2010



Base: All employee and self-employed jobs in treatment and comparison groups (except for wages – employee jobs only)

Source: QLFS Apr 2001 – Sept 2010

Table 6.19 Difference-in-differences estimates for care workers

	Qualification level			Job related training			Job related training for qualification			Gross hourly wages			Employment		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Treated group	-0.033 **	0.004	0.006	0.089 **	0.074 **	0.073 **	0.077 **	0.060 **	0.059 **	-0.067 **	0.043 **	0.045			
	-3.11	0.32	0.53	13.98	10.65	10.56	9.25	6.55	6.48	-5.25	3.49	3.7			
Treatment period	0.026 *	0.037 **	0.033 **	-0.05 **	-0.039 **	-0.037 **	-0.036 **	-0.027 **	-0.026 **	0.188 **	0.166 **	0.163	0.254 **	0.121 **	0.121 **
	2.31	3.41	3.01	-8.98	-6.9	-6.53	-5.66	-4.36	-4.15	12.89	12.72	12.51	7.28	11.18	11.18
Interaction	0.170 **	0.163 **	0.164 **	0.046 **	0.025 **	0.022 **	0.01	-0.007	-0.009	-0.013	0.008	0.011			
	11.54	11.10	11.20	5.34	2.85	2.59	0.89	-0.67	-0.79	-0.71	0.49	0.67			
Base															

*Notes: t-statistics below coefficients; ** = significant at 1% level, * = significant at 5% level.*

(1) no additional control variables; (2) restricted set of control variables; (3) full set of control variables

Base: All employee and self-employed jobs in treatment and comparison groups (except for wages – employee jobs only)

Source: QLFS Apr 2001 - Sept 2010

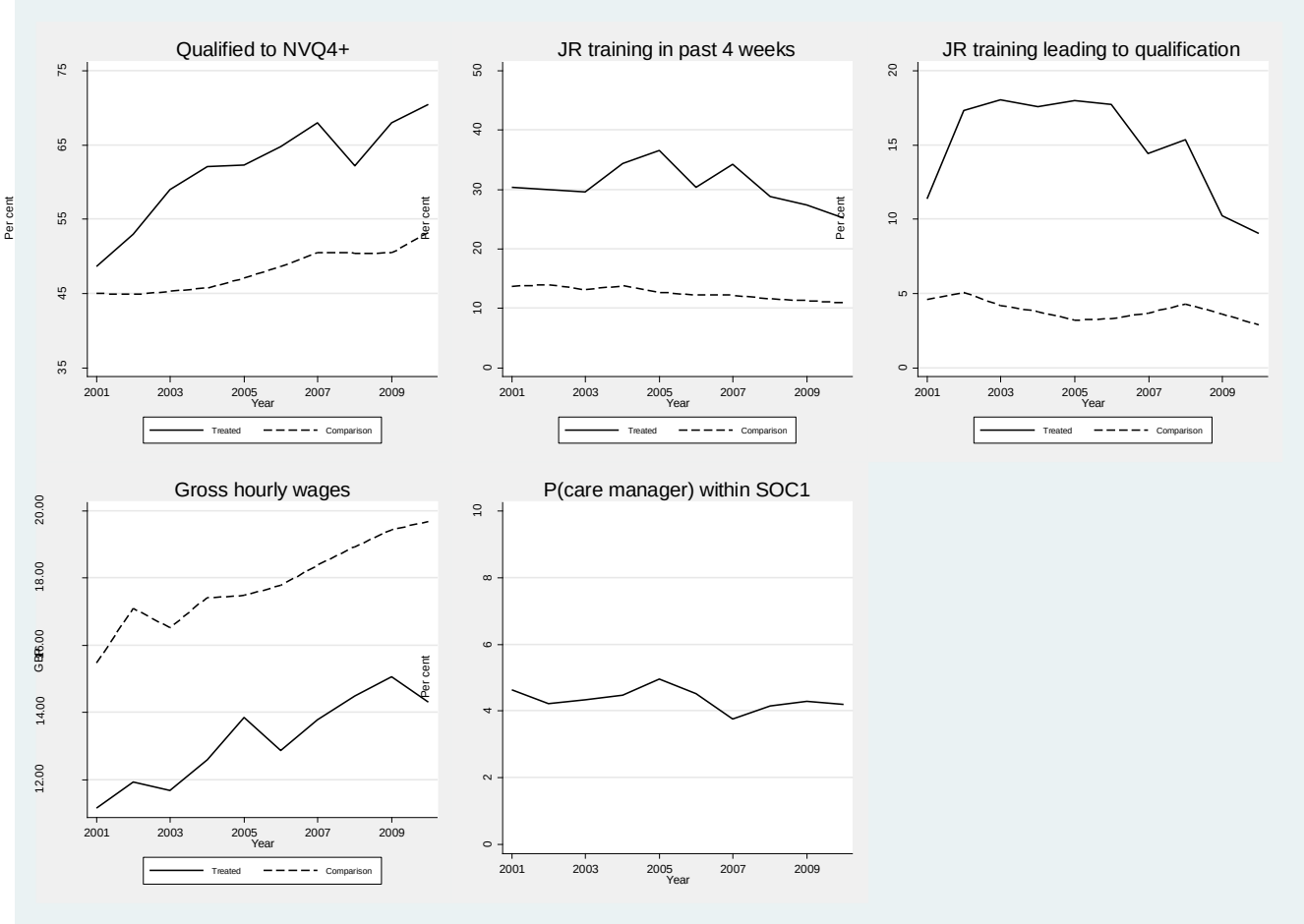
6.6.3 Social care managers

This third group to be examined comprises SOC(2000) Unit Group 1184 (Social Services Managers) and Unit Group 1185 (Residential and Day Care Managers). These jobs were also subject to new regulatory requirements under the Care Standards Act 2000. However, in these cases the requirement was for all job holders to possess, by April 2005, an NVQ Level 4 qualification in Care or Social Work together with an NVQ Level 4 qualification in Management. The skill requirements were therefore much higher for care managers than for care workers; moreover, they were binding on all job holders, in contrast to the quota system for care workers.

We identify the treatment group as those holding jobs classified to the two SOC(2000) Unit Groups noted above, again making the necessary restriction that the industry sector of the employing organisation is classified to SIC(2007) Division 87 (Residential Care Activities) or 88 (Social Work Activities Without Accommodation). After making this exclusion, we consider that all of the jobs in our treatment group will be subject to licensing from April 2005 onwards. We form a comparison group from all other Unit Groups in SOC(2000) Major Group 1 (Managers and Senior Officials) which remained unregulated throughout the period 2001-2010. The sample of care managers numbers around 530 each year, whilst the sample of jobs in the comparison group numbers around 11,000 each year.

Figure 6.3 presents charts showing the raw, unadjusted labour market outcomes for the treatment and comparison group over the period 2001-2010. Table 6.20 presents the results of the DiD regression analyses.

Figure 6.3 Labour market outcomes for social care managers and comparison group, 2001-2010



Base: All employee and self-employed jobs in treatment and comparison groups (except for wages – employee jobs only)

Source: QLFS Apr 2001 – Sept 2010

Table 6.20 Difference-in-differences estimates for social care managers

	Qualification level			Job related training			Job related training for qualification			Gross hourly wages			Employment		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Treated group	0.115 **	0.074 **	0.082 **	0.18 **	0.125 **	0.129 **	0.124 **	0.105 **	0.106 **	-0.235 **	-0.117 **	-0.117 **			
	5.84	3.7	4.13	13.53	9.16	9.49	7.71	6.42	6.49	-10.59	-5.66	-5.65			
Treatment period	0.048 **	0.05 **	0.05 **	-0.017 **	-0.018 **	-0.019 **	-0.008 **	-0.007 **	-0.007 **	0.126 **	0.107 **	0.105 **	0.023	0.003	0.002
	8.65	9.19	9.14	-6.57	-6.88	-7.2	-3.11	-2.72	-2.7	15.32	14.96	14.78	0.56	0.73	0.51
Interaction	0.041	0.037	0.037	0.004	0.005	0.005	-0.022	-0.021	-0.021	0.026	0.002	0.005			
	1.66	1.55	1.55	0.26	0.29	0.32	-1.06	-1.05	-1.03	0.89	0.1	0.18			
Base															

*Notes: t-statistics below coefficients; ** = significant at 1% level, * = significant at 5% level.*

(1) no additional control variables; (2) restricted set of control variables; (3) full set of control variables

Base: All employee and self-employed jobs in treatment and comparison groups (except for wages – employee jobs only)

Source: QLFS Apr 2001 - Sept 2010

The first chart suggests that, in common with care workers, levels of qualifications among care managers have risen relative to their comparators between the pre-and post-treatment periods. The coefficient on the interaction term in the DiD regression is not statistically significant at the five per cent level, however, lying just outside of statistical significance at the 10 per cent level. Moreover, in common with care workers, any increase in qualification levels appears to have begun before April 2005 and dates back at least to 2001 when our observation period begins. There is thus a clear suggestion again of anticipation effects which may plausibly have been stimulated by the passing of the legislation in 2000. The third chart, which shows a sharp increase in 2001 in the percentage of care managers engaging in training that leads to a qualification, dropping away after the implementation of the licensing system, adds support to this hypothesis.[56] However, it would only be possible to examine the impact of the passing of the legislation on anticipatory activity with a longer period of data.

Moving on to wages and employment, there is no suggestion of a treatment effect in either chart four or in the DiD regressions. However, in the case of wages, it is notable that, despite care managers being more qualified on average than their comparators (and increasingly so throughout the period), their wage levels are considerably lower than their comparators. This is not a function of the restricted base for the wage data, which is necessarily derived only from employees.[57] One possibility, as discussed in the case of care assistants, is that wages are not free to respond to increase in human capital in this sector. Another possibility, however, which is given weight by the magnitude of the differential (roughly £4 per hour throughout the period) is that there is some segmentation in the market for managers. If this is the case, the treatment and comparison group may not be subject to common macro trends, and this caveat must be acknowledged.[58]

6.6.4 Childcare workers

The Childcare Act 2006 introduction a requirement for all childcare workers working with children aged seven or younger to register with Ofsted. Registration was not dependent upon possession of a relevant qualification, but was subject to background checks. This provision came into force in March 2007. The Childcare Act also led to the creation of the Early Years Foundation Stage framework which required, from September 2008, that childminders must have attended a training course within six months of registration and that, in registered settings other than childminding settings, all supervisors and managers

[56] It seems plausible that the NVQ Level 4 qualifications are more readily recognised by respondents as formal qualifications at QLFS question NEWQUL than the lower-level vocational qualifications required by care workers and security guards.
[57] If one re-draws the charts in Figure 6.3 on a sample of employees only (excluding the self employed), the patterns are not qualitatively different.
[58] It may be possible, through further investigation, to find a smaller comparison group within SOC Major Group 1 whose wage levels are closer to those of the treatment group in the pre-treatment period.

must hold a relevant NVQ Level 3 qualification and 50 per cent of all other staff must hold a relevant NVQ Level 2 qualification. These various provisions meant that, between March 2007 and September 2008, many childcare workers became subject to a registration requirement, and those working in registered settings became subject to skill requirements.

