Occupational Regulation in the EU and UK: Prevalence and Labour Market Impacts

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Executive Summary

- The Department for Business, Innovation and Skills has commissioned this research to better understand the prevalence of occupational regulation across the EU and the economic costs and benefits of occupational regulation in the UK labour market.

- We focus on professions that are regulated either through certification, accreditation or licensing. These are occupations that are covered by the EU's Mutual Recognition of Professional Qualifications Directive (MRPQ). As part of the EU Single Market, the Directive provides a mechanism by which a professional can have their qualifications recognised or undertake compensatory measures to qualify in another Member State.

- Using the European Labour Force Survey we have estimated the prevalence of occupational regulation across 27 EU Member States. We find that **occupational regulation accounts for 10-24% of the EU's labour force**. We find significant heterogeneity across Member States in the overall prevalence of occupational regulation and particular professions that are regulated.

- We also find **evidence that intra-EU migrants are less likely to be found in regulated occupations**. This may be indicative of a barrier to migration in these occupations, but it is beyond the scope of this research to fully explore what may be driving this result.

- We then turn to examining the impact of occupational regulation focusing solely on the UK labour market. Using the UK Labour Force Survey we examine trends in the movement of regulated professions into the UK. We find that between 2010 and 2013 the largest proportion of migration is accounted for by unregulated occupations (48 per cent), followed by licensed occupations (36 per cent). The margin between unregulated and licensed occupations is even smaller if lower bound estimates are taken into account (31 per cent versus 30 per cent respectively). This suggests that, in contrast to the wider EU trends we observe, EU migrants into the UK are no less likely to be in a regulated occupation. We further find that entry of EU migrants into licensed occupations is not confined to high skilled occupations (where one would expect barriers to be higher) but also medium and low skilled ones.

- We use econometric analysis to examine more formally whether licensing affects migration into the UK. We find **little evidence in the UK of a link between licensing and inward migration** either overall or at major occupational group level (e.g. manager, professional, skilled trades) or distinguishing between different levels of stringency of the occupational regulation regime. This finding may suggest that on an aggregate level the EU MRPQ regime is broadly effective at facilitating migration amongst regulated occupations from the EU into the UK. Data limitations for this component of analysis mean we cannot rule out the possibility that regulation arrangements negatively affect migration within specific occupations.

- We then select eight occupations in the UK as case studies to examine the impact of licensing (as the most restrictive form of regulation) on wages and qualifications. We find, in line with theory, that **licensing is associated with a wage premium, though with substantial variation from 1.7%-19%**. In line with previous findings it appears that the size of the premium is positively linked to length of time the occupation has been licensed and the level of educational requirements. We also find a **positive effect on the level of qualifications for most of the** occupations thus signalling that licensing is associated with an improvement in the skill base of the UK workforce.

- Ideally an assessment of the impact of occupational regulation would include consideration of the effect on the outputs of the occupation, broadly speaking the quality of provision. In practice such assessment is challenging and beyond the scope of this project. We do however provide a feasibility assessment for carrying out such a study in the UK.

- This study has produced the first evidence on the prevalence of occupational regulation in the EU and the first to examine the link between licensing and migration in the UK. The results show that occupational regulation is an important labour market institution across the EU and reinforce the idea that it can have important effects on market outcomes such as wages and the level of qualifications. However, there remain many areas left to explore including:
    - Distinguishing between different types of regulation when examining their prevalence in the EU labour market.
    - The impact of occupational regulation on migration for other EU Member States.
    - The impact of regulation on the mobility of individual occupations in the UK.

- Many of these questions are very challenging to address given current limitations on available data. Further research into this topic would be greatly facilitated either through primary research or through new questions in national surveys such as the Labour Force Survey that specifically address occupational regulation. These advancements would allow researchers to more accurately estimate the prevalence of occupational regulation and better estimate its impacts on labour market mobility and other economic outcomes of interest.

Extended Summary

Introduction

The Department for Business, Innovation and Skills wishes to understand the economic costs and benefits of occupational regulation in the UK labour market and explore the potential impact of regulations that restrict the movement of professional in the EU. It further aims to expand the evidence base in relation to the current prevalence of occupational regulation amongst EU nationals and the level of mobility displayed by them.

The overall aims of the research were to:

1. Review the theory and evidence regarding the operation and impact of occupational regulation, with specific reference to the issue of labour mobility;

2. Provide estimates of the prevalence of occupational regulation in the EU and its links to labour mobility between member states;

3. Provide descriptive estimates of patterns of EU migration to the UK within regulated and unregulated occupations;

4. Attempt to assess the impact of occupational regulation on the mobility of professionals into the UK;

5. Explore regulatory arrangements and their impact on wages and qualifications for regulated occupations in the UK;

6. Assess the availability of data that can be used to estimate the effects of regulation on product and service quality.

We have addressed these aims through a number of individual pieces of research. While each section is free-standing and employs unique methodologies and data sources, they all contribute to advancing our knowledge on this very pervasive labour market institution. The table below summarises these objectives and how they are met by this report.

Objective	How this report meets the Objective
1. Review theory and evidence of occupational regulation	Chapter 2 – A literature review on the operation and impact of occupational regulation
2. Provide estimates of the prevalence of occupational regulation in the EU	Chapter 3 – Using the EU Labour Force Survey (LFS) to examine the prevalence of occupational regulation in 27 EU Member States
3. Provide descriptive estimates of patterns of EU migration to the UK within un/regulated occupations	Chapter 4 – Using the UK LFS to examine patterns of migration into the UK
4. Assess the impact of occupational regulation on the mobility of professionals into the UK	Chapter 4 – Using econometric analysis to estimate the relationship between licensing and labour mobility into the UK
5. Explore regulatory arrangements and their impact on wages and qualifications in the UK	Chapter 5 – Eight case studies are used to examine impact of licensing on wages and qualifications
6. Assess availability of data to estimate the effects of regulation on product and service quality	Chapter 6 - an assessment of the feasibility of conducting analysis on the impact of occupational licensing on service and product quality (known as product market impact)

Theory of occupational regulation and its impact

Occupational regulation involves the enactment of legal barriers to entry in occupations most commonly in relation to the attainment of some minimum qualification standards. We can generally distinguish between four types of regulation: licensing, registration, certification and accreditation. Occupations that do not fall in either of these categories are unregulated, meaning that there are no restrictions to entry. In brief:

- **Licensing** refers to situations where it is unlawful to practice and occupation or carry out a specified range of activities without meeting certain criteria usually but not exclusively relating to educational attainment. Examples of workers who require such licenses in the UK include pharmacists, dentists, midwives, driving instructors and private security guards.

- **Registration** applies when individuals have a legal requirement to register their names and address with a relevant regulatory body in order to be allowed to practice the occupation, but does not include stipulations in relation to skill levels or educational requirements.

- **Certification** allows practitioners to apply to be certified as competent by a relevant regulatory body after certain skills requirements have been met, but it is voluntary in nature. In some cases, certification provides the practitioner with a legal protection of title, for example Chartered Engineer.

- **Accreditation** involves practitioners applying for recognition of their competence by a professional body or industry association and it can confer protection of title (e.g. Chartered Accountants), however the criteria governing the process and their enforcement rest entirely with the professional body.

The key public policy justification for occupational regulation in general, and licensing in particular is its ability to protect consumers and the wider public from incompetent and unscrupulous practitioners. Through setting minimum skills standards for entry to occupations, occupational licensing is expected to raise average skills levels in the occupation, and as a result consumers are likely to receive a more homogeneous and high quality product while the resulting higher investments in training have the potential to enhance the skills base in the economy.

However, occupational licensing can create distortions in the operation of the labour and product markets such as higher incomes for practitioners and higher prices for consumer, while lower income consumers may be priced out of the service or opting for even lower quality services. Research, mainly emanating from the US, largely confirms these theories.

Perhaps the most under-developed theme in relation to occupational regulation is its impact on geographical mobility. In theory, occupational licensing is likely to act as a deterrent to geographical movements. This is first because under licensing arrangements investments entry to an occupation is more intense (especially in the absence of any harmonization, commonly referred to as 'reciprocity') commonly involving qualification requirements, passing exams and in many cases the engagement in continuing professional development activities (an investment that continues throughout ones career).

Second, in many professional labour markets practicing the occupation also involves location specific investments such as investments in local reputation, an additional cost that the worker has to bear if he or she decides to migrate. Finally, if a worker moves from a highly regulated labour market, and in particular a licensed occupation, to a less regulated one, then there is a possibility that of wage penalty if the wage premium associated with licensing is higher in the home country compared to that in the destination.

It is also important to note that while substantial research on occupational regulation has been conducted in the United States, relatively little has been done on the EU. As such, much of the research presented here reflects the first attempt to examine many aspects of this important labour market phenomenon.

The EU Legislative Framework

As this research deals in part with mobility between EU Member States it is worth briefly outlining one of the key regulatory frameworks that governs the movement of regulated professionals in the EU. The Mutual Recognition of Professional Qualifications Directive (MRPQ) was adopted in 2005. The principal aim of the Directive was to facilitate movement of professionals in the EU zone via the recognition of professional qualifications. To a large extent it amalgamated and replaced prior arrangements which mainly took the form of sectoral and occupation specific provisions.

The Directive provides a mechanism by which EU professionals are able to have their qualifications recognized in another Member State and/or provide for the ability to complete compensation measures to become qualified in another Member State. It is as such an important component of the free movement of people in the Single Market.

From a policy perspective it is important to understand the extent to which the current regime effectively reduces the potential barriers to intra-EU movement that may be presented by having different professional regulatory regimes in each Member State. This research seeks to provide evidence of this for the case of inward migration into the UK as well as some initial indications for the rest of the EU.

The prevalence of occupational regulation in the EU

No comprehensive information exists as to the proportion of the EU labour force that is subject to some form of occupational regulation. In order to fill in this knowledge gap we use information from the European Commission's Database of Regulated Occupations and match it with data from the 2012 European Labour Force Survey. Data limitations mean we can only provide broad estimates of the prevalence of occupational regulation.

- We find that **between 9 and 24 per cent of EU 27 workers are subject to occupational regulation**, which is between 19 and 51 million individuals. This would suggest the prevalence of occupational regulation in the EU is below that of the US. However, there is substantial variation across Member States in the overall prevalence of regulation and the distribution of regulation across professions.

- **Two groups of occupations are particularly affected by regulation, the classic liberal professions (e.g. accountants, doctors, lawyers) and craft and related professions (e.g. plumbers, electricians).** Some variation is also found here. Countries such as Italy and Spain stand out for high levels of regulation amongst professionals while others such as Germany, France and the Czech Republic have much higher levels of regulation for crafts professions. In

addition, occupational regulation in the EU is not solely confined to high skill workers but is also prevalent amongst medium skilled ones.

- We also find that, on average, **EU immigrants enter professions that are less likely to be subject to occupational regulation**, but significant differences are found across countries.

The existing evidence does not provide a definite answer as to why immigrants are less likely to be found in more regulated professions. It may be because regulation deters entry or because immigrants may not have the human capital to enter regulated occupations in other countries. Further, access to information about entry requirements to a regulated profession as well as the nature of the administrative procedures that need to be followed to obtain such recognition are also likely to be important determinants. The operational capacity of Competent Authorities and the resources available to them are likely to be central to such explanations.

Analysis of these issues is beyond the scope of this project and further detailed research is necessary to establish the extent to which occupational regulation is affecting intra-EU mobility. The creation of a European-wide dataset on occupations regulation and labour market outcomes would allow researchers to bridge many of these knowledge gaps.

Occupational Regulation and Labour Mobility into the UK

Following from our EU-wide analysis we focus on the UK and examine the impact of occupational regulation on inward migration and labour market outcomes including wages and qualifications. In this section we summarise our results for inward migration.