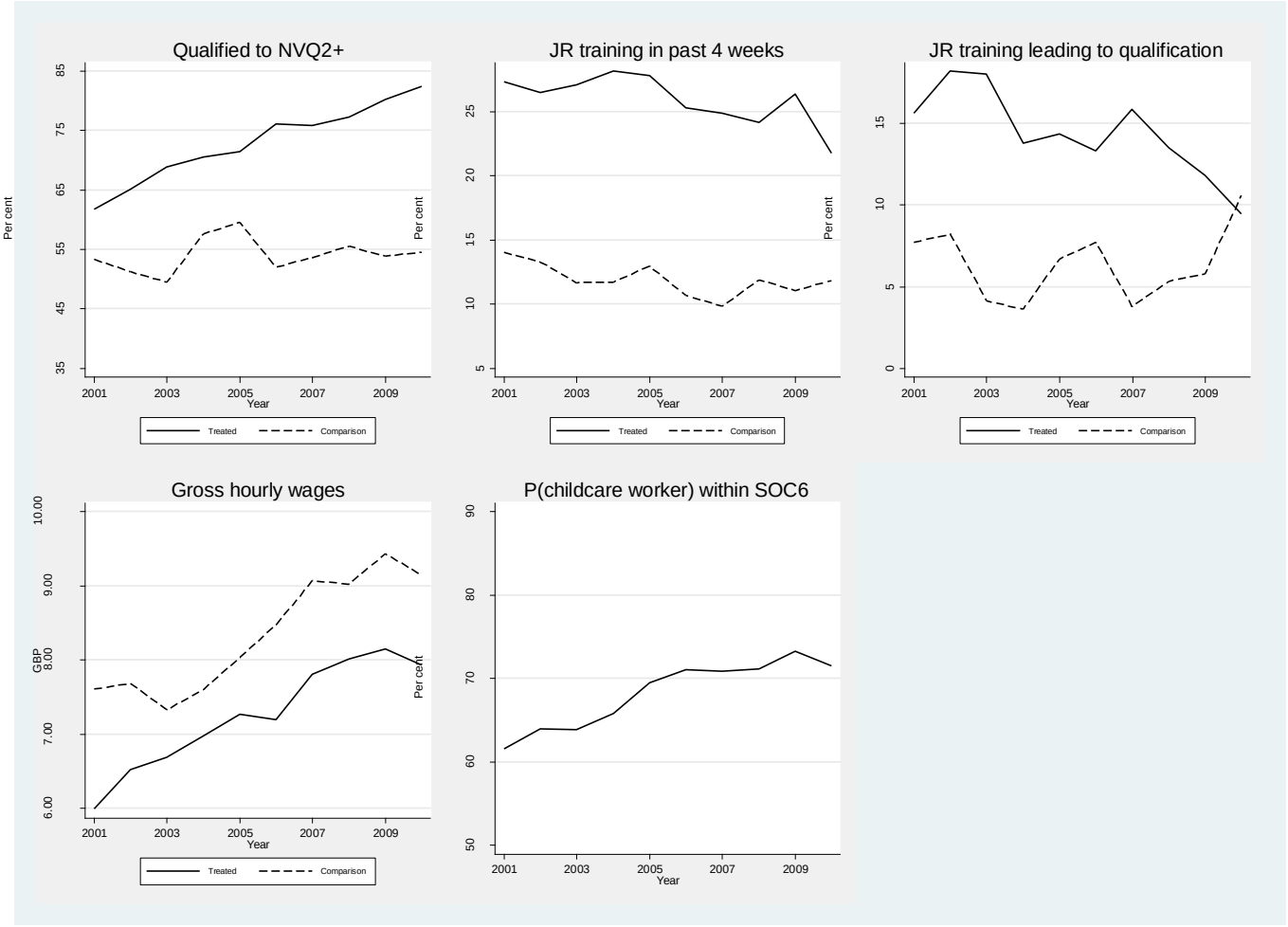
We identify the treatment group as those holding jobs classified to SOC(2000) Unit Group 6121 (Nursery Nurses), 6122 (Childminders and related occupations), 6123 (Playgroup leaders and assistants) and 6124 (Education assistants). Clearly the provisions of the legislation mean that not all workers in these groups will be subject to regulation and so, in common with care workers, one may expect some dilution of the possible effects when compared with full licensing. However, the group has the advantage that the relevant legislation was in place only a short time before its provisions came into force. We therefore expect this group to be relatively free of the long anticipation effects which we suspect may be at work among some of the other groups considered above.

We form a comparison group from all other Unit Groups in SOC(2000) Major Group 6 (Personal service occupations) which remained unregulated throughout the period 2001-2010. The sample of childcare workers numbers around 1,000 each year, whilst the sample of jobs in the comparison group numbers around 500 each year.

It is apparent from Figure 6.4 that qualification levels rose among the treatment group in the post-treatment period, whereas they remained broadly stable in the comparison group. The DiD regression analysis indicates a ‘treatment effect’ of around six percentage points in the percentage of workers qualified to NVQ Level 2 or above. However, since chart one in Figure 6.4 indicates that qualifications among childcare workers were on a steady upward trend since 2001 (i.e. well before the introduction of the Childcare Act in 2006), it seems unlikely that this indicates any of the anticipatory effects which we think may be present in other groups. The suspicion that the ‘treatment effect’ indicated by the DiD analysis may be spurious is given further weight by the absence of any treatment effect on job related training. In summary, we find no effect on qualifications or training activity which can be robustly linked to the new regulatory regime for childcare workers.

The DiD analysis further indicates a negative effect of the treatment on wages, although this is only statistically significant in the regression with additional controls. It indicates no effect on employment. The overall impression is, therefore, that the registration requirements introduced in 2007 and the subsequent skill requirements introduced for some workers in 2008 had little or no effect on labour market outcomes among childcare workers.

Figure 6.4 Labour market outcomes for childcare workers and comparison group, 2001-2010



Base: All employee and self-employed jobs in treatment and comparison groups (except for wages – employee jobs only)

Source: QLFS Apr 2001 – Sept 2010

Table 6.21 Difference-in-differences estimates for childcare workers

	Qualification level			Job related training			Job related training for qualification			Gross hourly wages			Employment		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Treated group	0.137 **	0.164 **	0.16 **	0.102 **	0.076 **	0.075 **	0.068 **	0.046 **	0.041 **	-0.106 **	-0.041 **	-0.018			
	14.82	13.81	13.41	21.25	11.91	11.63	11.85	6.09	5.28	-8.82	-2.87	-1.29			
Treatment period	0.025	0.058 **	0.058 **	-0.016 **	-0.013 *	-0.011	-0.006	-0.005	-0.004	0.16 **	0.174 **	0.172 **	-0.023	-0.010	-0.010
	1.96	4.62	4.65	-2.71	-2.12	-1.91	-0.96	-0.73	-0.62	9.32	11.45	11.51	-0.72	-1.26	-1.36
Interaction	0.083 **	0.055 **	0.055 **	0	-0.002	-0.004	-0.007	-0.006	-0.005	0.011	-0.033	-0.039 *			
	5.64	3.85	3.85	0.05	-0.32	-0.52	-0.84	-0.68	-0.6	0.56	-1.89	-2.26			
Base															

*Notes: t-statistics below coefficients; ** = significant at 1% level, * = significant at 5% level.*

(1) no additional control variables; (2) restricted set of control variables; (3) full set of control variables

Base: All employee and self-employed jobs in treatment and comparison groups (except for wages – employee jobs only)

Source: QLFS Apr 2001 - Sept 2010

6.6.5 Automotive technicians

The final group to be considered in this chapter comprises automotive technicians, who saw the introduction in June 2006 of an accreditation scheme run by the Institute of the Motor Industry. The Automotive Technician Accreditation (ATA) provides routes by which a variety of different types of automotive technician may become accredited. The requirements are broadly similar across the various roles however (e.g. light vehicle technician, paint technician, autoglazing technician), with accreditation requiring the applicant to hold either a relevant qualification at NVQ Level 2 or to have a specified period of industry experience (typically at least two years), and to successfully pass a practical assessment test.

We identify the treatment group as those holding jobs classified to SOC(2000) Unit Groups 5232 (Vehicle body builders and repairers), 5234 (Vehicle spray painters) or 8135 (Tyre, exhaust and windscreen fitters).[59] We expect all job holders in these unit groups to be eligible for accreditation, subject to them meeting the criteria set out in the previous paragraph. We form a comparison group from all other Unit Groups in SOC(2000) Minor Groups 521 (Metal forming, welding and related trades), 522 (Metal machining, fitting and instrument making trades) and 523 (Vehicle trades), plus Unit Group 8132 (Assemblers of vehicles and metal goods). We thus draw the comparison group more tightly than in previous cases, due to the heterogeneous nature of SOC(2000) Major Groups 5 and 8. The sample of automotive technicians numbers around 400 each year, whilst the sample of jobs in the comparison group numbers around 3,500 each year.

No effects of the introduction of the accreditation scheme are apparent on either qualification levels or the take up of job related training, either in Figure 6.5 or in the DiD regressions reported in Table 6.22. The introduction of the accreditation scheme does not therefore appear to have raised qualification levels within the affected occupations. This may perhaps be a function of the ability to gain accreditation through experience. The other possibility is that those workers who wished to become accredited already possessed the necessary qualifications.

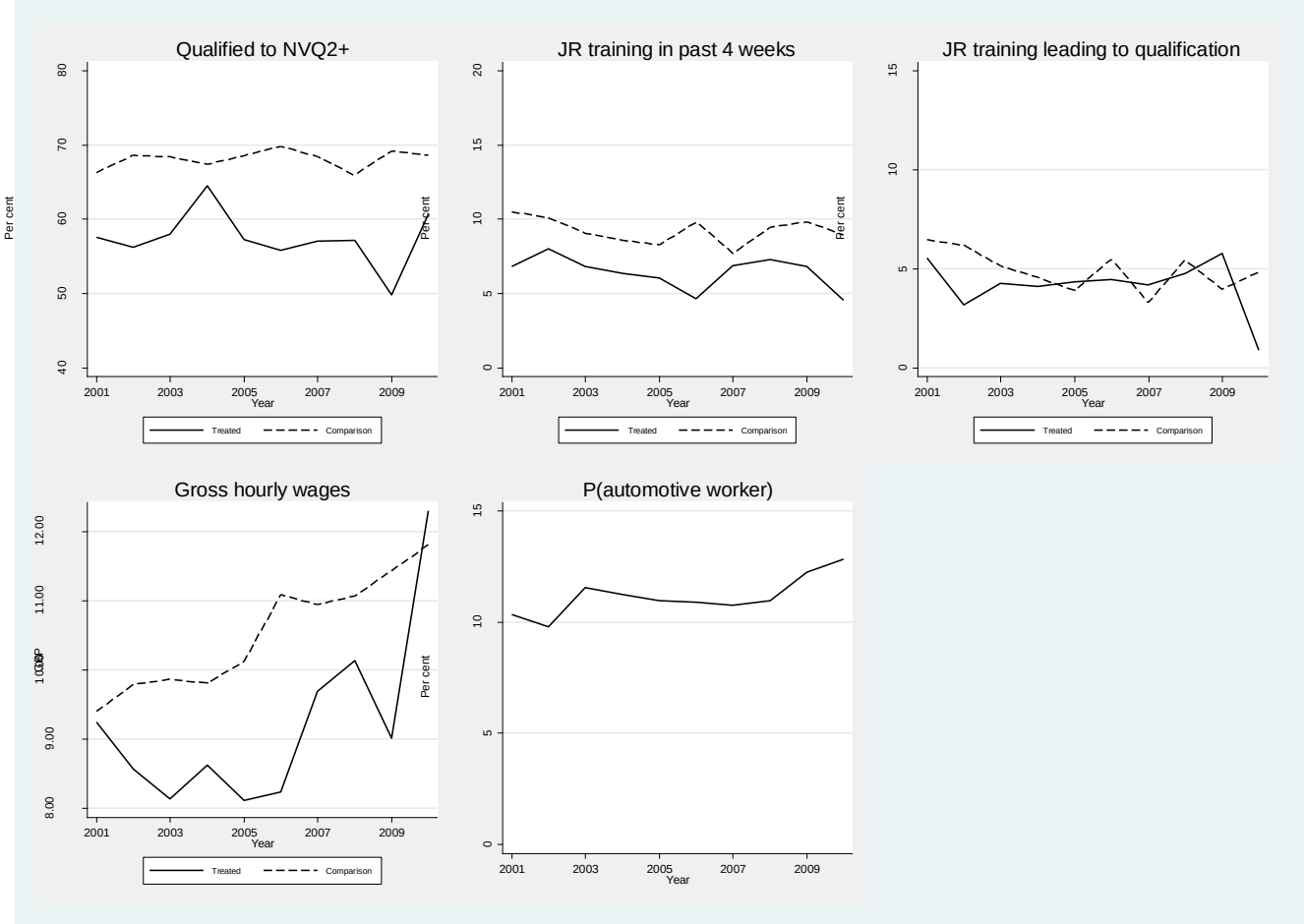
The DiD analysis shows no effect of accreditation on wages, although it is clearly apparent from the erratic trend in wages within the treatment group in the fourth chart in Figure 6.5 that sample sizes are a problem for the wages analysis in this particular

[59] We exclude Unit Group 5231 (motor mechanics and auto engineers) as some of the job holders in this unit group are subject to licensing.

case.[60] The fifth chart in Figure 6.5 accords with the DiD analysis in showing no effect of the accreditation scheme on employment.

[60] It will be recalled that wages data are only collected from two-fifths of the QLFS sample in a given quarter.

Figure 6.5 Labour market outcomes for automotive technicians and comparison group, 2001-2010



Base: All employee and self-employed jobs in treatment and comparison groups (except for wages – employee jobs only)

Source: QLFS Apr 2001 – Sept 2010

Table 6.22 Difference-in-differences estimates for automotive technicians

	Qualification level			Job related training			Job related training for qualification			Gross hourly wages			Employment		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Treated group	-0.098 **	-0.101 **	-0.1 **	-0.026 **	-0.029 **	-0.028	-0.010	-0.010	-0.010	-0.179 **	-0.046 *	-0.046 *			
	-5.24	-4.78	-4.75	-3.59	-3.51	-3.45	-1.11	-1.04	-0.97	-7.82	-2.08	-2.14			
Treatment period	-0.001	0.003	0.004	-0.004	-0.005	-0.005	-0.009	-0.010 *	-0.010 *	0.126 **	0.132 **	0.134 **	-0.088	0.004	0.004
	-0.15	0.37	0.42	-0.88	-1.17	-1.22	-1.73	-2.06	-2.03	11.51	13.59	13.88	-1.57	0.52	0.53
Interaction	-0.023	-0.029	-0.028	-0.002	-0.001	0.000	0.006	0.011	0.011	0.020	0.011	0.010			
	-0.78	-0.99	-0.98	-0.21	-0.1	-0.03	0.4	0.77	0.77	0.53	0.3	0.29			
Base															

*Notes: t-statistics below coefficients; ** = significant at 1% level, * = significant at 5% level.*

(1) no additional control variables; (2) restricted set of control variables; (3) full set of control variables

Base: All employee and self-employed jobs in treatment and comparison groups (except for wages – employee jobs only)

Source: QLFS Apr 2001 - Sept 2010

6.7 Summary and conclusions

In this chapter of the report, we present the results of a quantitative analysis which compares labour market outcomes among groups of employees who are subject to different forms of occupational regulation (including those in occupations which are unregulated). The analysis is based on data from the Quarterly Labour Force Survey; a large, quarterly survey of households, conducted by the Office for National Statistics (ONS).

Theoretical expectations, and the weight of available evidence, form the clearest hypotheses in respect of licensing. The introduction of a universal, skills based entry requirement can be expected to raise average skill levels in the occupation, since low quality workers who cannot meet the new entry requirement are forced out (thereby depressing employment levels) whilst other low quality workers must engage in job related training in order to increase their human capital to the new minimum standard. If the stock of human capital in the occupation rises because of the new entry requirement, or if the supply of labour falls, then wages can be expected to rise, as long as consumers are willing to pay higher prices. There is ample evidence of wage and employment effects arising from licensing in the US. However, there is less evidence of the effects of other forms of regulation (and greater uncertainty in the expected outcomes). Moreover, the available quantitative evidence for the UK is notably sparse, even in the case of licensing. The purpose of the analysis presented in this report is to provide up to date quantitative evidence on these issues.

We first reported cross-sectional analyses in which we examined the extent to which any raw differences in wage levels, qualifications and the take up of job related training between workers in regulated and unregulated occupations persisted after controlling for compositional differences. We found that many differences did persist. This could suggest that the various forms of occupational regulation investigated here have some causal impact on these labour market outcomes. However, the patterns of results seen in the cross-sectional analysis were notable for their inconsistency across occupational groups. The most consistent set of results identified a positive association between licensing and qualifications, job related training and wages within Professional and Associate Professional occupations. However, the negative coefficients seen among other groups, and associated with other forms of regulation, make it equally plausible that unobservable factors are at work which we have been unable to account for with the data available from the QLFS.

We employed a difference-in-differences (DiD) approach in an attempt to resolve this identification problem. In the absence of the random assignment of occupational regulation, we used the extension of occupational regulation to five specific occupations over the period 2001-2010 as a form of 'natural experiment'. We examined the wage differential (say) between the workers in a soon to be regulated occupation (the treatment group) and the workers in similar unregulated occupation (the comparison group). We then examined whether the magnitude of that differential changed after the treatment group became regulated. Any such change would indicate a causal effect of regulation, if one were to assume that all other macro trends were common to both treatment and comparison groups. Table 6.23 summarises the findings.

We identified some effects which could plausibly be attributed to the introduction of occupational regulation. These included a rise in wages among security guards following the introduction of a licensing system in 2003 and a rise in qualification levels and job related training among care workers as a result of the introduction of a licensing system in 2005. Considerable anticipation effects were apparent in respect of the latter group, however, as they were in respect of care managers, who were covered by the same provisions which had their origins in legislation passed some five years earlier.

Elsewhere, in the case of childcare workers and automotive technicians, we found no evidence that the introduction of occupational regulation had affected labour market outcomes. This may be because the regulations were somewhat weaker in either case, placing skill requirements only on a minority of workers (in the case of childcare) or comprising only of a voluntary scheme (in the case of vehicle repairers). It is difficult to make generalisations from these few cases, but the evidence provided by the DiD analysis does suggest, quite plausibly, that the effects of occupational regulation can be expected to be stronger when the entry requirements are either higher or are more extensively applied.

An examination of further cases would enable this final proposition to be placed on a firmer footing. Further research could usefully investigate the possibility of extending the observation period back beyond 2001 in order to examine possible anticipation effects more thoroughly. It could also usefully investigate the sensitivity of our results to alternative specifications of the comparison group.

Table 6.23 Summary of estimated impact of regulation from difference-in-differences analyses

	Characteristics of regulation			Estimated impact of regulation (from DiD analysis)					Comments
	Type of regulation	Timing	Skill level required	Qualification levels	Job related training	Job related training for qualification	Gross hourly wages	Employment	
Private security guards	From unregulated to licensing	Private Security Industry Act 2001. Enforced from April 2003.	Equivalent to NVQ Level 2	No effect (but see comments).	Possible anticipation effect.	No effect (but see comments).	Positive.	No effect.	Possible that vocational exam not viewed as a qualification by QLFS respondents.
Care workers	Organisation-level licensing scheme	Care Standards Act 2000. Enforced from April 2005	Quota for 50%+ in each care home to have NVQ Level 2	Positive.	Positive.	No effect.	No effect.	Positive.	Indications of substantial anticipation effect.
Social care managers	From certification to licensing	Care Standards Act 2000. Enforced from April 2005	NVQ Level 4	No effect (but see comments).	No effect.	No effect (but see comments).	No effect.	No effect.	Indications of substantial anticipation effect.
Childcare workers	From certification to registration/ licensing (dependent upon role)	Childcare Act 2006. Enforced from March 2007.	None/ NVQ Level 2-3 (dependent upon role)	Positive (but see comments).	No effect.	No effect.	Negative.	No effect.	Upskilling trend apparent before licensing regime.
Automotive technicians	From unregulated to accreditation	June 2006.	NVQ Level 2/ relevant experience, plus practical test	No effect.	No effect.	No effect.	No effect (but see comments).	No effect.	Small sample limits analysis of wages.

7 Summary and conclusions

7.1 Introduction

This report uses the term 'occupational regulation' as a broad heading for a set of mechanisms – namely licensing, registration, certification and accreditation - through which minimum skill standards are applied within occupations. Such mechanisms provide incentives for workers and employers to invest in skills by establishing a framework of rewards which are contingent upon successful attainment of a specified skill level. The use of occupational regulation as a mechanism for increasing the demand for, and supply of, skills was considered – alongside other measures such as training levies – as part of the UK Commission's recent Review of Employers Collective Measures (Stanfield *et al.*, 2009).[61] However, that Review acknowledged that the general topic of occupational regulation remains severely under researched in the UK. It went on to recommend that a further, more detailed investigation of the issue should be carried out. This report presents the findings from that investigation.