The evidence base on occupational regulation and labour mobility from the EU to the UK is non-existent. We attempt to address this gap by matching the UK Classification of Regulated Occupations produced by members of this team to the UK Labour Force Survey. This allows us to categorise the entire UK Labour Force Survey based on occupational regulation categorisations and examine trends over time. We then use this to focus on licensed professions and produce an econometric model to estimate the link between licensing and inward mobility of EU migrants into the UK.

Based on our upper bound estimates we found that between January 2010 and March 2013, the majority of EU migration into the UK for employment purposes is accounted for by unregulated occupations (48 per cent), this is followed by licensed occupations (36 per cent). Accredited occupations are the third most popular destination (21 per cent), while registration and certification attract the least number of EU-migrants (7 per cent and 3 per cent respectively). The margin between unregulated and licensed occupations is even smaller if lower bound estimates are taken into account (31 per cent versus 30 per cent respectively). Further, as it is evident from Figure 4.2, there is very little variation during the period 2010-2013. According to this 3-year snapshot the strictness of regulation does not appear to be

linked to employment-related movement to the UK or else, licensing, compared to other forms of regulation, has not deterred entry during this period. While only descriptive, this is a clearly encouraging finding for the UK labour market.

Our econometric model more formally estimates the link between licensing (as the most restrictive regulation) and mobility into the UK and we find that:

- Overall there is little evidence that licensing impacts on the ability of EU professionals to enter the UK labour market.

- No links were found between the licensing status of an occupation and the proportion of EU-migrants within it. This applies for both 2005 (before the introduction of the MRPQ Directive) and 2010 (when the Directive had been fully operational for 3 years).

- No substantial differences were found in the mobility of individuals from the EU to occupations subject to the automatic system of recognition of the MRPQ Directive (the route that harmonizes minimum training requirements and is generally considered to be least burdensome for professionals) vis-à-vis their general system counterparts.

It is important to highlight a number of caveats to this analysis. First, limitations of the available data mean that analysis cannot be conducted at a profession-specific level. It is as such not possible to exclude the possibility that occupational regulation presents a barrier to mobility to at least some UK professions. Second, this analysis is only for the UK and the results may well differ for other EU Member States.

Overall, these results provide evidence that the regulatory environment within the UK is sufficiently conducive so as not to present a substantive barrier to movement of regulated professionals into the UK. The results suggest this is true both of the current MRPQ Directive and the legislative regime pre-2005 (which as noted above, the MRPQ Directive largely amalgamated).

Further research would be valuable in establishing to what extent this is true for other EU Member States.

The impact of occupational regulation on the UK Labour Market

Following our analysis of licensing and mobility into the UK we examined the impact of occupational regulation on labour market outcomes. This was done primarily through the selection of eight occupations[1] as case studies to provide an in-depth analysis of the regulatory arrangements within them

[1] Dental practitioners; pharmacists; secondary education teaching professionals; social workers; plumbers, heating and ventilating engineers; security guards; architects and chartered accountants.

and their impact on the UK labour market. Professions were selected on the basis of providing a broad coverage of sectors, entry requirements and regulatory regime.

We conducted econometric analysis for these professions on the link between licensing and wages and qualification levels. We found that:

- In line with past empirical and theoretical literature there is **a positive licensing wage premium for most of the professions**. However, there was significant variation with the premium **ranging from 8.7 to 19.1 per cent**. The wage premium we found was higher for occupations that have been licensed for a longer period of time and those with higher educational and training requirements (e.g. dentists, pharmacists, accountants and architects). This finding is consistent with the proposition that the labour market takes some time to adjust to new institutional arrangements, such that improvements in the ability of the occupation to optimize supply relative to demand conditions take time to emerge.

- We also find that **licensing is positively associated with higher skill levels** compared to unregulated occupations, with the relationship being strongest for security guards, secondary teachers and plumbers thus demonstrating that licensing can have a positive effect in upskilling those at the lower and medium levels of the skill distribution.

We also provide data on the proportion of UK, EU and non-EU born workers within these occupations covering the period 2001-2013. With the exception of dentists and security guards, the remaining occupations have been relatively stable in terms of their share of EU-born workers.

Finally, we supplemented our econometric and descriptive analysis with interviews with Competent Authorities (who act as regulators of professions) on their views of the current regulatory system. These interviews suggested the need for harmonisation of the regulation vocabulary currently used at EU-level and the establishment of associations of regulators at European level. Respondents also commented on how variations in the operational capacity and resources available to Competent Authorities at EU level might be having an adverse effect on labour mobility, and while they showed support for the Common Training Frameworks initiative they question its compatibility with the deregulation pressures that underlie the transparency exercise.

Measuring the impact of occupational regulation on the quality of service

We have been able to produce some estimates of the link between occupational regulation and mobility, wages and skills. However, an important aspect of occupational regulation is its impact on the actual provision of services and in particular, whether regulation is linked to an improvement in the quality of service or similar dimensions such as public safety. Such analysis is highly challenging and beyond the scope of this report. Indeed, due to the difficulty in developing methods of estimating the

impact of licensing on quality, only few research studies have addressed this theme and the majority of such attempts come from the US literature. We do however offer a feasibility study where we explore how the quality effect of licensing has been studied in the academic literature, followed by recommendations as to how such efforts can be replicated in the UK.

Implications for policy makers and future research

Occupational regulation is an important labour market institution in the EU, covering between 10 and 24 per cent of the EU labour force. Therefore, it deserves more attention than it has currently been receiving by researchers and policy-makers. Further, it is a labour market institution that has the potential to deter inter-state labour mobility. This is particularly the case with licensing.

Our finding that across the EU immigrants are less likely to enter professions that are subject to regulation may be of concern, given the EU Commission's policy focus on reducing barriers to mobility and fostering labour movement within the EU. While we were not able to account for the observed trends, it is possible that the heterogeneity in regulation regimes coupled with the administrative procedures that need to be followed to obtain such recognition are important determinants. Indeed, one of the key messages that came out from our discussions with UK Competent Authorities was the high variation in the resource and operational capacity of Competent Authorities across the EU in dealing with recognition requests.
Our findings for the UK provide evidence that the existing MRPQ system and its predecessor regime may be working sufficiently well to mitigate the expected barriers that occupational regulation would impose on migration. However, it must be emphasised that we have not been able to conduct this particular analysis at a profession level and we cannot rule out the possibility that some individual UK professions do still face barriers to mobility from regulation. This analysis is also solely focused on the UK and the results cannot be extrapolated to other EU Member States.

We would also emphasise that the findings of this study are the outcome of an effort to make the most out of the existing survey data, which were **not** designed to collect information on occupational regulation. From this perspective, the results of our work in matching existing datasets are remarkable and provide a first assessment of occupational regulation in the EU. However, research on occupational regulation in the UK and EU is lagging behind that found in the US. This is largely due to access to better data sets.

We recommend the establishment of a new survey to collect individual-level data on occupational regulation and related demographic and labour market characteristics of workers, and/or the inclusion of questions relating to occupational regulation on existing large-scale authoritative surveys such as the UK Labour Force Survey (and the EU Labour Force Survey).

Better data would allow for greater specificity on the prevalence of occupational regulation in the EU and to better explore the link between regulation and labour mobility. Sadly, unless we are able to

access better datasets, our analysis will remain descriptive and inconclusive, not allowing us to provide solid evidence-based policy recommendations on the economic impact of occupational regulation in the UK and EU.

Structure of the Report

The report is structured as follows:

- **Chapter 1** provides background on the definition of occupational regulation
- **Chapter 2** provides an outline of the economic literature relating to occupational regulation and its expected impact on the labour market and mobility.
- **Chapter 3** analyses the prevalence of occupational regulation across the EU. Some descriptive evidence on the impact on mobility is also presented.
- **Chapter 4** examines the issue of occupational regulation and the impact on mobility in the UK.
- **Chapter 5** presents evidence on the impact of occupational regulation on the UK labour market. This is done through a selection of case studies looking at eight professions in the UK. This is supplemented with interviews with UK Competent Authorities on their views of the current regulatory system.
- **Chapter 6** provides an assessment of the feasibility of conducting analysis on the impact of occupational licensing on service and product quality (known as product market impact).
- **Chapter 7** contains a summary of the findings of the report as well as recommendations for further research and methods to improve the availability of data in this area.

1. Background to Occupational Regulation

Chapter Summary

- Occupational regulation involves the enactment of legal barriers to entry in occupations most commonly in relation to the attainment of some minimum qualification standards.
- In the UK labour market we can distinguish between four types of regulation: licensing, registration, certification and accreditation. Occupations that do not fall into any of these categories are unregulated, meaning that there are no restrictions to entry.

Occupational regulation refers to legally defined requirements or rules that govern entry into occupations and subsequent conduct within them. In the UK, entry is commonly determined by the attainment of certain minimum qualifications, but can also include satisfying certain work experience and continuous professional development requirement (CPD) requirements, as well as passing competence tests, CRB checks and medical assessments. Based on these characteristics, Forth *et al.* (2012)[2] develop two criteria for mapping regulation in the UK. First, whether the government (directly or through an appointed agency) sets legal barriers to entry making it unlawful to practice otherwise. Second, whether the attainment of minimum skills standards (whether mandatory or voluntary) is present within the occupational group in question. The resulting typology is depicted in Table 1.1.

[2] Forth, J., Bryson, A., Humphris, A., Kleiner, M. and Koumenta, M. (2012) A Review of Occupational Regulation and its Impact, UK Commission for Employment and Skills, London. UK Commission for Employment and Skills, London.

Table 1.1 Typology of Occupational Regulation (UK)

		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 Certified Locksmiths
	Yes, but confers no rights to practice	**N/A**	**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 Architects' Registration Board
	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

Source: Forth et al. (2012)

The resulting typology consists of three forms of legal regulation (licensing, certification and registration) and one form of regulation that has no legal backing or state involvement (accreditation). The remaining occupations are classified as unregulated. A detailed description of each type of regulation is provided below:

- **Licensing** refers to situations where it is unlawful to carry out a specified range of activities without meeting certain criteria such as those discussed above (e.g. qualifications, work experience etc.). Examples of workers who require such licenses in the UK include pharmacists, dentists, midwives, taxi drivers, driving instructors and private security guards.

- **Registration** applies when individuals have a legal requirement to register their names and address with a relevant regulatory body in order to be allowed to practice the occupation. In some cases the regulation requires clear criminal records or no history of being bankrupt. Such regulation makes no stipulations in relation to skill levels or educational requirements.

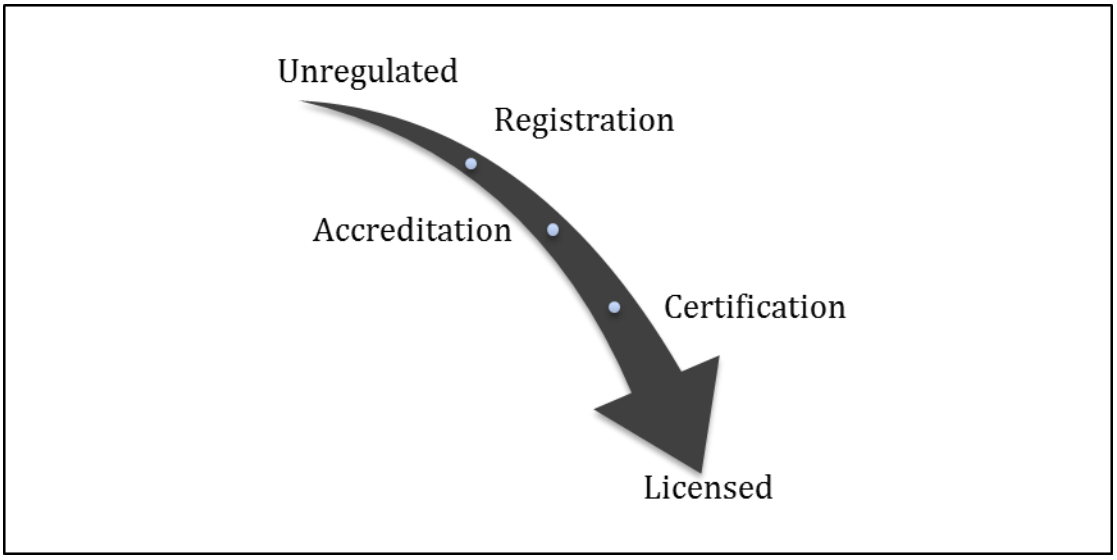
- **Certification** allows practitioners to apply to be certified as competent by a relevant regulatory body. As with licensing, certification is granted when certain skills requirements are met or when exams have been passed but contrary to licensing such provisions are voluntary meaning that certified individuals do not hold a monopoly over practicing the occupation. In some cases,

certification provides the practitioner with a legal protection of title, for example Chartered Engineer.