The overall aims of the research were to:

- map the current pattern of occupational regulation in the UK;
- review the theory regarding the operation and impact of occupational regulation;
- examine the existing evidence on the impacts of occupational regulation in the UK and abroad;
- provide initial estimates of the impact of occupational regulation on labour market outcomes such as skill levels, wages and employment in the UK.

In so doing, it was expected that the research would inform the development of policy on the specific issue of skills, but would also aid the development of labour market policy more generally.

7.2 Theoretical perspectives on occupational regulation

Much of the existing theory on the development and impact of occupational regulation is focused on occupational licensing. This is the strictest form of occupational regulation and refers to situations in which it is unlawful to carry out a specified range of activities for pay without first having obtained a licence which confirms that the license holder meets prescribed standards of competence.

[61] The Review focused mainly on one form of occupational regulation, namely occupational licensing.

A simple theory of licensing indicates that the imposition of a universal, skills based entry requirement through licensing can be expected to raise average skill levels in the occupation, since low quality workers who cannot meet the new entry requirement are forced out whilst other low quality workers must engage in job related training in order to increase their human capital to the new minimum standard. If the stock of human capital in the occupation rises because of the new entry requirement, then one may also expect the quality of the product or service to increase and thus for wages to rise, as long as consumers are willing to reward the associated increase in product/service quality by paying higher prices. Yet, if prices and wages are free to respond to changes in supply, then any restriction of the number of workers in the occupation may also drive prices upwards and allow wages to rise. Thus wages may increase as a result of human capital effects or monopoly effects. Employment levels within the occupation – and the availability of the associated product or service to consumers – may fall in the short term, as low quality workers who cannot meet the new minimum standard are barred from engaging in the now regulated activity. In the medium to long term, however, any rise in average wages in the occupation may attract higher quality workers who now see the possibility of a return on their human capital investments. This could increase average skill levels further, whilst also depressing any negative employment effect.

More complex theories provide insights into the detailed operation and effects of licensing, however, which further illuminate the possible effects. First, it is clear that the incentive for upskilling to meet the new skill standard is likely to be weak if incumbents are grandfathered into the new system or if workers can move to alternative (unregulated) occupations with little loss of income.[62] The propensity to engage in further upskilling once licensed will depend upon the usual market mechanisms, unless the licensing system intervenes by providing explicit requirements for continued professional development. The incentives for workers and firms to invest in human capital before and after entry to the occupation will thus vary on a case by case basis.

Second, the likely availability of monopoly rents provides incentives for individuals and firms to invest in newly regulated occupations. However, in the short term at least, this can result in higher consumer prices for the products or services provided by that occupation. Whether these persist depends, in part, on consumers' preferences for the good or service, and whether they can substitute away from that good or service to similar alternatives. It also depends upon how the labour market responds to the new regulation. An important factor here is the responsiveness of labour supply to the regulation and the degree to which entry to the newly regulated occupation is truly limited.

[62] The incentive is also likely to be weak if enforcement is ineffective, as would be the case if the agency which issues licences does not check applicants' credentials or if the market is not regularly purged of unlicensed operators.

Indeed, if monopoly rents are available and there are also entry opportunities, workers and firms may migrate away from other activities towards the regulated occupation and so the total number of providers of the good or service in the regulated occupation may ultimately rise.

At the same time, it is important to recognise that there is also a 'political' element to occupational regulation since those with a vested interest in an occupation being regulated may use their political capital to create monopoly rents through regulation. This is most likely in cases where the members of the occupation play a pivotal role in determining entry standards. Vested interests may manifest themselves, for example, in unnecessarily restrictive skill demands to enter the occupation.

It is also important to recognise the potential for wider labour market adjustments. In the initial stages of occupational regulation, and in the absence of constraints, the labour market will adjust to the new skill standards set for the occupation. This adjustment may involve unemployment for workers who cannot meet the skill standard and who cannot find alternative employment. If their numbers are sufficient, their unemployment may drive down wages in the wider labour market and, if they enter particular alternative occupations, this may drive down wages in those particular jobs due to a supply shock. Consequently, there are potentially important spillover effects in the labour market, at least in the short term.

The potential product market effects also need to be recognised. If occupational regulation limits the opportunities for workers and firms to produce low quality goods/services, it is likely to push up the average quality of what is produced in the regulated occupation. Whilst quality standardisation may be prized, low income consumers may find the costs charged for the higher standard good/service prohibitive and may therefore be forced to seek substitute services. If they are unable to find substitutes they may rely on lower quality services provided by illegal or unethical providers or choose not to consume at all. In these circumstances overall welfare among those previously consuming the unregulated goods/services may fall.

Finally, it is not simply whether an occupation is regulated or not that may affect labour market and product market outcomes, but also the nature of that regulation. For example, whilst grandfathering rights can limit the potential extent of upskilling they can also limit unemployment effects among incumbents (similarly, 'sunset clauses' can be used to remove licensing if regulators feel that regulation has served its purpose in improving standards of operation in the occupation[63]). In addition, periodic reviews of the minimum

[63] Although in practice such clauses are rarely imposed. Furthermore, it is unusual for an occupation, which is subject to licensing, to move down the scale of occupational regulation or, indeed, become unregulated.

standards required of new entrants can be undertaken to ensure that any standards remain fit for purpose.

Less restrictive forms of regulation such as certification and accreditation offer the possibility of ensuring quality for consumers and of providing practitioners with higher incomes and labour market status. However, they have the disadvantage of providing weaker incentives for upskilling since, in the absence of a universal entry barrier, the strength of any incentives for human capital investments will ultimately depend upon the degree of demand for certified/accredited workers in the product market.

The theorised effects of occupational regulation are thus complex and their practical realisations, in particular labour and product markets, depend upon their interaction with a range of other factors including: price structures in product and labour markets; the existing stock of human capital; political processes governing the regulation of occupations; and the effects of other labour market institutions. Empirical studies are therefore critical in understanding the effects of occupational regulation under different scenarios.

7.3 Existing evidence

Although many studies have been conducted into occupational licensing in the United States, there is a paucity of evidence on the prevalence, operation and impact of occupational regulations in most EU countries, including the UK. Nonetheless, the available evidence suggests that licensing is less common in the UK than it is in the US. The overall conclusions from the US studies on the impact of licensing are that, in general, occupational licensing increases the wage of licensed workers, reduces employment growth and raises the price of goods or services but without any overall improvements in the quality of service or product offered.

The magnitude of the effects vary, however. For instance, US research suggests that those licensed occupations, which benefit most in terms of wages, have certain characteristics, such as dealing directly with customers or patients or working independently of other licensed occupations (e.g. doctors, dentists and lawyers). But there is very limited evidence from the US on the impact on skill levels or the propensity to engage in job related training.

The available evidence on the operation of occupational regulation within countries such as Germany, France and Italy is extremely limited. This makes it very difficult to make comparative assessments of the efficacy and impact of licensing in different national contexts within Europe. However, wage premia do seem lower in some EU countries,

such as Germany, than they are in the US. Post entry controls on the level of professionals' fees and, by implication, earnings have been offered as one potential explanation. This serves to indicate the importance of the broader regulatory framework applying to labour and product markets (particularly competition law) in shaping the effects of occupational licensing.

The position of the UK, in relation to other countries in the EU in respect of its approach to occupational regulation, is not easy to discern. From the available evidence it appears that the UK is less restrictive than many EU countries in its approach to regulating some professions, but that it is more restrictive than many in its approach to regulating lower skilled occupations. However, in contrast to evidence from counterparts within the EU, existing research does indicate that licensing is associated with a wage premium in the UK and that this is higher for the more skilled and better paid occupations. Furthermore, firm evidence on the employment effects of licensing is currently missing, as is evidence on the impact of regulation on product markets.

Nonetheless, within the UK, there is some evidence in the research literature that the training requirements recommended or imposed in lower skilled occupations have had some effect in increasing the level of training and qualifications (e.g. among care workers). In other cases, however, (e.g. the introduction of licensing for private security guards) the existing evidence suggests that the new skill standards have been too low (or the barriers to access them have been too high) to result in any substantial up skilling of the workforce in question.

7.4 Mapping occupational regulation in the UK

In order to address the absence of any comprehensive information on the prevalence or nature of occupational regulation in the UK, we draw up a map of occupational regulation in the UK. The map has been compiled at SOC(2000) Unit Group level and classifies the type of occupational regulation that applies within each Unit Group, as well as providing a range of details about the characteristics and enforcement of these regulations. Among the 353 Unit Groups in the SOC(2000) Classification, some 82 contain jobs that require licences to practice. A further 19 contain jobs for which there is a state based certification scheme, whilst 20 contain jobs that are subject to registration requirements. A further 67 Unit Groups contain jobs for which there is no state based regulation but for which there exists a recognised, non-governmental accreditation scheme. This leaves 165 Unit Groups that are classified as being 'unregulated'.

The database enables estimates of the prevalence of each form of occupational regulation to be compiled and also enables estimates of the impact of occupational regulation to be derived.

7.5 The prevalence of occupational regulation in the UK

Estimates of the prevalence of occupational regulation are derived using data from the UK's Quarterly Labour Force Survey (QLFS). By matching the mapping spreadsheet to the QLFS one is able to classify each job in the economy according to the regulatory characteristics of the Unit Group to which it belongs. One can then obtain an estimate of the percentage of all jobs that are accounted for by Unit Groups requiring licences to practice, for example. The partial coverage of some Unit Groups means that one obtains upper and lower bound estimates of the prevalence of regulation.

The upper bound estimates indicate that: up to 31 per cent of all jobs require licences to practice; up to three per cent have the option of state certification; up to six per cent require registration; and up to 19 per cent have the option of accreditation. The lower bound estimates indicate that: at least 14 per cent of all jobs require licences to practice; at least three per cent have the option of state certification; at least two per cent require registration; and at least 10 per cent have the option of accreditation. These estimates imply that the overall percentage of jobs that are covered by state based regulation of some form (whether licensing, certification or registration) lies between 40 per cent and 19 per cent. The percentage of jobs that are 'unregulated' lies between 40 per cent and 72 per cent.

Those Unit Groups which contribute most to the range of uncertainty are ones in which only a minority of the jobs are likely to be subject to the regulation. Accordingly, we judge that the true incidence of licensing is closer to 14 per cent than 31 per cent and that the true incidence of accreditation is closer to 10 per cent than 19 per cent. The percentage of unregulated jobs is thus much closer to 72 per cent than 40 per cent.

Based on the lower bound estimates, we find that the percentage of jobs subject to licensing requirements has risen from 12 per cent in 2001 to 14 per cent in 2010, whilst the percentage of unregulated jobs has fallen from 77 per cent to 72 per cent. Around half of the two percentage point growth in licensing since 2001 on this measure has come about because of the extension of licensing requirements to Unit Groups that were previously unlicensed; the remaining half can be attributed to a higher rate of employment growth among licensed occupations than among non-licensed occupations over the past decade.

Professional occupations are the most likely to be regulated, and the most likely to be subject to licensing. They are followed by Process, plant and machine operatives – a group which includes taxi drivers, HGV drivers and others requiring transportation licences. A majority of jobs in each of these Major Groups is subject to some form of regulation. In contrast, only a small minority of jobs are estimated to be regulated (in any form) within those Major Groups which comprise of Sales occupations, Skilled trades, Personal service occupations and Elementary occupations.

Turning to demographic characteristics, regulated jobs are more likely to be held by men than by women, with the certification group very strongly biased towards men (87 per cent of job holders in this group are male). Those in the licensing and accreditation groups tend to be older, on average, than other groups, which may be related to the time investment that is sometimes needed in order to gain the qualifications or work experience that is required under a licence to practice or an accreditation. Those in the licensing group are also less likely to be white than the average, but are a little more likely to be disabled than those in the other groups.

7.6 The impact of occupational regulation on qualification levels, training and wages in the UK

In order to provide new evidence on the labour market outcomes of occupational regulation in the UK, new analysis was undertaken which compared qualification levels, training receipt and wages among groups of employees who are subject to different forms of occupational regulation (including those in occupations which are unregulated). The analysis was based on data from the Quarterly Labour Force Survey; a large, quarterly survey of households, conducted by the Office for National Statistics (ONS).

Cross-sectional analysis was used to examine the extent to which any raw differences in wage levels, qualifications and the take up of job related training between workers in regulated and unregulated occupations persist after controlling for demographic characteristics and other job characteristics. Such analyses help us to gain a better understanding of the nature of regulated jobs and how they differ (in cross-section) from unregulated jobs. In summary, the raw differences in wages and so on between regulated and unregulated jobs were not always explained away by other observable worker characteristics. In particular, within SOC(2000) Major Groups 2 (Professional occupations) and 3 (Associate Professional and Technical occupations), qualification levels, job related training and wages were found to be higher among workers in Unit Groups that are subject to licensing than among workers in unregulated Unit Groups. This was in line with expectations and the limited existing evidence for the UK. However, in most other Major Groups there were instances where licensing was associated with

lower levels of qualifications, training and wages. This suggests that there are unobservable factors at work which we were unable to account for in this cross-sectional framework with the data available from the QLFS. Such unobservable factors would confound any attempts to identify a causal effect of occupational regulation through cross-sectional analysis. Specifically, occupational regulation is not randomly assigned. Instead, there are often particular reasons why one occupation is subject to regulation and another occupation is not. In such cases, it is difficult for cross-sectional analyses to account for any consequent biases.

A difference-in-differences (DiD) approach was employed in an attempt to identify the causal relationship between occupational regulation and labour market outcomes. In the absence of the random assignment of occupational regulation, the extension of occupational regulation to specific occupations over the period 2001-2010 was used as a form of 'natural experiment'. The analysis examined the wage differential (say) between the workers in a soon to be regulated occupation (the treatment group) and the workers in similar unregulated occupation (the comparison group). It then examined whether the magnitude of that differential changes after the treatment group becomes regulated. By assuming common trends for the treatment and control groups in the absence of the intervention (i.e. that the pre-treatment differential would have been maintained if the treatment had not occurred), the DiD methodology aims to provide a robust estimate of the causal impact of regulation.

The analysis focused on five occupations which saw either the introduction of regulation or a change in the type of regulation over the period 2001-2010, namely:

- Private security guards, who saw the introduction of a licensing system in April 2003;
- Social care managers, who switched from certification to licensing in April 2005;
- Care workers, a quota of whom (at least 50% in each residential care home) were required after April 2005 to hold an appropriate NVQ in order for the home to meet a set of mandatory National Minimum Standards for care homes;
- Childcare workers, who switched from certification to licensing in March 2007;
- Automotive technicians, who saw the introduction of an accreditation scheme in June 2006.

The analysis identified some effects which could plausibly be attributed to the introduction of occupational regulation. These included a rise in wages among security guards following the introduction of a licensing system in 2003 and a rise in qualification levels, and job related training, among care workers as a result of the introduction of a set of National Minimum Standards for care homes in 2005. Considerable anticipation effects

were apparent in respect of the latter group, however, as they were in respect of care managers, who were covered by provisions which also had their origins in legislation passed some five years earlier.

Elsewhere, in the case of childcare workers and automotive technicians, we found no evidence that the introduction of occupational regulation had affected qualification levels, the take up of job related training or the level of wages. This may be because the regulations were somewhat weaker in these instances, placing qualifications requirements only on a minority of workers (in the case of childcare) or comprising only of a voluntary scheme (in the case of vehicle repairers). It is difficult to make generalisations from these few cases, but the evidence provided by the DiD analysis does suggest, quite plausibly, that the effects of occupational regulation can be expected to be stronger when the entry requirements are either higher or are more extensively applied. An examination of further cases would enable this proposition to be placed on a firmer footing, although data constraints necessarily limit the possibilities.

7.7 Implications for policy

Forms of occupational regulation, such as licensing, certification and accreditation, clearly have the potential to raise average skill levels in an occupation. They do so by providing new incentives for workers or firms to invest in occupation specific human capital. The incentives are clearly strongest – and more equally felt by both workers and firms – in the case of licensing.

The limited pre-existing evidence on the impact of occupational regulation in the UK indicated that such upskilling has occurred in some specific cases, and our analysis found further empirical support for this. However, our analysis also supported the notion that the effects on skill levels can also sometimes be limited. We find no widespread and consistent effects on skill levels. The effects appear to be heavily contingent upon the prevailing circumstances within a particular occupation and its wider labour and product market.

At the heart of any policy on whether or not to regulate an occupation is a trade off between the potential benefits of occupational regulation and its potential costs. Those benefits can include a more highly skilled labour force, at least in the regulated sector, improvements in quality of goods or services provided in the regulated sector, and welfare benefits for the regulated sector in terms of wages and profits.

The potential downsides include possible negative spillovers into the unregulated sector of the labour market, such as the depression of wages in adjacent labour markets due to

labour supply shocks, and a diminution in the number of providers. With these labour market effects come potential costs for consumers in terms of higher prices and thus difficulties in accessing services at affordable prices. Of course, if labour markets are sufficiently flexible, the downside of regulation may be temporary because, once markets have adjusted, a new equilibrium may be reached in which higher skilled workers offer higher quality goods and services which customers see as 'value for money' because they recognise that they are paying quality adjusted higher prices. On the other hand, regulation can drive a wedge into the labour market, resulting in segmentation between the regulated and unregulated sectors, creating a 'two-tier' system which may not be welfare enhancing in sum.

Although our research has found some evidence of wage increases among regulated occupations, the results were not consistent across all of the occupations that we have studied. Furthermore, we found no evidence of negative effects on employment. The potential downsides of occupational regulation were thus not prominent in our findings. However, we were able to look at employment effects for only a small number of occupations and we were unable to look at price/quality effects. The evidence base on these issues thus remains relatively limited for the UK.

If policymakers or employers believe there is a strong prima facie case for regulation of a particular occupation, the other issue is how to regulate that occupation. This raises questions about the design of the regulation (e.g. whether any skill standard should be mandatory or voluntary; at what level the skill standard should be set; whether the regulatory scheme should be aimed at employers or individuals; whether the renewal of licences should be conditional upon evidence of further training etc.). It also raises questions about its governance (e.g. who is empowered to regulate; how and when the scheme should be monitored for its fitness for purpose etc.). These major design factors can be crucial in determining the actual effects of regulation.

Two policy considerations emerge from the discussion above. The first is whether there is a prima facie case for regulating a particular occupation. The second consideration is how to go about creating, enforcing and monitoring the regulation. The latter can be just as important as the former in determining ultimate labour market and product market outcomes.

There may be analogies with the policy making considerations which surrounded the introduction and enforcement of the statutory national minimum wage. The costs and benefits of the regulation of prices for labour were central in that instance, as were alternative models for setting a wage and enforcing it. If anything, occupational regulation is liable to be more complicated since it must cover a variety of different policy

instruments relating to different occupations. The design of such policies therefore requires extensive knowledge of labour market and product markets, and of the incentives and constraints which apply to the various actors within them. The analysis conducted in this research project has identified considerable heterogeneity, both in the design of occupational regulations within the UK and in the apparent impact of regulation across different occupations. This indicates that the detailed outcomes of regulation – and thus the case for regulating – can only be determined on a case by case basis.

7.8 Avenues for further research

The work undertaken in the project suggests a number of avenues for further research to augment the existing evidence base, which remains limited for the UK in spite of the new analysis discussed above.

1. It would be beneficial to extend the Map of Occupational Regulation so that the incidence of voluntary accreditation schemes is mapped in a more comprehensive manner. At present, accreditation schemes have only been mapped in a systematic fashion within Unit Groups that are not subject to any of the three forms of state based regulation; the Map of Occupational Regulation thus provides a partial picture of the prevalence of accreditation. If the availability of accreditation schemes was also to be mapped within Unit Groups that are subject to licensing, certification or registration, this would allow for the production of more complete estimates of the availability of accreditation schemes within the UK. It would thus add to the existing knowledge on the prevalence and nature of different forms of occupational regulation. It would also enable accreditation to be handled separately, alongside state based forms of regulation, in any statistical analysis of the impact of regulation, acknowledging the fact that accreditation and state based forms of regulation are not mutually exclusive.
2. Fielding survey questions on the incidence of different forms of occupational regulation has the potential to address some of the other limitations in the SOC based Map of Occupational Regulation. Such an approach offers the potential to obtain more precise estimates of: (a) the percentages of jobs covered by different forms of regulation; and (b) the percentages of workers who have been successful in their applications under the various regulatory schemes. This would not only enable one to be more definitive about the coverage of different forms of regulation, it would also have benefits when attempting to estimate the effects of licensing on wages and other outcomes since, if some regulated jobs are classified as unregulated (or vice versa), this is likely to bias any estimates of the effects of regulation.

3. There is scope to extend the difference-in-differences analysis to a greater selection of occupations. However, there is also scope to build on the analysis which has already been done by: (i) exploiting cross country variation within the UK in the timing of the introduction of some recent licensing requirements (e.g. for security guards) so as to provide closely matched counterfactuals; (ii) extending the period of observation back into the 1990s so as to explore anticipation effects. Both would assist with the identification of the causal impact of regulation.
4. There is also scope to extend the analysis of skills impact by matching the Map of Occupational Regulation to other datasets which provide information on workers' skill attainments. One obvious candidate is the UK Skills Survey. This would provide direct measures of worker skill, in contrast to the measures of qualifications, job related training and skill deficiencies that have been analysed within the current project.
5. A feasibility study undertaken as part of the broader project indicated that it would be possible in some circumstances to conduct analysis of the impacts of occupational regulation on product quality and prices in the UK. Such research – which may be qualitative or quantitative – would address a clear gap in the available evidence for the UK by indicating the circumstances in which the introduction of occupational regulation can have positive or negative impacts on product markets. Such research could usefully examine the potential for post entry conduct regulations (such as price caps) to mitigate some of the potential negative effects of introducing skill related entry barriers.