- **Accreditation** has many similarities to certification, in that practitioners apply for recognition of their competence by a professional body or industry association and it can confer protection of title (e.g. Chartered Accountants), however the criteria governing the process and their enforcement rest entirely with the professional body.

Based on the degree of restrictiveness to entry, occupational regulation can be depicted as a continuum ranging from unregulated to licensing (Figure 1.1).

Figure 1.1: The regulatory continuum in the UK



The above typology of regulation in the UK is also broadly applicable across the EU, although one might expect to find variations in terminology and entry requirements to the occupation. The focus of this study is on licensing, the most restrictive form of regulation, as it is this form that has the potential to create the biggest distortions in the operation of the labour market.

2. The Economic Impact of Licensing

Chapter Summary

- The introduction of regulation within occupations is justified on the grounds of public interest, health and safety and up-skilling of the workforce.
- Licensing, the most restrictive form of occupational regulation, has the potential to create various distortions in the operation of the labour and product markets, in particular by restricting the supply of labour within the affected occupations. Such restrictions can result in: higher prices for some consumers; others consumers being priced out of the market; higher wages for incumbents in licensed occupations; a downward pressure on the wages of individuals in non-licensed occupations due to the increased supply of labour from those that cannot meet the licensing requirements; and a negative impact on labour mobility.
- While the knowledge base on occupational licensing in the US is advanced, there is a lack of evidence on the operation of this labour market institution in the UK and EU. The limited research work that has been carried so far in the UK points towards some variation in the labour outcomes of licensing vis-à-vis the US, though with broadly the same kinds of impact. The impact of licensing on the geographical mobility of labour is one of the most under-developed themes within the occupational regulation literature.
- In the absence of complete harmonisation of licensing requirements, we would expect licensing to have a negative impact on geographical mobility. This is due to education and location specific investments it requires from practitioners, as well as the wage penalty that the incumbent might incur when moving from one country to another.
- Research evidence from the US has found support for this view, and has also shown that it can put a downward pressure on the number of practitioners in a country and an upward pressure on the wages within the occupation.
- Due to lack of data, similar studies have not been undertaken in the EU and the UK labour market contexts.

2.1 Impact on labour and product market outcomes

The key public policy justification for occupational regulation in general, and licensing in particular is its ability to protect consumers and the wider public from incompetent and unscrupulous practitioners (Humphris, Kleiner and Koumenta 2011[3]). Consumers cannot easily obtain information or lack the knowledge to assess the quality of the product or service prior to its purchase, particularly where the provision of a technical service requiring specialist knowledge and skills is involved. Through setting minimum skills standards for entry to occupations, occupational licensing is expected to raise average skills levels in the occupation, since low-quality providers cannot meet the new skill standard and are driven out of the occupation (Pagliero 2013)[4]. As a result consumers are likely to receive a more homogeneous and high quality product while the resulting higher investments in training have the potential to enhance the skills base in the economy (Shapiro 1986[5]).

At another level, occupational licensing can create distortions in the operation of the labour and product markets thus leading to economically and socially inefficient outcomes. Tight entry requirements reduce the pool of practitioners thus creating monopoly rents within the occupation (Pagliero 2011[6]). Economic theory would therefore predict that occupational licensing is associated with higher incomes for practitioners and higher prices for consumers (Kleiner 2006 and Kleiner 2013[7]). Further consequences include lower income consumers being priced out of the service, thus forcing consumers to opt for even lower quality services (Friedman 1962[8]). In a context of licensing, such substitutes are confined to 'do-it-yourself' services as cheaper non-regulated providers do not exist. 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. A further potential drawback of licensing is that it could increase structural unemployment as entry to licensed occupations is delayed by the requirement to attain the necessary skill standards. As such, licensing can delay adjustments in the labour market (Mortensen and Pissarides 1994[9]). Finally, the impact of licensing can extend beyond the occupations in question. Inability to meet the required skills standards is likely to displace prospective practitioners to

[3] Humphris, A., Kleiner, M. and Koumenta, M. (2011) 'How Does Government Regulate Occupations in the United Kingdom and the United States? Issues and Policy Implications', in Marsden, D. (ed.) Employment in the Lean Years: Policy and Prospects for the Next Decade, Oxford: Oxford University Press.
[4] Pagliero, M. (2013) 'The Impact of Potential Labor Supply on Licensing Exam Difficulty', Labour Economics, 25, 141-152.
[5] Shapiro, C. (1986) 'Investment, Moral Hazard and Occupational Licensing', Review of Economic Studies, 53, 843-62.
[6] Pagliero, M. (2011) 'What is the Objective of Professional Licensing? Evidence from the US Market for Lawyers', International Journal of Industrial Organization, 29, 4.
[7] Kleiner, M. (2006) Licensing Occupations: Ensuring Quality or Restricting Competition? Michigan: W.E. Upjohn Institute for Employment Research; and Kleiner, M. (2013), *Stages of Occupational Regulation: Analysis of Case Studies,* Michigan: W.E. Upjohn Institute for Employment Research.
[8] Friedman, M. (1962) Capitalism and Freedom, University of Chicago Press, Chicago.
[9] Mortensen, D. and Pissarides, C. (1994) 'Job Creation and Job Destruction in the Theory of Unemployment', Review of Economic Studies, 61, 397-415.

unregulated neighbouring occupations. Such migration can lead to excess supply and a reduction in the wages in these occupations (Koumenta and Humphris 2011[10]).

Research evidence confirms such assumptions. Kleiner and Krueger (2010)[11] find a wage premium associated with licensing in the US, while studies show that any restrictions on interstate mobility further add to such premiums (e.g. Tenn 2001)[12]. Humphris, Kleiner and Koumenta's (2011)[13] UK estimates based on the LFS find that licensing is associated with a 13 per cent higher hourly pay, with more recent evidence showing differential effects by occupation (Forth, *et al*. 2012)[14] while similar results are obtained by Pagliero in his study of US lawyers (Pagliero 2010)[15]. The price effects of occupational licensing are also well-documented in the US literature (e.g. Kleiner and Todd (2009)[16] on mortgage brokers; Kleiner and Kudrle (2000)[17] on dentists) but as with wage effects, restrictions on interstate mobility produce even larger premiums (e.g. Kleiner, Gay and Greene 1982)[18].

In the US occupational regulation is generally determined at state level. The observed variation in the licensing arrangements between US states has provided US researchers with the appropriate data and comparable cases, which in turn have enabled them to undertake more robust studies on the effect of licensing on the labour and product markets. As such, studies have commonly compared the effects of licensing in states where it is present to those on identical or comparable occupations in states where such occupations do not exist. Further, as licensing is more widespread and adoption rates between states vary, researchers have also been able to undertake before and after studies of the effect of licensing, thus overcoming some of the common limitations of cross-sectional research. Lastly, US researchers have traditionally had superior datasets in their disposal, thus allowing them to address a wider range of questions relating to regulation.

Due a lack of the above, the EU and UK evidence base is much more limited. A recent comprehensive study of regulation in the UK finds that in 2010 at least 14 per cent of employees and self-employed in

[10] Koumenta, M. and Humphris, A. (2011) 'Occupation Licensing in the UK: Some Preliminary Findings', Paper presented at the Society for the Advancement of Socio-Economics Conference, Madrid, June.

[11] Kleiner, M. and Krueger A. (2010) 'The Prevalence and Effects of Occupational Licensing', British Journal of Industrial Relations, 676–687.

[12] Tenn, S. (2001)' Occupational Licensing: An Effective Barrier to Entry?',Unpublished Dissertation, The University of Chicago.

[13] Humphris, A., Kleiner, M. and Koumenta, M. (2011) 'How Does Government Regulate Occupations in the United Kingdom and the United States?' Issues and Policy Implications, in Marsden, D. (ed.) Employment in the Lean Years: Policy and Prospects for the Next Decade, Oxford: Oxford University Press.

[14] Forth, J., Bryson, A., Humphris, A., Kleiner, M. and Koumenta, M. (2012) A Review of Occupational Regulation and its Impact, UK Commission for Employment and Skills, London.

[15] Pagliero, M. (2010) 'Licensing Exam Difficulty and Entry Salaries in the US Market for Lawyers', British Journal of Industrial Relations, 48, 4.

[16] Kleiner, M. and Todd R. (2009) 'Mortgage Broker Regulations That Matter: Analyzing Earnings, Employment, and Outcomes for Consumers, Labor Market Intermediation', edited by David Autor, MIT,University of Chicago Press.

[17] Kleiner, M., and Kudrle R. (2000) 'Does Regulation Affect Economic Outcomes? The Case of Dentistry'. Journal of Law and Economics 43(2): 547-582.

[18] Kleiner, M., Gay R. and Greene K. (1982) 'Barriers to Labor Migration: The Case of Occupational Licensing.' Industrial Relations. 21(3), 383-91.

the UK are subject to licensing[19]. Accreditation is present amongst at least 10 per cent of the same group, while certification and registration account for 3 and 2 per cent respectively. Overall, a total of 28 per cent of all jobs in the UK are covered by some type of regulation and this figure has been rising since 2001[20]. The same research showed that qualifications and the take-up of job related training were found to be higher amongst licensed occupations, compared to other regulated and unregulated groups and that in some cases (e.g. for security guards and care workers) the introduction of regulation had a positive effect on wage and qualification levels respectively. However, such effects were not found to be uniform across other occupations (e.g. childcare workers, automotive technicians) pointing out to the possibility that the effects of regulation are heterogeneous by occupation.

The remaining research on regulation in the UK tends to be single occupation case studies and supports the heterogeneity argument. Gospel and Lewis (2011)[21] draw on interview evidence with employees within the eldercare, adult and childcare sectors. They show that while regulation standardised training standards and led to a considerable increase in both the flow and stock measures of qualifications. On the other hand, Lloyd (2005)[22] finds little impact of regulation on the skills of fitness instructors in the UK and shows the inferiority of training requirements vis-à-vis those found in France and Germany.

As the preceding discussion has demonstrated, while there is a plethora of studies on occupational regulation (and in particular licensing) in the US, there is a lack of evidence into the operation of this labour market institution in the UK. Recent efforts to address this gap are not as conclusive as their US counterparts with regards to the presence of a universal negative impact on wages, skills and employment. Instead, researchers have alluded to a heterogeneity effect and have called for an examination of the impact of licensing on a case-by-case basis. The section that follows discusses the relationship between occupational regulation and migration at UK and EU levels, an even less familiar ground for researchers in this field.