Annex A: Options for Improving the Measurement of Occupational Regulation

A.1 Introduction

The SOC based classification described in Chapter Four of the Report has the notable advantage of enabling us to produce the first comprehensive and nationally representative estimates of the proportions of jobs which are subject to different types of occupational regulation in the UK. However, as discussed in Sections 4.4. and 5.2, there are two limitations to this approach.

Limitation 1: The problem of aggregation in SOC

There is first the potential for measurement error, if some types of jobs within the Unit Group are subject to mandatory licensing or registration requirements, whilst others are not, as is the case in Unit Group 6124 (Education assistants). In such cases, one cannot obtain a definitive estimate of the percentage of all jobs in the economy that are subject to such mandatory requirements. Equally, if some jobs in the Unit Group have the option of certification or accreditation but others do not, as is the case in Unit Group 1132 (Marketing and sales managers), it is not possible to obtain a definitive estimate of the percentage of all jobs to which the options of certification or accreditation are available. In these cases, one can obtain an upper bound estimate of prevalence (the maximum percentage of jobs that are regulated) by assuming that all jobs within partially regulated Unit Groups are subject to regulation; and one can obtain a lower bound estimate (the minimum percentage of jobs that are regulated) by assuming that none of the jobs in such Unit Groups are subject to regulation.

The range between these upper and lower bound estimates is small in the cases of certification and registration, but relatively large in the cases of licensing and accreditation (see Table 5.1) Consequently, the range between the upper and lower bound estimates of the percentage of jobs that are unregulated is considerable. We have used our knowledge of the types of jobs that are regulated in partially covered Unit Groups to judge that the true estimates of the prevalence of each type of regulation are closer to the lower bounds than to the upper bounds. However, the true estimates are themselves unknown.

Limitation 2: Classifying jobs not workers

The second limitation of the SOC based approach is that it is based on a classification of whether the particular type of job held by a worker is subject to regulation and so it does

not indicate the percentage of workers who have been awarded licences, been certified or accredited or who have registered to practice. It cannot account for non-compliance with mandatory licensing or registration requirements and it can give no estimate of the take up of certification or accreditation schemes. The SOC based approach can only provide estimates of the percentages of jobs that are subject to different forms of regulation; the numbers of workers who have successfully met the regulatory requirements is necessarily lower.

Given these limitations, it would clearly be preferable if one could obtain more precise estimates of: (a) the percentages of jobs covered by different forms of regulation; and (b) the percentages of workers who have been successful in their applications under the various regulatory schemes. This would not only enable one to be more definitive about the coverage of different forms of regulation, it would also have benefits when attempting to estimate the effects of licensing on wages and other outcomes. If some regulated jobs are classified as unregulated (or vice versa) this is likely to bias any estimates of the effects of regulation.[64]

No other means of classifying the regulatory status of jobs or workers has yet been attempted in the UK, other than the SOC based approach which we have adopted in this research report. However, the remainder of this Annex goes on to examine three possible alternatives.

A.2 Option 1: Weighting Unit Groups using administrative data

The first approach that is discussed here is to weight Unit Groups according to the percentage of jobs or workers within that Group which are thought to be subject to regulation. The upper bound estimates in Table 5.1, in the main body of the report, give partially covered groups a weight of 1, whilst the lower bound estimates given them a weight of zero. However, in some cases, it would be possible to devise a weight between 0 and 1 on the basis of administrative data.

For instance, if one was concerned to estimate the proportion of all jobs that were subject to licensing requirements, yet one had Unit Groups in which only some jobs were subject to licensure, it would theoretically be possible to use administrative data on the number of issued licences to estimate the actual percentage of jobs in that Unit Group which were covered by the regulations (subject to an assumption of full compliance). This estimate could be used to compute a weight for all jobs in that Unit Group. Taking Unit Group 6124

[64] Specifically, if the measurement error in the regulation status variable is random (i.e. uncorrelated with the outcome of interest, say the wage premium from occupational licensing), then the estimated effect of regulation will be biased downwards towards zero. If the measurement error is correlated with the outcome, however, then the estimated effect of regulation could be biased upwards or downwards, depending on which types of workers were more or less likely to be mis-classified.

(Education assistants) as an example, only those educational assistant jobs which involve contact with children under five years of age are subject to licensing. Suppose that the QLFS classifies N_1 jobs to this Unit Group. If the regulatory body's records indicated that current licences were held by N_2 education assistants, one would estimate that $(N_2/N_1)*100$ per cent of all jobs in this Unit Group were subject to licensing. Applying a weight of (N_2/N_1) to each job in Unit Group 6124, in the QLFS, would then produce a more accurate overall estimate of the prevalence of licensing which took account of the partial coverage of licensure in this Unit Group. The approach could be repeated for all 35 Unit Groups in which only some job titles are covered by mandatory requirements.

This approach would not be able to improve the accuracy of any estimates of the percentages of jobs to which the options of certification or accreditation were available, since administrative data could not indicate which jobs in a partially covered Unit Group were actually eligible. But the administrative data could indicate the *number* of workers who had been successfully certified or accredited. Following the approach outlined above, one could then use the QLFS to estimate the *percentage* of workers in any Unit Group (and thus in the whole economy) that are certified or accredited. For instance, the Register of Exercise Professionals notes that it has around 30,000 individuals on its register. If the QLFS were to indicate that there were N_3 exercise professionals in employment, one could estimate that $(N_3/30{,}000)*100$ per cent of all exercise professionals are currently certified. Applying a weight of $(N_3/33{,}000)$ to each job in Unit Group 3443 (Fitness instructors) in the QLFS, and repeating this for other Unit Groups subject to certification or accreditation, would then enable one to produce an aggregate estimate of the percentage of all workers that are certified or accredited.

This approach would address the aggregation problem inherent in the SOC based classification of licensing and registration, and it would provide worker based estimates of the prevalence of certifications and accreditations. However, the problems with this approach are numerous. First, it relies on available data from each regulatory body; those operating state backed schemes (licensing, registration or certification) may be persuaded to provide it, but those operating accreditation schemes are unlikely to feel any obligation to do so. Second the data must be of good quality with no double counting, yet this will not always be the case: the Security Industry Authority (SIA) can issue more than one licence to a single individual if that person's work is multi faceted and the SIA knows only of the numbers of licences issued, not the number of licensed individuals. Third, in order to be comparable with the employment data extracted from the QLFS, the data on regulated persons should include only those currently in employment in the specified occupation – it should exclude those who are no longer practising in the UK (either because they have retired, died or emigrated) and should exclude those who are

currently unemployed. There are unlikely to be any enforcement bodies who can supply such information, as none are them are likely to have the means to exclude the unemployed and they are only likely to remove retirees and so on from their databases if those persons cease to pay any annual membership fee that becomes due. Finally, it is clear that this approach is also highly labour intensive, requiring significant effort to be expended each time it is used.

A.3 Option 2: More detailed coding of job titles

A second possible approach is to engage in a more detailed coding of job titles that goes beyond the SOC Unit Group level. Any survey, such as the QLFS, which permits occupation to be coded to SOC Unit Group level must collect a number of items of data, including a verbatim description of the respondent's job title and the tasks or activities which they engage in as part of their job. Computer assisted structured coding tools, such as CASCOT, are then used by coders to assign a Unit Group occupation code.[65] However, the verbatim job titles and descriptions could equally be used to code at a finer degree of disaggregation. This approach would, for example, enable one to separately identify toymakers (or wigmakers) from among those jobs coded to Unit Group 5499 (Handcraft occupations not elsewhere specified). Toymakers and wigmakers are the only jobs within Unit Group 5499 that have recognised accreditation schemes available to them.

Such fine coding would only be necessary in the 73 Unit Groups where only some job titles were covered by regulation (see Table 4.3). If it could be undertaken successfully, it could be used in conjunction with the information on protected and regulated job titles in the 'Map of Occupational Regulation' to produce more precise estimates of the percentage of all jobs that are subject to regulation. It would thereby address the aggregation problem inherent in the SOC based approach. The reduction in measurement error at the level of the individual job would also improve any estimates of the effects of regulation (e.g. on wages). However, the approach would require one to have access to the verbatim responses to the occupation questions in a large scale survey such as the QLFS or Understanding Society; this may present challenges from a data protection point of view.[66] The other principle disadvantage of this approach is that it would necessarily be labour intensive, as structured coding tools are not typically set up in such a way as to enable coding beyond Unit Group level.

[65] Such tools assist the coder in their efforts to assign a numeric code to a verbatim text string by suggesting feasible codes based on the appearance of key words within the verbatim text string. They therefore make the process of coding quicker and more reliable. For further details on CASCOT, see: http://www2.warwick.ac.uk/fac/soc/ier/publications/software/cascot/

[66] If the approach were to be implemented in a small-scale survey, then the benefits of fine coding could be minimal because of the small numbers of individuals likely to be classified to each of the 73 Unit Groups of interest. A small sample would also necessarily imply broad confidence intervals around any resultant estimates.

A.4 Option 3: Fielding new survey questions

The third possible approach considered here is to field new survey questions which seek to establish from individual respondents whether their jobs are subject to regulation and whether they are themselves licensed/registered/certified/accredited. This approach has been applied twice with success in the United States by one member of the project team in order to identify individuals whose jobs require licences to practice.

In the first application in 2006 (discussed in Kleiner and Krueger, 2010), a single question was added to a national survey conducted by the Gallup Organisation. The survey asked: "Does your job require a licence by a federal, state or local government agency?". The survey also collected information on respondents' demographic characteristics, industry, occupation, education and earnings. The survey results could therefore be used not only to estimate the percentage of jobs requiring licences to practice, but also to estimate the wage premium enjoyed by licensed workers over non-licensed workers.

In the second application in 2008 (discussed in Kleiner and Krueger, 2009), a series of questions were added to a national survey administered by Westat on behalf of Princeton University. Again, the survey collected information on respondents' employer, job activities and demographic characteristics. The questions on occupational licensing focused on whether individual workers were themselves licensed and covered the following:

- Whether the respondent has a licence or certification to do their job.
- If the respondent does have a licence/certification.
- Which type of agency issued the licence or certificate.
- Whether someone who does not have a licence or certificate would legally be allowed to do the job.
- Whether everyone who does the job is eventually required to have a licence or certification.
- What type of qualifications are required in order to become licensed or certified.
- Whether a test of competence was required in order to become licensed or certified.
- Whether a fee had to be paid to become licensed or certified.
- Whether continuing professional development has to be undertaken, or a test passed, in order to renew the licence or certification.