2.2 Impact on Labour Mobility

Perhaps the most under-developed theme in relation to occupational regulation is its impact on geographical mobility. An initial economic rationale for labour migration across nations fits with the view that it is one of resource allocation. Mobility is theorised as a function of age and investments in education, both interacting to increase or reduce the costs of migration to the individual (Sjaastad, 1962)[23]. Further, research on the occupational determinants of migration shows that occupations that

[19] Forth, J., Bryson, A., Humphris, A., Kleiner, M. and Koumenta, M. (2012) A Review of Occupational Regulation and its Impact, UK Commission for Employment and Skills, London.
[20] When comparing these estimates with those produced in this report, please refer to Table 3.2, footnote 44.
[21] Gospel, H. and Lewis, P. (2011) 'Who cares about skills? The Impact and Limits of Statutory Regulations on Qualifications and Skills in Social Care', British Journal of Industrial Relations, 49(4), pp. 601-622
[22] Lloyd, C. (2005) 'Training standards as a policy option? The regulation of the fitness industry', Industrial Relations Journal, Vol. 36, No. 5, pp.367-385
[23] Sjaastad, L. (1962) 'Costs and Returns of Human Migration'. The Journal of Political Economy, 60 (5), pp. 80-93.

require heavy investments in capital equipment and the establishment of clienteles have low migration rates, while occupations with short organizational hierarchies, low ratios of managers to managed and decentralised work units have high migration rates (Ladinsky, 1967)[24]. At a macro level, the impetus for mobility comes from wage and income differentials between origin and destination labour markets. For example, increasing income inequality over the last decades is shown to be an important factor in attracting highly skilled migrants in the UK (Hatton 2005)[25], since high pay differentials signal high returns to human capital investments incurred by the individual. Structural demand and the presence of social-networks are also significant variables affecting migration levels, and so are the degree to which culture and language are shared between origin and destination (Mayda, 2009[26]; Pedersen *et al*. 2008[27]).

Besides economic and social explanations, the stringency of migration policies also plays a role, although research has shown it not to be as important as other economic, social and political determinants (Czaika and De Haas, 2013)[28].

2.2.1 Theory and Evidence

In theory, occupational licensing is likely to act as a deterrent to geographical movements for a number of reasons. First, under licensing arrangements entry to an occupation is more difficult (especially in the absence of any harmonization, referred to as 'reciprocity') commonly involving qualification requirements, passing exams and in many cases the engagement in continuing professional development activities (an investment that continues throughout ones career). Second, in many professional labour markets practicing the occupation also involves location specific investments such as investments in local reputation, an additional cost that the worker has to bear if he or she decides to migrate (Pashigian 1980)[29]. Finally, if a worker moves from a highly regulated labour market, and in particular a licensed occupation, to a less regulated one, then there is a possibility of a wage penalty if the wage premium associated with licensing is higher in the home country compared to that in the destination. As such, one would expect licensing to add to the cost of mobility and to be inversely related to labour movements both into and out of the regulating country.

However, this is likely to be mediated by the extent to which educational and other regulation-related requirements are harmonised, as well as the existence of rents to be captured in the destination country

[24] Ladinsky, J. (1967) 'Occupational Determinants of Geographic Mobility among Professional Workers', American Sociological Review, 32(2), pp. 253-263.
[25] Hatton, T. (2005) 'Explaining Trends in UK Immigration', Journal of Population Economics, 18(4), pp. 719-740.
[26] Mayda, A. M. (2009) 'International Migration: A Panel Data Analysis of the Determinants of Bilateral Flows', Journal of Population Economics, 23(4), pp. 1249-1274.
[27] Pedersen, P.J., Pytlikova, M. and Smith, N. (2008) 'Selection and Network Effects: Migration Flows into OECD Countries 1990-2000', European Economic Review, 52(7), pp. 1160-1186.
[28] Czaila, M. and De Haas, H. (2013) 'The Effectiveness of Immigration Policies: A Conceptual Review of Empirical Evidence', Population and Development Review, 39(3), pp. 423-442.
[29] Pashigian, P. B. (1979) 'Occupational Licensing and the Interstate Mobility of Professionals,' Journal of Law and Economics. 22(1), pp. 1-25.

(e.g. in the form of a wage premium). Further, the ease with which one can access information on entry to the profession (e.g. procedures to follow for recognition of qualifications, language requirements etc.) is also likely to reduce the cost of movement borne by the individual. Conversely, we assume that tougher licensing in the host country would deter outmigration, because it is unlikely that individuals in occupations that are more heavily regulated occupations are likely to receive a wage offer that is high enough to induce exit.

The first paper to empirically examine this issue within the context of economic theory focused on the effects of US state licensing arrangements and practices in the professions of medicine, dentistry, on interstate mobility and the allocation of professional labour resources (Holen, 1965[30]). Holen finds that the empirical evidence is consistent with the hypothesis that professional licensing arrangements and practices in dentistry and law restrict interstate mobility among dentists and lawyers and distort the allocation of professional personnel in these fields. Follow up work along the same lines by Pashigian (1979) shows that occupational licensing reduces the mobility of individuals across state lines. Kleiner, Gay and Greene (1982)[31] find that restrictive licensing may operate as a barrier to mobility causing a misallocation of labour resources across U.S. states, with increased earnings for the practitioners in those states with the most restrictive barriers.

Tenn (2001)[32] uses a model where occupational licensing is assumed to be exogenous. He posits and assumes that wages increase through a supply effect. He notes that supply restrictions cause equilibrium wages to rise due to the supply shock and this results to higher quality workers with presumably higher wages. Drawing on prior research by Pasigian (1979) and Kleiner *et.al*. (1982), he examines the influence of licensing for attorneys - an occupation that has long been licensed in the US. He finds that migration rates and licensing statutes jointly have significant power in explaining wages and concludes both of these issues need to be addressed as part of the analysis of the impact of occupational licensing.

More recently, Federman *et al*. (2006)[33] estimate the effects of licensing regulations on the entry of manicurist immigrants into the occupation in the US. This represents the first study that looks at links between licensing and the migration patterns in a low-skilled occupation. Their findings show that the level of migration is impeded by the existence and restrictiveness (in terms of minimum entry standards) of state licensing regulations. In particular, they estimate that the requirement to have an additional 100 hours of training reduces the likelihood of having a Vietnamese manicurist by 4.5 per cent, while states requiring some level of English proficiency were 5.7 percentage points less likely to have a Vietnamese manicurist.

[30] Holen, A. (1965). 'Effects of Professional Licensing Arrangements on Interstate Labor Mobility and Resource Allocation', Journal of Political Economy, 73(5), pp. 492-498.
[31] Kleiner, M., Gay R. and Greene K. (1982) 'Barriers to Labor Migration: The Case of Occupational Licensing.' Industrial Relations. 21(3), pp.383-91.
[32] Tenn, S. (2001) 'Occupational Licensing: An Effective Barrier to Entry?' Unpublished Dissertation, University of Chicago.
[33] Federman, M.N., Harrington, D. E., and Krynski, J.K. (2006) 'The Impact of State Licensing Regulations on Low-Skilled Immigrants: The Case of Vietnamese Manicurists' The American Economic Review, 96 (2) pp. 237-241.

There have been few studies examining the influence of occupational licensing laws on educational attainment of migrants. In one of the few studies, Kugler and Sauer (2005)[34] analyse physicians who came from the former Soviet Union to Israel, and faced different barriers to becoming licensed. The degree of difficulty in getting licensed was based on experience. Specifically, those with fewer than 20 years of experience had to take a difficult general medical knowledge licensing exam to become licensed in Israel. This exam had a fairly low pass rate. Consequently, many of these former Soviet physicians did not become practicing doctors in Israel and entered entirely different professions. Conversely, the physicians with more than 20 years of experience in the Soviet Union were granted an exemption to the exam and issued a temporary general practitioner license for six months. During this period, they were allowed to practice medicine under the observation of native physicians. At the end of the six months, it was nearly certain that the immigrant physicians on the observation track would receive a permanent license. The result was much higher earnings for those migrants who were able to attain the license. Overall, this study shows the effect that lack of recognition of qualifications has on the stock of employment within occupations in the host country as well as the impact on the earnings of migrant workers.

Taken together, these studies support the view that regulation may limit the number of practitioners in a nation. If this is the case, then nationwide endorsement through policies that harmonise entry requirements could alleviate uneven geographic distribution of licensed practitioners and ease possible shortages. Second, nationwide endorsement represents a potential policy reform, since the proposal is often supported by a majority of the members of a profession relative to deregulation.

Despite some recent cases where harmonisation has taken place, research on occupational licensing in the EU has yet to address its impact on the geographical mobility of labour. For example, 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)[35]. 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 license (Haas 2008)[36]. Our empirical gaps are even more marked in the case of how less restrictive forms of regulation such as certification and accreditation impact labour mobility. Such alternatives might be more effective means of solving information asymmetry problems between providers and consumers whilst facilitating labour movement in the EU. For instance, as early as 1989 the First General Systems Directive (89/48/EEC OJ

[34] Kugler, A. D., and R. M. Sauer.(2005) 'Doctors without Borders? Relicensing Requirements and Negative Selection in the Market for Physicians' Journal of Labor Economics 23(3). Pp: 437–465.

[35] Haas, J. (2009) Harmonising Occupational Regulations in the EU transport sector: Institutions, Participants and Outcomes, Paper presented at the 9th European Sociological Association Conference, Lisboa, Portugal, September

[36] Hass, J. (2008). Occupational Licensing Verses Company-Led Training: The Controversy over the Competence Assurance System for European Aircraft Technicians. European Societies, 10(4), 597-617.

1989 L19/16) required professional associations involved in accreditation to provide membership routes for migrant professionals (Evetts 1999)[37], but its impact is yet to be assessed.

To some extent these omissions are not unjustified. Data availability at both member state and EU level has not kept pace with developments in policy. This has meant that researchers have been restricted to the issues that can be investigated. Some of these data restrictions apply to this project and will be discussed where applicable in the sections that follow. The evidence is non-existent once we move away from licensing and considers alternative forms of regulation. Registration is a mandatory form but does not place any restrictions on qualification so we would expect to observe any impact on labour movement. Accreditation and certification on the other hand involve voluntary skill standards, but since these are not mandatory, their impact on labour movement is ultimately determined by the extent to which there is a demand for accredited and certified workers over their non-accredited and non-certified counterparts. If such demand is high, then entry to the host country's labour market is likely to depend on the attainment of entry requirements and therefore the higher the criteria or the more they are misaligned with the human capital of the perspective migrant, the less likely migration is to happen.

In summary, we posit that the theoretical frameworks discussed above would apply in our analysis of the UK and EU occupational licensing regime and its relationship to migration.

2.3 The Legislative Framework

The legislative framework that governs movement of professionals in the EU is important in contextualising and explaining the findings of this report. In 2005, the Mutual Recognition of Professional Qualifications (MRPQ) Directive 2005/36/EC was introduced within the EU. The principal aim of the Directive was to facilitate movement of professionals in the EU zone via the recognition of professional qualifications. To a large extent it amalgamated and replaced prior arrangements which mainly took the form of Sectoral and occupation specific provisions. Sectoral Directives for example covered occupations such as doctors, general care nurses, dental practitioners, veterinary surgeons, midwives, pharmacists and architects and provided automatic recognition of diplomas (mainly due to the high correspondence of the educational requirements in these occupations across Member States), whilst making some minor provisions relating to co-ordination of training and a European-wide definition of these professions.

These were supplemented by various Craft Directives that commonly applied to craft, commercial and industrial activities and granted professionals automatic recognition of their experiences and, to a lesser extent, mutual recognition of their diplomas, as well as occupation specific instruments such as Directives for lawyers, statutory auditors, transport professions and those working in the toxic products industries. The remaining occupations were covered by General Systems Directives which included

[37] Evetts, J. (1999). Regulation of Professions in Global Economies: dimensions of acquired regulation. Paper presented at the Society for the Advancement of Socioeconomics Conference, Wisconsin, USA, July.

mutual recognition of training and professional experience as well as compensatory measures if there were big discrepancies in the qualification requirements between home and host countries.

Overall, the MRPQ Directive consolidated a total of 15 Directives whilst maintaining existing rights and guarantees. It further simplified certain provisions, for example in relation to the automatic recognition of medical specialties. After the end of the transposition period in 2007 and up until today, two main regimes of recognition of qualifications are in operation.

Automatic recognition involves the complete harmonization of qualifications and concerns architects, dentists, doctors, midwives, nurses, pharmacists and veterinary surgeons, and is generally considered the least burdensome system for professionals. This is supplemented by the *general system*, which covers all other regulated professions in the EU and gives Competent Authorities powers to assess the comparability of acquired qualifications to those needed to enter the occupation in the host country. While for many commentators the changes in the new provisions were only marginal, with the bulk of the reform being focused in simplifying administrative and operational procedures, nevertheless they provide a useful setting that enables us to explore links between licensing and migration before and after their implementation.

In 2011, in an attempt to further support mobility of professionals in the EU, the EU Commission proposed the modernization of the MRPQ Directive. The key pillars of this change were the introduction of a European Professional Card that aims to enable more efficient recognition of qualifications, the introduction of common training frameworks and common training tests as well as improved access to recognition-related information for citizens seeking to migrate. In October 2013, the Commission voted in favor of these proposals which are now fully operational. It is too early to consider the impact of these changes.

The sections that follow present the empirical analysis and discuss the results.

3. The Prevalence of Occupational Regulation in the EU

Chapter Summary

- Hundreds of occupations are subject to occupational regulation in Europe but no information exists as to how many European workers it affects. This chapter provides the first basic estimates of the prevalence of occupational regulation in the EU as well as a broad description of the relationship between occupational regulation and labour mobility.
- Classifying and measuring occupational regulation is not a simple task due to the lack of reliable data. In this section we define an occupation as regulated if it is subject to licensing, accreditation, or certification. Information on regulated professions from the EU Single Market Regulated Professions Database is matched with survey data from the European Labour Force Survey.
- There are over 800 occupations regulated in at least one country. We find that between 9 and 24 per cent of all EU workers are subject to occupational regulation, which is between 19 and 51 million individuals. We also find that on average, immigrants enter professions that are less likely to be subject to occupational regulation. Still, there is significant heterogeneity across countries.
- Occupational regulation is clearly not uniformly distributed across occupational groups. Two groups are particularly affected by regulation, the classic liberal professions and crafts and related professions. Overall, occupational regulation in the EU is not solely confined to high skill workers but is also prevalent amongst medium skilled ones.
- Countries such as Italy and Spain stand out for high levels of regulation amongst professionals while others such as Germany, France and the Czech Republic have much higher levels of regulation for crafts professions.
- We do not find any clear evidence of a trend towards more prevalence of regulation, but this remains an open question and one that is difficult to answer due to the absence of reliable data on occupational regulation.
- We conclude by highlighting the importance of collecting new data occupational regulation and labour market outcomes and provide suggestions for how to overcome the lack of data on this important labour market institution. In particular it would be valuable to narrow down estimates of the prevalence of regulation and to be able to separate out the different forms of regulation.

3.1 Introduction

For a number of occupations in the EU, prospective professionals must satisfy the requirements set by national governments and professional associations. This usually means passing a licensing examination and possibly meeting educational, residency, moral character and fitness requirements. It is well known that physicians, nurses, and teachers are commonly required to be licensed to practice their professions throughout the EU. Perhaps less well known is that hundreds of other occupations are also subject to licensing regulations in the EU. Real estate and travel agents, manicurists, podiatrists, golf instructors, beekeepers, stonemasons, car mechanics, musical instrument manufacturers, corset makers and potters are just some of the over 800 professions that according to the European Commission are affected by occupational regulation in at least one European country.

No information exists as to how many EU workers are subject to occupational regulation. In the US, occupational licensing directly affects 29 per cent of workers (Kleiner and Krueger 2013)[38], more than those affected by other labour market institutions such as the minimum wage or unionization. Similarly, it is unknown whether the number of EU workers affected by licensing is increasing or decreasing. However, for the US, we know that this number has been systematically growing for the past 60 years.

Another important research question for this report is the extent to which licensing affects intra-EU mobility. Examining the prevalence of occupational regulation between nationals and EU migrants may provide initial descriptive indications of whether there may be an effect.

Thus, the objectives of this chapter are to:

- Measure the prevalence of occupational regulation in the EU.
- Provide a broad description of the relationship between occupational regulation and labour mobility in the EU by examining the relative prevalence of occupational regulation between nationals and migrants.

3.2 The prevalence of occupational regulation: background and methodology

Classifying and measuring occupational regulation is not a simple task. Our reading of the literature demonstrates that the UK typology of occupational regulation discussed earlier is also applicable to the EU member states. As such, occupational regulation may take the form of licensing, registration, certification, and accreditation.

The lack of research on occupational regulation is clearly not due to its lack of importance or its decline. More likely, the lack of research on occupational licensing is due to the lack of an established source of data to be exploited. Almost all the existing evidence on occupational licensing comes from specific

[38] Kleiner, M. and Krueger A. (2010) 'The Prevalence and Effects of Occupational Licensing', British Journal of Industrial Relations, 676–687.

markets and countries, most notably the US. While all these studies are interesting and useful, the policy relevance for the EU is clearly limited. The absence of specific questions on occupational licensing in large-scale labour force surveys implies that it is very difficult to point estimate the prevalence of occupational licensing in the EU.

The EU Single Market Regulated Professions Database[39] (maintained by the EU Commission) includes information on the regulated professions covered by the Mutual Recognition of Professional Qualifications (MRPQ) Directive 2005/36/EC. According to this directive, a "regulated profession" is a "professional activity or group of professional activities, access to which, the pursuit of which, or one of the modes of pursuit of which is subject, directly or indirectly, by virtue of legislative, regulatory or administrative provisions to the possession of specific professional qualifications" (Article 3,1,a). This definition nicely fits the economic definition of a licensed profession.

However, the same article adds that "the use of a professional title limited by legislative, regulatory or administrative provisions to holders of a given professional qualification shall constitute a mode of pursuit". This extends the definition of a regulated profession, including also what economists typically call accredited or certified occupations.

Drawing on this source we know for example that lawyers, physicians, and nurses are reported to be regulated professions in all countries. Architects and mechanical engineers are also often regulated, while real estate agents, financial brokers, and ski instructors are regulated only in some countries. We are not aware of any systematic source of data on only those professions subject to registration or licensing at the EU level.

Ideally we would provide estimates of the prevalence of each type of regulation. However, disentangling licensing from certification and accreditation in the available databases is very difficult. We attempted to classify professions by category of regulation for a few countries, but this required studying in detail the legislation and regulation for each. For example, in Italy most of the regulated professions in the EU data set have ***some*** reserved activities (i.e. activities only a licensed or registered professional can conduct) according to state law, regional, or city-level regulation[40]. According to this definition, we are able to confirm that most of the regulated professions in Italy and the UK (where members of the team have specialist knowledge of occupational regulation) are in fact licensed. However, the exact definition of the reserved activities of each profession is not always clear, which makes the classification difficult.

Due to this limitation in the available data, **in this section we focus on regulated professions following the definition used by the EU Single Market Regulated Professions Database and Directive 2005/36/EC, hence including licensing, accreditation, and certification**.

[39] http://ec.europa.eu/internal_market/qualifications/regprof/index.cfm?action=homepage

[40] Note that the existence of some reserved activities does not imply that all or most the tasks performed by a licensed worker are reserved activities.)

Information on regulated professions can be matched with labour force survey micro data sets from the European Labour Force Survey, a large household sample survey providing data on labour participation of employees and self-employed aged 15 and over, living in private households[41]. National statistical institutes in each Member State are responsible for selecting the sample, preparing the questionnaires, conducting the direct interviews among households, and forwarding the results to Eurostat in accordance with the common coding scheme[42]. In our subsequent analysis, we pool the observations from the four successive quarters in 2012 to produce an annual dataset.

We focus on 2012 as it is the most recent available year in the EU Labour Force Survey data set. Some changes in regulation have occurred since then, but we cannot yet match them with labour force data. Earlier changes in the regulatory status of professions in European countries are not recorded in the EU Single Market Regulated Professions Database. It is as such not possible to look at trends in the professions regulated over time.

The matching procedure is as follows:

- The European Labour Force Survey assigns an occupational code (4-digit ISCO code) to each worker in the sample. ISCO codes provide a very detailed description of the occupation in question. There are over 600 codes and they identify very specific occupations such as electricians, hotel managers, and hairdressers. To achieve the matching, we go through the list of regulated occupations in the EU Commission database and then assign one such occupational code to each profession;

- Occupational codes describe occupations at a fairly detailed level. Some occupational codes only include jobs that are subject to licensing. In other words, all surveyed workers assigned to such codes work within regulated professions. For example, ISCO code 2210 describes medical doctors, who are regulated in all EU countries.

- Some other codes- in specific countries- turn out to include different types of jobs. In other words, some workers assigned to such codes work in a regulated profession, but some do not. For example, code 2432 includes "Librarians and related information professionals". Librarians are regulated in some countries (e.g., Greece, Poland, Slovenia), but other information professionals are not and therefore we cannot determine the proportion of workers affected by regulation.

- Finally, the remaining country-code combinations are not subject to regulation. No worker assigned to such ISCO codes works in a regulated profession.

[41] Persons carrying out obligatory military or community service are not included in the target group of the survey, as is also the case for persons in institutions/collective households.)
[42] For more details see http://epp.eurostat.ec.europa.eu/portal/page/portal/microdata/lfs

This procedure clearly partitions the sample from the European Labour Force Survey into three groups, namely those who are subject to regulation (regulated), those who are not (unregulated), and those where only some may be regulated (mixed). This last group includes workers with ISCO codes that include some regulated professions and some unregulated ones.

Because we cannot exactly determine the proportion of workers affected by regulation in the mixed group, **we cannot provide a point estimate the proportion of workers subject to regulation** (i.e. we cannot say that x per cent of workers are subject to regulation.) This introduces the potential for measurement error. However, we can estimate the maximum and the minimum number of workers subject to regulation, that is produce an upper and lower bounds to the prevalence of occupational regulation. The upper bound is computed by summing the proportion of workers in the regulated and mixed groups and assumes that all workers within the ISCO codes are subject to regulation, while the lower bound is the proportion of workers in the regulated group and assumes that none of the workers within the remaining ISCO codes are regulated. The true prevalence of occupational regulation will lie somewhere in this interval.

3.3 Results on the overall prevalence of occupational regulation

Table 3.1 reports the number of regulated occupations by country based on ISCO codes. There are over 800 occupations regulated in at least one country and over 2,700 occupation-country combinations. The Baltic states, Sweden and Bulgaria have fewer than 40 regulated occupations, while the Czech Republic, Poland, Austria and Slovenia have over 130. Somewhat surprisingly, with 131 regulated occupations, the UK is amongst these countries with the highest number of regulated occupations. It is also interesting to note that the UK regulates more occupations than Germany and the Mediterranean economies such as Italy, Greece and Portugal; the former being a keen supporter of occupational regulation and the latter being particularly well known for their intense labour market regulation regimes. Differences among countries are very large and reflect the diverse types of activities subject to regulation in different countries.

However, it is important to note that the number of professionals that are regulated does not necessarily reflect the overall prevalence of regulation in the workforce, as the number of practitioners within different occupations may vary substantially.

Table 3.1. Regulated occupations in the EU27[43]

	Number of regulated professions
Estonia	14
Latvia	16
Lithuania	27
Sweden	38
Bulgaria	39
Luxembourg	48
Romania	48
Ireland	57
Cyprus	62
Finland	63
Hungary	75
Malta	75
Belgium	78
Portugal	85
Germany	86
Italy	86
Netherlands	87
Denmark	90
France	90
Greece	98
Slovak Republic	109
Spain	112
United Kingdom	131
Slovenia	135
Austria	151
Poland	162
Czech Republic	215

Note: In this section, we apply the definition of regulated profession used by the EU Single Market Regulated Professions Database and Directive 2005/36/EC, hence including licensing, accreditation, and certification. Source: The EU Single Market Regulated Professions Database (accessed in spring 2012).

Table 3.2 reports the estimated number of employed individuals in each EU-27 country in 2012 that are affected by regulation vis-à-vis their unregulated counterparts. Workers are classified into three groups described above: unregulated (column 1), mixed (column 2), and regulated (column 3), with these three columns reporting the raw figures. Columns 6-9 show the proportion of workers in each group as a

[43] The database relies on authorities from all Member States reporting their recognition decisions. The numbers may be slightly incomplete if the quality of the reporting is low. Also, a few professions may be omitted, particularly where no or very few decisions are taken.

percentage of total employment in each Member State. Columns 10-11 report the upper and lower bounds to the prevalence of occupational regulation.