If one could field similar questions in a large scale survey in the UK, it would enable one to reduce the measurement error in the SOC based estimates of the percentage of all

jobs which are subject to regulation. It would also enable one to obtain estimates of the percentage of all job holders who hold licences/certifications/accreditations.

Such questions could not easily be placed on the QLFS without high level support from the various stakeholders to that survey. However, it would be possible to administer them in the first instance on one of the higher quality omnibus surveys (i.e. ONS Opinions or the NatCen Omnibus). This would provide a large scale field test and would also provide some survey responses which could be used for analysis purposes. If that were to prove successful, the UK Commission would then be in a robust position from which to lobby for the inclusion of the questions on a large scale official survey such as the QLFS. There are a number of practical considerations, however.

First, it is necessary to be able to draft questions which accurately measure the requirement for, or possession of, licences/registrations/certifications/accreditations. The questions fielded by Kleiner and Krueger in the United States could provide one starting point; these were tested on focus groups before they were administered in the field. However, they would need to be adapted to the UK context, not least because of the inconsistent use of terminology across regulated occupations in the UK. “Licensing” would be the term in common usage among security guards, publicans, taxi drivers and HGV drivers, but it would be unfamiliar to many health professionals, who would typically refer to the process of “applying to be registered” with the General Medical Council or Health Professions Council. Similarly, certification is referred to as “registration” by the regulatory bodies governing architects, engineers and fitness professionals. In either case, these forms of regulation are conceptually distinct from the registration of names and addresses that is required of estate agents or financial advisers.

Possible new questions to identify instances of licensing might be as follows:

Question: Would someone applying for your job today require a qualification?

- ✓ If **YES**: Which qualification would that be?
- ✓ If **YES**: Would someone without that qualification legally be allowed to do the job, if an employer were to appoint them to the post?
  - × If **NO**: Would their qualifications need to be formally vetted by a professional body, an industry association or some regulatory body?
    - ✓ If **YES**: Which body would that be?

Questions to identify instances of certification and accreditation would then need to account for the non-mandatory aspect of those regulations. If the new questions were not able to accurately distinguish between different forms of regulation, it is possible that they may simply introduce new measurement errors.[67] Considerable resources would therefore need to be devoted to question testing, although such question testing can be undertaken as part of the process of adding questions to an omnibus survey.

Second, one must ensure that any reductions in measurement error that are achieved from well tested questions are not counter balanced by increases in other forms of survey error when moving away from the QLFS. The ONS Opinions Survey and the NatCen Omnibus are the only omnibus surveys based on random probability designs and, consequently, are the only ones that can generate estimates with known statistical properties; other omnibus surveys should therefore be disregarded. The response rates are reasonable (around 60 per cent in the case of the NatCen Omnibus) and the achieved samples are weighted back to population characteristics. However, the ONS and NatCen Omnibus surveys yield achieved samples of only 1,500-2,000 adults in each wave, thereby providing achieved samples of only 800-1,000 workers. Questions would therefore need to be fielded over multiple waves in order to obtain the kinds of sample sizes (and narrow confidence intervals) for sub groups of workers (e.g. more or less

[67] Kleiner and Krueger (2009, p.9) report the results of post fieldwork validation checks on respondents' answers to their 2008 survey question on licensing. These checks, which sought to identify whether individuals who reported that they held licences, could be found on administrative databases listing licence holders, suggested that respondents may have given incorrect answers in up to one-third of cases, although at least some of these cases may have been due to poor record keeping by enforcement bodies.

educated employees) that are available in the QLFS. The ONS Opinions Survey has an advantage over the NatCen Omnibus in this respect as it is fielded on a regular monthly basis, whereas the frequency of the Natcen Omnibus is less predictable.

Third, one must ensure that the new survey questions on occupational regulation are accompanied by a full range of complementary questions describing the demographic characteristics of the respondent and the nature of their job and employer. Many of the standard classifications (such as ethnicity, disability, education) are included as a matter of course on the ONS and NatCen Omnibus surveys, and are provided free of charge with the data from the funder's own questions. However, detailed occupation coding is not undertaken on the ONS Opinions Survey, whilst detailed industry coding is not undertaken on the NatCen Omnibus. These coding exercises would need to be paid for in addition.[68] Moreover, if one wanted to use the survey data to estimate the effects of regulation, one would also require accompanying questions on earnings, receipt of training and so on. Such questions are not asked as a matter of course. They might be added to an omnibus questionnaire, but their addition would necessarily add to the cost of the exercise.[69]

A.5 Conclusions

The SOC based approach has enabled us to produce some estimates of the prevalence of occupational regulation across all SOC Major Groups in the UK, where previously there were none. However, the approach has two key limitations. First, it provides estimates only of the percentage of jobs that are subject to regulation, and does not provide estimates of the percentage of workers who have successfully applied for licences/registration/certification/accreditation. Second, it provides only upper and lower bound estimates of prevalence since it cannot adequately deal with Unit Groups in which only some jobs are subject to regulation.

In this Annex, we have discussed three alternative means of trying to improve on the SOC based approach. One is to weight each Unit Group by the percentage of jobs that are estimated to be regulated. However, this approach requires the collation of a great deal of good quality data from enforcement agencies. Whilst some enforcement bodies may be willing and able to provide such data, it is improbable that this will be so in all cases. The work involved in producing estimates under this approach is also

[68] Detailed occupation codes would be necessary as one means of validating respondents' answers. They could also be used to ensure that new classification errors are not introduced among groups where the regulatory status of the job is known for certain from the Map of Occupational Regulation.
[69] We do not provide any indication of cost here. However, indicative costs for fielding a set of questions on occupational regulation could be obtained from survey agencies.

considerable, and must be repeated each time that a new time point is required. Accordingly, we do not recommend this approach.

A second alternative is to code occupation at a greater level of detail than Unit Group. This requires access to the verbatim responses to the occupation questions in a large scale survey such as the QLFS or Understanding Society. Acquiring such access is unlikely to be easy and, again, the approach is labour intensive at each application. Accordingly, this approach is not attractive either.

The third approach that we have discussed is to field new questions in a survey of individuals. The questions require careful development but, once they have been refined, they could be valuable, road tested in a good quality Omnibus survey. They could be accompanied by questions on attitudes to regulation, if the extension of licensing was one policy option under consideration. One is likely to wish to field the questions over multiple waves in order to obtain reasonable sample sizes, and one would need to ask additional questions over and above the questions on regulation status in order to obtain a good set of complementary data items (detailed SOC coding would be one minimum requirement).

However, if such data could be collected it would provide a valuable addition to the current evidence base on occupational regulation in the UK, providing more precise estimates of the prevalence of regulation, of the characteristics of regulated workers and of the impact of regulation on labour market outcomes, such as earnings. The US is currently moving in this direction with prospective surveys to be carried out by the Bureau of Labor Statistics. We would therefore recommend that further consideration be given to this option, if resources can be found.

Annex B: List of SOC(2000) Unit Groups experiencing a switch in regulation status since 2001

SOC(2000) Unit Group	Title of Unit Group	Year of switch
From unregulated to accreditation:		
1134	Advertising and Public Relations Managers	2005
1226	Travel Agency Managers	2006
1232	Garage Managers and Proprietors	2010
1235	Recycling and Refuse Disposal Managers	2002
2112	Biological Scientists and Biochemists	2009
3449	Sports and Fitness Occupations NEC	2004
3531	Estimators, Valuers and Assessors	2010
3567	Occupational Hygienists and Safety Officers	2005
4212	Legal Secretaries	2005
5232	Vehicle Body Builders and Repairers	2006
5234	Vehicle Spray Painters	2006
5323	Painters and Decorators	2002
6212	Travel Agents	2006
6291	Undertakers and Mortuary Assistants	2002
8135	Tyre, Exhaust and Windscreen Fitters	2006
9225	Bar Staff	2005
From unregulated to certification:		
3443	Fitness Instructors	2002
8114	Chemical and Related Process Operatives	2009
8115	Rubber Process Operatives	2009
8116	Plastics Process Operatives	2009
8118	Electroplaters	2009
8119	Process Operatives NEC	2009
From certification to licensing:		
1184	Social Services Managers	2005
1185	Residential and Day Care Managers	2005
2212	Psychologists	2009
2442	Social Workers	2005
3231	Youth and Community Workers	2010
6121	Nursery Nurses	2008
6123	Playgroup leaders/Assistants	2008
From unregulated to licensing:		
1174	Security Managers	2003
6114	Houseparents and Residential Wardens	2009
6115	Care Assistants and Home Carers	2005
9241	Security Guards and Related Occupations	2003
9249	Elementary Security Occupations NEC	2008
From unregulated to registration:		
1225	Leisure and Sports Managers	2007
1239	Managers and Proprietors in Other Services NEC	2007
3544	Estate Agents and Auctioneers	2008
4123	Counter Clerks	2007
6122	Childminders and Related Occupations	2007
6124	Education Assistants	2007
6211	Sports and Leisure Assistants	2007
9226	Leisure and Theme Park Attendants	2007
9229	Elementary Personal Services Occupations NEC	2007

Annex C: The Prevalence of Occupational Regulation (upper bound)

This annex presents tables indicating the prevalence of occupational regulation in the UK using the *upper bound* measure discussed in Sections 5.2 and 5.3 of the main body of the report. These tables are the equivalent of Tables 5.5 to 5.10 in the main body of the report, which present estimates of the prevalence of occupational regulation using the *lower bound* measure. The tables below are numbered C.5 to C.10 to aid cross referencing.