The analysis shows that between **9 and 24 per cent** of European workers are subject to occupational licensing, which is between 19 and 51 million individuals. These are the first estimates of the prevalence of occupational regulation in the European Union to ever be produced, and thus an important contribution to our understanding of the prevalence of this labour market institution.

Countries in Table 3.2 are sorted by their upper bounds. The Baltic states, Ireland, Romania, Malta, Sweden, Bulgaria and Finland all have less than 15 per cent of the labour force affected by occupational regulation. The prevalence of regulation in the UK is between 11 and 21 per cent, which places it in the second group of countries with intermediate regulation (between 16 and 26 per cent)[44]. This group also includes the Netherlands and France. The 9 countries with highest prevalence of regulation by proportion of the workforce within such occupations include Spain, Italy, and Germany, although there are variations when bounds are taken into consideration. These results are not always in line with those obtained at occupation level (Table 3.1). For example, there is a commonly held view that certain countries such as Greece, Italy and Cyprus are over-regulating their occupations, but what is emerging is that such assertions are more linked to the number of individuals working within licensed occupations rather than the proportion of occupations licensed.

On the other hand, while Denmark only licenses 90 occupations (and is thus in the intermediate category in Table 3.1), such arrangements cover a significant proportion of its workforce (up to 43 per cent in Table 3.2). Similarly, Cyprus only licenses 62 occupations, but up to 30 per cent of the workforce is affected by such arrangements. Indeed, the difference between how many occupations are regulated in each Member State versus how many individuals are working within regulated occupations is important not only when estimating changes in the prevalence of licensing over time, but also when estimating its labour market and macroeconomic impact. For example, to conclude that licensing is becoming more prevalent, we should observe an increase in the number of occupations subject to such arrangements rather than an increase in the number of employees and self-employed working within licensed occupations. The labour and economic impact of licensing on the other hand will also depend on employment levels within the occupation in question.

The correlation between upper and lower bound is high (0.53) but different from 1. This is partly due to the variability across countries in the precision of occupational classifications in the European Labour Force Survey. Some countries (Latvia, Bulgaria, Portugal, Spain, Greece, Italy, Cyprus, Germany and Denmark) report relatively coarse occupational codes in the European Labour Force survey (3-digit level only). This implies that the interval between the upper and lower bounds is much larger (on average

[44] The UK results are consistent with those reported by Forth et al. (2012), allowing for some measurement error in both theirs and our calculations.

twice as large, as described in column 12[45]). Lower bounds, for these countries, are particularly small due to the difficulty in classifying workers as definitely subject to occupational licensing. These issues with the available data mean that it is not currently possible to draw firm conclusions about the overall prevalence of occupational regulation in each EU Member State.

[45]Overall, Column 12 provides us with an estimate of the difference between the upper and lower bounds and is thus a measure of the precision of the estimate.

Table 3.2. Employment and prevalence of occupational regulation (licensing, accreditation, or certification) in EU-27 countries.

	Estimated number of employed individuals (thousands)						Proportion of employed individuals				Prevalence of occupational regulation		
	(1)	(2)	(3)	(4)	(5)		(6)	(7)	(8)	(9)	(10)	(11)	(12)
Country	Unregulated	Mixed	Regulated	No info	Total		Unregulated	Mixed	Regulated	No info	upper bound	lower bound	upper-lower
Estonia	598	0	17	1	615		0.97	0.00	0.03	0.00	0.03	0.03	0.00
Latvia*	828	27	24	2	881		0.94	0.03	0.03	0.00	0.06	0.03	0.03
Lithuania	1,184	12	73		1,269		0.93	0.01	0.06	0.00	0.07	0.06	0.01
Ireland	1,638	35	148	10	1,831		0.89	0.02	0.08	0.01	0.11	0.08	0.02
Romania	8,176	92	905		9,173		0.89	0.01	0.10	0.00	0.11	0.10	0.01
Malta	144	5	19	0	169		0.86	0.03	0.11	0.00	0.14	0.11	0.03
Sweden	3,974	139	506	26	4,644		0.86	0.03	0.11	0.01	0.14	0.11	0.04
Bulgaria*	2,481	321	105		2,908		0.85	0.11	0.04	0.00	0.15	0.04	0.11
Finland	2,085	121	239	6	2,451		0.85	0.05	0.10	0.00	0.15	0.10	0.05
Netherlands	7,010	440	839	93	8,382		0.84	0.05	0.10	0.01	0.16	0.10	0.06
Luxembourg	185	19	26	2	233		0.80	0.08	0.11	0.01	0.20	0.11	0.09
France	20,319	1,843	3,384	1	25,546		0.80	0.07	0.13	0.00	0.20	0.13	0.07
United Kingdom	23,265	2,873	3,122	100	29,360		0.79	0.10	0.11	0.00	0.21[46]	0.11	0.10

[46] In the case of the UK, we observe some discrepancy between the estimates produced by Forth *et al*. (2012) using the QLFS and those produced here using the EULFS. We expect this to be the result of the different approaches used to classify regulated occupations. In particular, while we do not anticipate large differences between the two when it comes to classifying licensed occupations, this is not the case with certification and accreditation. We believe that the Forth et al. (2012) approach is superior to that adopted to populate the EU Commission's database, as their data is collected on an occupation by occupation basis after contacting professional associations and regulatory bodies. We therefore expect that the EU Commission's database to be an underestimate of occupations that are subject to such arrangements in the UK. Further, a small proportion of the variance is likely to come from the fact that the estimates are for two different time periods, namely 2010 for the QLFS and 2012 for the EULFS.

Portugal*	3,622	650	331		4,603		0.79	0.14	0.07	0.00		0.21	0.07	0.14
Slovenia	718	96	97	5	916		0.78	0.10	0.11	0.00		0.22	0.11	0.11
Slovak Republic	1,791	235	287	0	2,313		0.77	0.10	0.12	0.00		0.23	0.12	0.10
Hungary	2,975	337	548	0	3,859		0.77	0.09	0.14	0.00		0.23	0.14	0.09
Spain*	12,786	2,967	1,444		17,197		0.74	0.17	0.08	0.00		0.26	0.08	0.17
Belgium	3,330	435	720		4,485		0.74	0.10	0.16	0.00		0.26	0.16	0.10
Greece*	2,725	676	305		3,707		0.74	0.18	0.08	0.00		0.26	0.08	0.18
Poland	11,387	1,922	2,179	13	15,502		0.73	0.12	0.14	0.00		0.27	0.14	0.12
Italy*	16,454	4,818	1,362		22,633		0.73	0.21	0.06	0.00		0.27	0.06	0.21
Austria	2,957	597	618		4,172		0.71	0.14	0.15	0.00		0.29	0.15	0.14
Cyprus*	270	81	34		385		0.70	0.21	0.09	0.00		0.30	0.09	0.21
Germany*	27,476	10,843	1,459	110	39,888		0.69	0.27	0.04	0.00		0.31	0.04	0.27
Czech Republic	2,914	1,077	826		4,817		0.61	0.22	0.17	0.00		0.39	0.17	0.22
Denmark*	1,521	814	341	1	2,678		0.57	0.30	0.13	0.00		0.43	0.13	0.30
Total EU	162,814	32,576	18,855	255	214,613		0.76	0.15	0.09	0.00		0.24	0.09	0.15

*Note: Estimates are based on EULFS data for 2012. In this section, we apply the definition of regulated profession used by the EU Single Market Regulated Professions Database and Directive 2005/36/EC, hence including licensing, accreditation, and certification. * denotes countries for which only 3-digit ISCO codes are available.*

3.4 Results on occupational regulation by type of activity

Table 3.3 reports the prevalence of occupational regulation in the EU by type of job. Occupations are grouped into 9 broad categories based on 1-digit ISCO codes. This first group, called “managers”, includes chief executives, administrative and commercial managers, production and specialized services managers. These are typically positions with a fair amount of responsibility and independence (this may or may not be associated with a high level of formal education). We find that the prevalence of regulation amongst this group in the EU is small; at most 10 per cent of workers are subject to regulation.

The second group includes “professionals”. Competent performance in most occupations in this group requires study in a higher education institution for a period of 3-6 years leading to the award of a first degree or higher qualification. In some cases, extensive experience and on the job training may be required for competent performance. This group includes the typically regulated professions, such as medical doctors, engineers, architects and lawyers. This is also the group with the highest prevalence of regulation (between 36 and 54 per cent of workers).

“Technicians and associate professionals” perform mostly technical tasks similar to professionals, but require somewhat lower skill levels or specialization, equivalent to study at a higher education institution for 1-3 years following the completion of secondary education. For example, this group includes dental hygienists and medical assistants. The proportion of regulated workers within this group is much lower than that of professionals (between 0.6 and 3.6 per cent of workers).

“Clerical support workers” perform clerical duties in connection with money-handling operations, travel arrangements, requests for information, and secretarial work in general. Most occupations in this major group require skills equivalent to the completion of secondary education although in some cases vocational training may be necessary. The prevalence of regulation is small; at most 4 per cent are regulated.

“Service and sales workers” provide services related to travel, housekeeping, catering (e.g., waiters), personal care (e.g., hairdressers), or sell goods in wholesale or retail shops (e.g., shop assistants). Few workers are regulated (at most 7 per cent). “Skilled agricultural workers” typically includes farmers and the figure for regulation is again very low (at most 5 per cent).

“Craft and related trades workers” construct and maintain buildings, build metal structures, set machine tools, or make, fit, maintain and repair machinery, equipment or tools, carry out printing work; produce or process foodstuffs, textiles, or wooden, metal and other goods. The work is carried out by hand and by hand-powered and other tools which are used to reduce the amount of physical effort and time required for specific tasks. A significant proportion of workers (between 9 and 40 per cent) in this group is regulated.

“Plant and machine operators” operate and monitor industrial and agricultural machinery and equipment, drive and operate trains and motor vehicles. Between 7 and 15 per cent are regulated. Finally, “elementary occupations” involve the performance of simple and routine tasks which may

require the use of hand-held tools and considerable physical effort. Tasks performed by workers in elementary occupations usually include: cleaning, restocking supplies and performing basic maintenance in apartments, houses, kitchens, hotels, offices; washing cars and windows; helping in kitchens and performing simple tasks in food preparation; delivering messages or goods. The proportion of regulated workers is almost negligible.

Overall, occupational regulation is clearly not uniformly distributed across occupational groups. Two groups are particularly affected by regulation. The first includes the classic liberal professions with different levels of skills. Professionals are characterized by the highest level of human capital and independence, while technicians and associate professionals typically have lower human capital and might work under the supervision of professionals. Regulation of these professions may be justified by the existence of asymmetric information between buyers and sellers.

The second group includes crafts and related professions. These activities do not generally require a significant investment in formal education; they are often related to construction industry (electricians, plumbers, brick layers, stonemasons), but their consumption often entails significant health and safety risks for consumers and practitioners. Regulation of these professions may be justified on the basis of these health and safety risks. Asymmetric information may also exist, but it seems to be less significant than in the first set of professions. Overall, occupational regulation in the EU is not solely confined **to high skill workers but is also prevalent amongst medium skilled ones.**

Table 3.3 Upper and lower bounds to the prevalence of occupational regulation (licensing, accreditation, or certification), by type of activity.

	EU 27 countries	
	Lower bound	Upper bound
Managers-1	0.00	0.10
Professionals-2	0.36	0.54
Technicians and associate professionals-3	0.06	0.36
Clerical support workers-4	0.00	0.04
Service and sales workers-5	0.01	0.07
Skilled agricultural workers-6	0.00	0.05
Craft and related workers-7	0.09	0.39
Plant and machine operators -8	0.07	0.15
Elementary occupations-9	0.00	0.02
Average EU	0.09	0.24

Note: The estimates are based on EULFS data for 2012. In this section, we apply the definition of regulated profession used by the EU Single Market Regulated Professions Database and the MRPQ Directive, hence including licensing, accreditation, and certification. Figures may not add up to one due to rounding error.

Table 3.4 reports the upper and lower bounds by country for selected countries[47]. At this level of disaggregation differences in type and scope of regulation between Member States become clearer. It is interesting to note that countries with a relatively high prevalence of regulation like Austria, Czech Republic, France, Germany, Greece, Italy and Spain are quite different in their regulation of crafts and related activities. In Austria, Czech Republic, Germany and France the prevalence of regulation in these activities is very large, while in Greece, Italy and Spain regulation is more concentrated in the professional activities rather than crafts. There seems to be a Southern European approach to occupational regulation that focuses more on professional activities. More importantly, **a high level of occupational regulation can be achieved in different ways.**

[47] The same table for the remaining EU Member States is presented in Appendix A (Table A1).

Table 3.4 Upper and lower bounds to the prevalence of occupational regulation (licensing, accreditation, or certification) by type of activity and country.

	Austria		Czech Republic		France		Germany		Greece		Italy		Spain		UK	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Managers-1	0.26	0.15	0.22	0.00	0.16	0.00	0.00	0.00	0.06	0.00	0.11	0.00	0.28	0.00	0.07	0.01
Professionals-2	0.51	0.42	0.57	0.43	0.43	0.37	0.51	0.20	0.84	0.43	0.79	0.44	0.81	0.50	0.52	0.41
Technicians and associate professionals-3	0.46	0.18	0.58	0.10	0.23	0.11	0.47	0.00	0.53	0.00	0.51	0.00	0.30	0.00	0.23	0.05
Clerical support workers-4	0.04	0.00	0.03	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.14	0.00	0.00	0.00	0.10	0.00
Service and sales workers-5	0.07	0.00	0.15	0.07	0.07	0.02	0.10	0.00	0.07	0.00	0.09	0.00	0.01	0.00	0.05	0.00
Skilled agricultural workers-6	0.11	0.00	0.04	0.00	0.30	0.00	0.00	0.00	0.04	0.00	0.02	0.00	0.09	0.00	0.07	0.00
Craft and related workers-7	0.61	0.31	0.67	0.30	0.59	0.51	0.76	0.00	0.28	0.00	0.25	0.00	0.38	0.00	0.16	0.00
Plant and machine operators -8	0.08	0.00	0.39	0.22	0.00	0.00	0.05	0.00	0.12	0.00	0.00	0.00	0.16	0.00	0.19	0.00
Elementary occupations-9	0.05	0.00	0.01	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.00

Note: The estimates are based on EULFS data for 2012. In this section, we apply the definition of regulated profession used by the EU Single Market Regulated Professions Database and Directive 2005/36/EC, hence including licensing, accreditation, and certification. Figures may not add up to one due to rounding error.

3.5 Results on the trends in occupational regulation

Table 3.2 shows that between 9 and 24 per cent of EU workers are affected by occupational regulation, which is significantly less than the 29 per cent of workers subject to licensing in the US. Both sets of estimates have their own problems and they are not easily comparable. Still, this is the only existing evidence available to us and it suggests that occupational regulation is at least somewhat more pervasive in the US than in the EU.

The prevalence of licensing in the US has been systematically increasing over the past 60 years. What about the EU? This is a difficult question for three main reasons. First, the EU has been incorporating new countries and it simply did not exist as such 60 years ago. Second, our procedure for estimating bounds crucially relies on precise information on occupational codes in the European Labour Force Survey. Going back in time, information on ISCO codes becomes less precise and it is not available before 1992. Moreover, a change in the definition of occupational codes in 2011 makes earlier data not easily comparable.

Third, no retrospective dataset exists for regulated professions. The EU commission data set does not provide information on the professions subject to regulation in the past. This implies that we can only measure the impact of the changes in the number of workers within each group of professions currently regulated. We cannot capture changes in the prevalence of regulation due to the regulation of previously unregulated professions. This is somewhat unfortunate, as there is anecdotal evidence of a number of professions being regulated over the past decades, as well as some recent attempts to deregulate some professions. It would be important for the policy debate to understand if there is a trend towards more extensive regulation in the EU.

Leaving these caveats to the side, we compute the upper and lower bounds using previous waves of the EU LFS and holding constant our classification of professions.

The results are shown in Figure 3.1, which also reports the estimated prevalence of occupational licensing in the US (Kleiner and Krueger 2013). To maintain comparability over time we restrict the analysis to the 8 countries that have provided reliable data on occupational codes throughout the period[48]. The estimated bounds are remarkably stable from 1992 to 2007. The sharp convergence of the bounds in 2012 is simply due to better quality data (4-digit ISCO codes instead of 3-digit), which allows a more precise estimation. It does not reflect changes in the underlying prevalence of regulation.

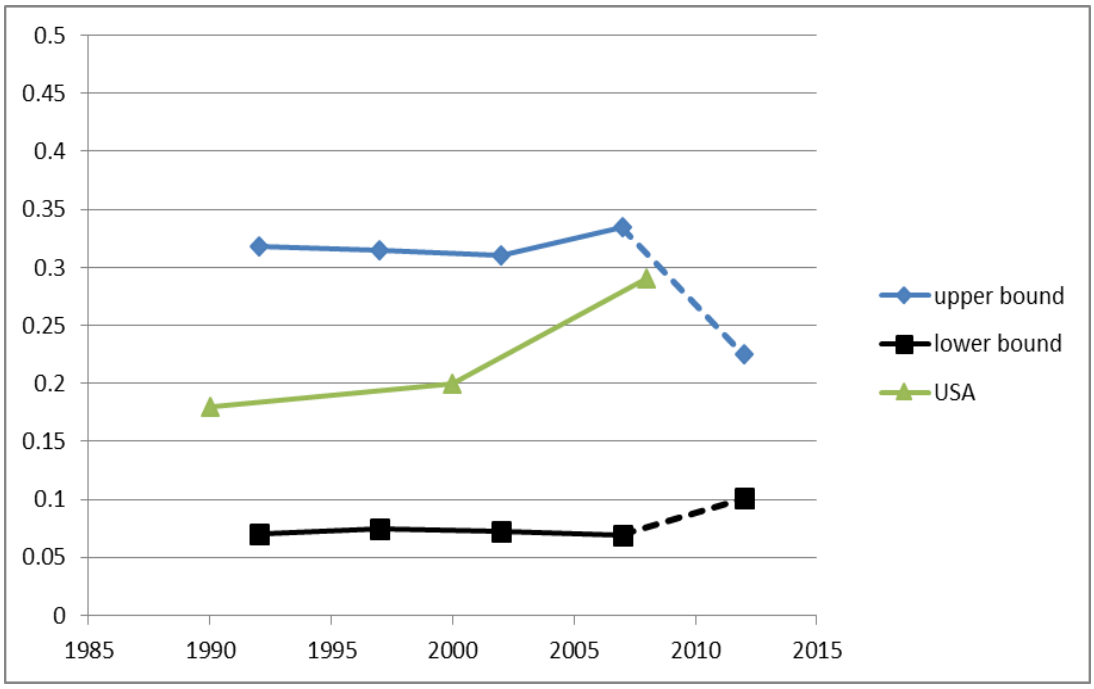
In summary, Figure 3.1 provides two insights. First, **there is no significant trend in the estimated bounds**. However, **there might be a trend of the true prevalence of regulation within such bounds** that we cannot capture in Figure 3.1. Second, **occupational regulation is currently less prevalent in the EU countries sampled than in the US and it might have been so for a number of years**. In the US, the

[48] These countries are Austria, Czech Republic, France, Germany, Greece, Italy, Spain and the UK.

increase in occupational regulation occurred together with a sharp decrease in unionization. In Europe, the lower level of occupational regulation may reflect the higher level of unionization, and the smaller trend towards more expansive regulation might reflect the slower decline of unionization.

While the results presented here present some initial findings of the prevalence and trends of occupational regulation in the EU, there are many open questions that remain. Data limitations mean point estimates cannot be provided and so trends in the prevalence of occupational regulation are difficult to detect. Moreover, because no database exists on changes in regulation it is not easy to determine if the trend in the EU has been to increase or decrease the level of occupational regulation.

Figure 3.1 Trends in the prevalence of occupational regulation in the EU for eight selected Member States (licensing, accreditation, or certification) and the US (licensing only).



Note: The estimates are based on EULFS for 1992, 1997, 2002, 2007, and 2012. In this section, we apply the definition of regulated profession used by the EU Single Market Regulated Professions Database and Directive 2005/36/EC, hence including licensing, accreditation, and certification. Data for the US are from Kleiner and Krueger (2013) and refer to licensing only. Dotted lines indicate improvements in measurement precision, rather than a fall in the prevalence of licensing, i.e. from 2007 the precision of measurement improves.

3.6 Results on labour mobility and occupational regulation

Labour mobility can be measured in different ways. The EULFS provides information on the country of birth of each worker. This provides some indirect evidence on worker mobility. Ideally for the purposes of analysing occupational regulation there would be data recording where workers gained their qualifications as well as any movement for employment purposes (allowing the analysis to focus on those who have moved to a different regulatory system). As this measure does not exist in any large database, country of birth can only act as an approximation. However, this introduces the possibility for measurement error, for example in cases when migration has occurred before qualifications were obtained. On the other hand, focusing on country of birth rather than nationality has the advantage of avoiding the ambiguous classification of workers with more than one nationality, or the complexities deriving from different national legislations on this topic. It is as such the best available measure currently available to us.

Table 3.5, column 1 reports the proportion of workers born in the same country in which they are working. Columns 2 and 3 report the upper and lower bounds for the prevalence of regulation among these workers. Only in Luxemburg is the proportion of foreign-born workers higher than 20 per cent. On average, 11 per cent of workers are foreign-born, of which 6 per cent come from another EU-27 country (column 4).

Columns 5 and 6 report the estimated upper and lower bounds for the proportion of immigrant workers born in the EU affected by occupational regulation, while columns 8 and 9 report such bounds for workers born outside the EU. While it is difficult to draw firm conclusions in the absence of single point estimates, the differences between the bounds for foreign and national workers are striking. While immigrants from the EU have a similar upper bound to nationals, the lower bound is 0.03 (33 per cent) lower. Immigrants from outside the EU have 0.09 (36 per cent) smaller upper bound, and 0.02 (21 per cent) smaller lower bound. The picture that emerges from Table 3.3 suggests that on average, immigrants, particularly those from outside the EU, enter professions that are less likely to be subject to occupational regulation.

Still, there is significant heterogeneity across countries. Hungary seems to be a particular exception, attracting a significant number of immigrants (from other EU countries) into regulated occupations. Also Sweden and France seem to be able to do so, although to a much lower extent. Columns 8 and 9 show that very few countries attract a high proportion of non-EU immigrants into regulated professions. Ireland, Malta, and the UK stand out from the rest. Both the upper and the lower bounds are significantly higher for immigrants than natives in both Ireland and Malta. In the UK, the upper bound is the same but the lower bound is about 37 per cent higher for immigrants from outside the EU. It is probably not a coincidence that all these countries share English as one of their official languages. These countries might also share some other characteristics specific to regulation of labour markets.

The relatively small proportion of immigrants in regulated occupations may be explained by two main reasons. First, in line with the theoretical assumptions and US evidence, regulation might deter entry. Occupational regulation has been documented to limit entry of immigrant workers and to affect their occupational choices (see, for example, Federman *et al.* 2006[49]). This may be particularly true of immigrants from outside the EU who do not benefit from the provisions for mutual recognition of qualifications and face much higher barriers. Second, immigrants may not have the human capital to enter high skilled occupations, which tend to be more subject to regulation (e.g., lawyers, physicians, engineers). Further, country specific immigration policies are often based on skill levels and some countries may be more effective in attracting high skilled workers. Finally, access to information about entry requirements to a regulated profession as well as the nature of the administrative procedures that need to be followed to obtain such recognition are also likely to be important determinants.