Table C.5 Regulation status in 2010 (upper bound), by Employment status

Employment status	Licensing	Certif.	Regist.	Accred.	Unreg.	Total	Base
	Row %	Row %	Row %	Row %	Row %	Row %	*No.*
Employee	32	3	6	18	42	100	129,530
Self-employed	28	4	6	31	30	100	22,643
All	*31*	*3*	*6*	*19*	*40*	*100*	*152,173*

Base: All employee and self-employed jobs

Source: QLFS Jan-Sept 2010

Table C.6 Regulation status in 2010 (upper bound), by SOC(2000) Major Group

SOC(2000) Major Group	Licensing	Certif.	Regist.	Accred.	Unreg.	Total	Base
	Row %	Row %	Row %	Row %	Row %	Row %	*No.*
Managers and senior officials	20	0	10	24	46	100	23,241
Professionals	40	13	0	30	16	100	21,102
Assoc Prof and Technical	33	4	6	17	39	100	22,485
Admin and Secretarial	0	0	6	19	75	100	17,147
Skilled trades	28	0	0	47	25	100	15,771
Personal service	48	6	28	2	15	100	13,831
Sales and customer service	57	0	3	0	40	100	11,027
Process, plant and machine operatives	60	6	0	5	29	100	10,054
Elementary	20	0	0	13	67	100	17,533
All	*31*	*3*	*6*	*19*	*40*	*100*	*152,191*

Base: All employee and self-employed jobs

Source: QLFS Jan-Sept 2010

Table C.7 Regulation status in 2010 (upper bound), by Region of workplace

Government Office Region	Licensing	Certif.	Regist.	Accred.	Unreg.	Total	Base
	Row %	Row %	Row %	Row %	Row %	Row %	*No.*
North East	34	4	5	16	42	100	6,490
North West	34	3	5	18	40	100	17,535
Yorks and The Humber	33	4	5	18	40	100	13,625
East Midlands	34	4	5	17	41	100	11,066
West Midlands	32	3	5	18	42	100	12,963
East of England	30	4	5	21	39	100	13,608
London	26	3	9	23	39	100	17,255
South East	29	3	6	22	40	100	19,952
South West	30	4	6	19	41	100	13,559
Wales	36	3	5	17	39	100	6,624
Scotland	35	3	4	18	40	100	13,255
Northern Ireland	38	3	5	18	35	100	5,593
All	*31*	*3*	*6*	*19*	*40*	*100*	*151,525*

Base: All employee and self-employed jobs

Source: QLFS Jan-Sept 2010

Table C.8 Regulation status in 2010 (upper bound), by LSC area

LSC area	Licensing	Certif.	Regist.	Accred.	Unreg.	Total	Base
	Row %	Row %	Row %	Row %	Row %	Row %	*No.*
County Durham	31	5	3	17	44	100	2,878
Northumberland	34	3	5	20	38	100	2,152
Tees Valley	35	4	4	16	40	100	3,756
Tyne & Wear	31	3	5	17	43	100	6,697
Cheshire/ Warrington	31	4	5	22	39	100	6,065
Cumbria	35	5	3	19	38	100	3,297
Greater Manchester	33	3	5	18	40	100	14,953
Lancashire	34	4	5	18	40	100	8,882
Greater Merseyside	33	3	5	17	43	100	7,700
Humberside	35	5	4	16	40	100	5,598
North Yorkshire	35	3	5	17	40	100	5,129
South Yorkshire	33	3	5	17	41	100	7,607
West Yorkshire	30	3	6	20	41	100	13,861
Derbyshire	31	4	4	18	43	100	6,383
Leicestershire	31	3	5	19	42	100	6,151
Lincolnshire/ Rutland	37	4	4	16	39	100	4,781
Northampton-shire	31	3	6	19	41	100	4,837
Nottinghamshire	34	3	5	18	40	100	6,424
Birmingham & Solihull	33	3	6	18	40	100	6,034
Coventry & Warwickshire	28	4	5	19	43	100	5,192
Herefordshire & Worcestershire	32	4	5	19	39	100	4,758
Shropshire	37	3	4	18	38	100	2,792
Staffordshire	32	3	4	18	42	100	7,012
The Black Country	34	3	5	16	43	100	5,154
Bedfordshire and Luton	29	4	5	21	41	100	3,724
Cambridgeshire	29	4	5	23	39	100	5,153
Essex	29	4	8	20	40	100	9,859
Hertfordshire	24	3	7	25	40	100	6,842
Norfolk	33	3	6	17	41	100	5,149
Suffolk	30	4	4	21	41	100	4,836
Central London	25	2	10	24	39	100	6,917
East London	28	2	8	21	41	100	9,615

Continued on next page

Table C.8 continued

LSC area	Licensing	Certif.	Regist.	Accred.	Unreg.	Total	Base
	Row %	Row %	Row %	Row %	Row %	Row %	*No.*
North London	30	2	8	21	38	100	4,677
South London	27	3	8	25	37	100	7,123
West London	27	3	7	23	40	100	6,328
Berkshire	26	3	6	25	40	100	5,372
Sussex	30	3	7	21	39	100	9,477
Hampshire/ Isle of Wight/ Portsmouth/ Southampton	29	4	6	21	41	100	11,080
Kent/Medway	29	3	7	20	41	100	9,319
Oxon/Bucks/Milton Keynes	27	3	6	23	41	100	8,563
Surrey	27	3	8	24	37	100	6,769
West of England	30	4	5	20	41	100	6,771
Bournemouth/ Dorset/Poole	32	3	6	19	40	100	4,338
Devon & Cornwall	33	3	5	19	41	100	9,403
Gloucestershire	29	5	5	20	40	100	3,718
Somerset	32	4	5	19	41	100	3,330
Wiltshire & Swindon	27	4	5	20	43	100	4,601
All	*30*	*3*	*6*	*20*	*40*	*100*	*301,057*

Base: All employee and self-employed jobs in England

Source: QLFS Jan 2009 - Sept 2010

Table C.9 Regulation status in 2010 (upper bound), by Industry

SIC(2007) Section	Licensing	Certif.	Regist.	Accred.	Unreg.	Total	Base
	Row %	Row %	Row %	Row %	Row %	Row %	*No.*
A: Agriculture, forestry and fishing	43	0	0	15	40	100	2,012
B: Mining and quarrying	7	20	2	24	47	100	553
C: Manufacturing	14	11	1	19	55	100	14,903
D: Electricity, gas	10	16	2	24	48	100	896
E; Water supply, sewerage, waste	20	7	1	18	54	100	999
F: Construction	9	5	1	63	22	100	11,214
G: Wholesale, retail, repair of vehicles	51	0	1	10	37	100	20,645
H: Transport and storage	43	1	2	10	44	100	7,470
I: Accommodation and food services	46	0	1	17	36	100	7,459
J Information and communication	2	2	2	43	52	100	4,889
K: Financial and insurance activities	2	0	36	24	37	100	5,667
L: Real estate activities	5	0	12	19	63	100	1,467
M: Prof, scientific, technical activ.	12	10	4	37	37	100	9,526
N: Admin and support services	17	1	3	26	54	100	6,950
O: Public admin and defence	30	2	3	14	52	100	10,220
P: Education	40	1	16	7	37	100	17,223
Q: Health and social work	63	0	6	6	26	100	20,870
R: Arts, entertainment and recreation	14	4	6	18	57	100	4,132
S: Other service activities	8	21	8	17	46	100	3,957
All	*31*	*3*	*6*	*20*	*40*	*100*	*151,052*

Base: All employee and self-employed jobs

Source: QLFS Jan-Sept 2010

Table C.10 Regulation status in 2010 (upper bound), by Sector Skills Council

SIC(2007) Section	Licensing	Certif.	Regist.	Accred.	Unreg.	Total	Base
	Row %	Row %	Row %	Row %	Row %	Row %	*No.*
Asset Skills	4	0	6	12	78	100	3,737
Cogent	11	19	3	22	46	100	2,769
ConstructionSkills	4	10	1	63	23	100	10,793
Creative and Cultural Skills	5	1	1	20	74	100	1,907
E-skills UK	1	2	2	50	45	100	3,527
Energy and Utility Skills	15	12	1	22	50	100	1,903
Financial Services Skills Council	2	0	32	33	33	100	7,094
GoSkills	57	2	1	8	33	100	3,350
Government Skills	15	2	4	17	62	100	7,410
IMI	43	1	1	18	38	100	2,786
Improve Ltd	54	3	1	10	32	100	2,238
Lantra	33	2	0	29	36	100	3,613
Lifelong Learning UK	31	1	8	11	49	100	10,074
People 1st	41	0	4	20	35	100	8,499
Proskills UK	9	5	1	21	64	100	2,722
SEMTA	6	14	1	20	58	100	8,319
Skills for Care and Development	59	0	9	5	26	100	10,198
Skills for Health	66	0	4	6	24	100	11,463
Skills for Justice	63	0	0	7	29	100	3,005
Skills for Logistics	33	1	2	14	49	100	7,341
SkillsActive	25	8	1	18	48	100	2,715
Skillset	7	1	2	24	67	100	3,234
Skillsmart Retail	56	0	1	7	35	100	14,365
SummitSkills	28	6	1	35	30	100	2,425
Unclassified - no lead SSC	30	6	14	17	32	100	16,128
All	*31*	*3*	*6*	*20*	*40*	*100*	*151,615*

Base: All employee and self-employed jobs

Source: QLFS Jan-Sept 2010

Table C.11 Gender of job holder, by Regulation status of Unit Group in 2010 (upper bound)

Regulation status of Unit Group (upper bound)	Male	Female	Total	Base
	Row %	Row %	Row %	No.
Licensing	47	53	100	48,206
Certification	75	25	100	5,107
Registration	34	66	100	8,661
Accreditation	70	30	100	28,970
Unregulated	51	49	100	61,247
All	*53*	*47*	*100*	*152,191*

Base: All individuals in employee and self-employed jobs

Source: QLFS Jan-Sept 2010

Table C.12 Age of job holder, by Regulation status of Unit Group in 2010 (upper bound)

Regulation status of Unit Group (upper bound)	16-19	20-29	30-39	40-49	50-59	60+	Total	Base
	Row %	Row %	Row %	Row %	Row %	Row %	Row %	No.
Licensing	5	21	22	25	19	8	100	48,206
Certification	3	22	24	25	19	8	100	5,107
Registration	2	19	24	30	19	7	100	8,661
Accreditation	2	21	25	26	18	8	100	28,970
Unregulated	4	19	20	26	21	10	100	61,247
All	*4*	*20*	*22*	*26*	*20*	*8*	*100*	*152,191*

Base: All individuals in employee and self-employed jobs

Source: QLFS Jan-Sept 2010

Table C.13 Ethnic group of job holder, by Regulation status of Unit Group in 2010 (upper bound)

Regulation status of Unit Group (upper bound)	White	Mixed	Asian or Asian British	Black or Black British	Chinese	Other	Total	Base
	Row %	Row %	Row %	Row %	Row %	Row %	Row %	No.
Licensing	88	1	6	3	1	2	100	21,847
Certification	93	1	3	1	1	1	100	4,094
Registration	90	1	5	2	0	1	100	2,413
Accreditation	93	1	4	2	0	1	100	14,565
Unregulated	92	1	4	2	0	1	100	109,182
All	*91*	*1*	*5*	*2*	*0*	*1*	*100*	*152,101*

Base: All individuals in employee and self-employed jobs

Source: QLFS Jan-Sept 2010

Table C.14 Disabled status of job holder, by Regulation status of Unit Group in 2010 (upper bound)

Regulation status of Unit Group (upper bound)	DDA and work-limiting disabled	DDA disabled only	Work-limiting disabled only	Not disabled	Total	Base
	Row %	Row %	Row %	Row %	Row %	No.
Licensing	6	6	3	85	100	48,206
Certification	4	6	2	88	100	5,107
Registration	6	7	3	85	100	8,661
Accreditation	5	5	3	87	100	28,970
Unregulated	6	6	3	85	100	61,247
All	*6*	*6*	*3*	*85*	*100*	*152,191*

Base: All individuals in employee and self-employed jobs

Source: QLFS Jan-Sept 2010

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ISBN 978-1-906597-77-1