Taken together, the nature and operation of the regulatory regime compared with that in the origin country may explain some of the observed differences across Member States, particularly the high proportion of immigrant workers in regulated professions in the UK.

Overall, while these findings are notable, the existing data and evidence does not provide a definite answer for whether and why immigrants are less likely to be found in less regulated professions. However, the results in Table 3.3 do provide some insights on the potential magnitude of the differential entry of immigrants into regulated and unregulated professions in the EU. Illustratively, equalizing the upper bound of immigrants from outside the EU (0.16) and natives (0.25) would require a reallocation of European workers from unregulated to regulated professions of about 1.15 million workers (0.09x0.06x214). This counterfactual figure is clearly based on the estimated bounds, not on the actual prevalence of occupational regulation. Still, it suggests that the combination of occupational regulation and immigration policy may have an impact on the composition of the EU labour force, particularly for immigrants from outside the EU.

[49] Federman, M.N., Harrington, D. E., and Krynski, J.K. (2006) 'The Impact of State Licensing Regulations on Low-Skilled Immigrants: The Case of Vietnamese Manicurists' The American Economic Review, 96 (2) pp. 237-241.

Table 3.5 The prevalence of occupational regulation (licensing, accreditation, or certification) by country of birth.

	National workers			Immigrants from EU			Immigrants from outside EU		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Proportion of workers	Prevalence of occupational regulation		Proportion of workers	Prevalence of occupational regulation		Proportion of workers	Prevalence of occupational regulation	
		upper bound	lower bound		upper bound	lower bound		upper bound	lower bound
Estonia	0.90	0.03	0.03	0.00			0.10	0.01	0.01
Latvia	0.89	0.06	0.03	0.00			0.10	0.05	0.03
Lithuania	0.97	0.07	0.06	0.00			0.03	0.07	0.06
Ireland	0.80	0.11	0.08	0.14	0.08	0.06	0.05	0.17	0.14
Romania	1.00	0.11	0.10	0.00			0.00		
Malta	0.97	0.14	0.11	0.01	0.00	0.00	0.02	0.18	0.18
Sweden	0.85	0.15	0.11	0.05	0.16	0.12	0.10	0.12	0.10
Finland	0.96	0.15	0.09	0.02	0.13	0.09	0.02	0.10	0.06
Bulgaria	1.00	0.15	0.03				0.00		
Netherlands	0.89	0.17	0.10	0.03	0.17	0.11	0.08	0.13	0.07
France	0.88	0.21	0.13	0.03	0.21	0.16	0.08	0.16	0.11
Portugal	0.91	0.21	0.07	0.02	0.20	0.07	0.07	0.24	0.09
United Kingdom	0.86	0.21	0.10	0.05	0.16	0.09	0.09	0.21	0.14
Slovenia	0.92	0.22	0.11	0.00			0.08	0.17	0.07
Slovak Republic	1.00	0.23	0.12	0.00			0.00		
Hungary	0.98	0.23	0.14	0.02	0.28	0.20	0.01	0.20	0.09
Poland	1.00	0.27	0.14	0.00			0.00		
Belgium	0.87	0.27	0.17	0.06	0.22	0.13	0.06	0.19	0.10

Luxembourg	0.49	0.27	0.14	0.45	0.15	0.09	0.06	0.17	0.11
Spain	0.84	0.27	0.09	0.05	0.19	0.04	0.11	0.14	0.03
Greece	0.91	0.28	0.09	0.02	0.14	0.04	0.07	0.07	0.01
Italy	0.87	0.30	0.07	0.04	0.13	0.01	0.09	0.10	0.01
Austria	0.84	0.30	0.15	0.06	0.28	0.17	0.10	0.23	0.12
Cyprus	0.73	0.34	0.10	0.13	0.25	0.08	0.13	0.12	0.03
Germany	0.85	0.36	0.06	0.15	0.32	0.05			
Czech Republic	0.97	0.40	0.18	0.02	0.32	0.11	0.01	0.31	0.09
Denmark	0.90	0.44	0.13	0.04	0.41	0.13	0.06	0.37	0.10
Total EU	0.89	0.25	0.10	0.06	0.25	0.07	0.06	0.16	0.08

Note: The estimates are based on EULFS data for 2012. In this section, we apply the definition of regulated profession used by the EU Single Market Regulated Professions Database and Directive 2005/36/EC, hence including licensing, accreditation, and certification. Figures may not add up to one due to rounding error.

3.7 Summary

The findings of this chapter are the outcome of an effort to make the most out of the existing survey data, which were **not** designed to collect information on occupational regulation. From this perspective, the results of our work in matching existing datasets are remarkable and provide a first assessment of occupational regulation in the EU. However, there is still a gap between research on occupational regulation in the EU and the US, with the former lagging behind. This is largely due to access to better data sets.

On the other side of the Atlantic, **specific surveys on occupational regulation** have been implemented (Kleiner and Krueger 2013)[50]. As a result, the US is now moving ahead with gathering **data on occupational regulation in national surveys** (Survey of Income and Program Participation) starting in 2013. This further confirms the importance of the policy issue, but also gives the US the lead in terms of data availability, which will tend to direct the attention of researchers to issues that are mostly relevant for the US policy debate.

We believe that only the creation of a **new, representative European-wide dataset on occupational regulation and labour market outcomes** would allow researchers to make significant progress on the effects of occupational regulation in Europe. The collection of such new data set will also make a compelling case for the importance of collecting data on this key issue in large-scale European surveys. The final chapter of this report describes in more detail how this could be implemented in practice. A second important implication of our work is that it is crucial to create common definitions of licensing, certification, and accreditation at the EU level. We understand that the EU Commission has currently embarked on the task of collecting new and more reliable data on occupational regulation in the EU. This will provide a good starting point for future research on regulation in the EU.

These points aside our analysis has provided the first indications of:

- The range between Member States in the proportion of the workforce affected by occupational regulation. There are particularly significant differences when looking at broad sectors of activities. Countries such as Italy and Spain stand out for high levels of regulation amongst professionals while others such as Germany, France and the Czech Republic have much higher levels of regulation for crafts professions.

- The prevalence of occupational regulation in the EU appears below that of the US.

- There are indications that immigrants (particularly those from outside the EU) are less likely to enter regulated occupations. At this stage it is not possible to determine what may be driving this effect, but it may be a combination of factors such as regulation (particularly for immigrants from outside the EU), immigration policy and differences in the level of human capital. Further research will be required to better understand the impact of occupational regulation on intra-EU mobility.

[50] Kleiner, M. and Krueger A. (2010) 'The Prevalence and Effects of Occupational Licensing', British Journal of Industrial Relations, 676–687.

4. Licensing and Labour Mobility in the UK

Chapter Summary

- The evidence base on occupational licensing and labour mobility in the UK is non-existent. We address this gap using the UK LFS and our classification of regulated occupations.
- We estimate the share of EU migration for employment purposes within licensed, registered, certified, accredited and unregulated occupations and show that while between 2010 and 2013 the majority of EU migrants entered unregulated occupations, licensed ones are the second most popular destination. Lithuanians, Latvians, Slovakians and Spanish accounted for the majority of this movement, while nurses, care workers, medical practitioners and secondary education teachers were the top five destination occupations.
- Our econometric analysis suggests that the licensing status of the occupation is not associated with the proportion of EU migrants across groupings of occupations. This result holds for two time periods; before the transposition of the MRPQ Directive (2005) and after (2010).
- Significant associations are found between licensing and the proportion of migrants in an occupation only in three situations: (a) a positive association is found in 2005 where licensing has partial coverage in the skilled trade occupations and provides a low barrier to entry, (b) a negative association is found in 2010 where licensing has full coverage in the associate professional and technical occupations and demands medium entry requirements and (c) a negative association is found in 2005 where licensing has partial coverage in the associate professional technical occupations and requires high entry requirements to be met.
- Given data limitations it has not been possible to conduct this analysis at the level of specific professions. As such, the possibility that occupational regulation affects the mobility of some professions in the UK cannot be ruled out at this stage.
- In both 2005 and 2010, EU migrants are more likely to be found in licensed occupations subject to automatic recognition (the system that harmonizes requirements for some professions in the MRPQ Directive). However, automatic recognition is also positively associated with migration from outside the EU, which alludes to the conclusion that rather than the Directive driving the results, it is perhaps a characteristic endemic within these occupations that drives migration.

4.1 Introduction

Research that links occupational licensing and migration in the UK is non-existent. We address this gap using the UK Quarterly Labour Force Survey (QLFS) and our classification of UK regulated occupations. In particular, we produce a **descriptive analysis** of the levels of EU migrants within regulated occupations in the UK and we further distinguish between their

country of origin and the main occupation within which they are found. This part of the analysis covers trends relating to all types of regulation present in the UK labour market as well as those not subject to any form of regulation, and aims in setting the context for the econometric analysis that follows.

In the second part of this chapter, the focus shifts to licensing. Here the aim is to explore whether entry to occupations which are licensed is lower amongst migrants, or else if the licensing status of an occupation is an important determinant of EU migration to that occupation. Using **cross sectional analysis**, we produce estimates of the association between migration and licensing in two time periods (2005 and 2010). These two time periods were chosen to coincide with regulatory changes that have taken place at EU level. We further explore the potential for variations in effect by distinguishing between the stringency of the entry requirements for licensing, by whether regulation covers all occupational titles within the SOC minor group and by whether the occupation is subject to automatic or general recognition arrangements. The methodology and the limitations of the approaches used are also explored.

In brief, the aims of this chapter are as follows:

- Provide a descriptive analysis of patterns of EU migration to the UK within regulated and unregulated occupations.

- Examine whether the licensing status of an occupation affects the mobility of professionals from the EU to the UK.

4.2 Overview of the Methodology

4.2.1 Occupational Mapping

For a number of years, the UK was lacking a comprehensive database which mapped the extent and nature of occupational regulation in the UK. This has prevented researchers from producing estimates of the prevalence and impact of regulation, not least in relation to labour mobility. Forth *et al*. (2012)[51] are behind the first comprehensive attempt to systematically group occupations according to their regulation status. Through desk-research they record whether the occupation is licensed, accredited, registered, certified or unregulated and supplement this analysis with information on the characteristics of the regulatory regime (e.g. stringency, year of introduction, qualification and other requirements etc.). This mapping takes place at the Unit Group level (4-digit) of the Standard Occupational Classification (SOC2000), the most detailed level of occupational coding available.

[51] Forth, J., Bryson, A., Humphris, A., Kleiner, M. and Koumenta, M. (2012) A Review of Occupational Regulation and its Impact, UK Commission for Employment and Skills, London. UK Commission for Employment and Skills, London.

We begin by updating this map of occupational regulation to reflect any changes in an occupation's regulation status since 2012. We find one example of an occupation switching from unregulated to licensed (Train Drivers, SOC3514); one switching from unregulated to certified (Hairdressing and Beauty Salon Managers and Proprietors, SOC1233); and one example of a switch from unregulated to registered (Veterinary Nurses and Assistants, SOC6131). We find no changes in the regulation status of the remaining 350 SOC codes. The updated database is then matched on the QLFS. This is done at SOC (2000) Unit Group level[52]. This exercise enables us to categorize each respondent's job according to the regulation status present in the occupation and proceed with our estimates in relation to labour mobility.

4.2.2 Descriptive Analysis

We descriptively examine both the stock and flow of migrants into licensed occupations. To produce the estimates based on stock we explore the nationality variable of the LFS and link it to the respondents' job at SOC (2000) Unit Group level. Through applying the licensed variable to the LFS it is possible to estimate a time series of how UK, EU and non-EU workers are distributed within licensed and unregulated occupations.

To produce the descriptive estimates based on flow we pool together each quarter of the LFS between 2010 and 2013 and explore the question that asks respondents to report their nationality, year of entry to the UK and whether entry is for employment purposes (i.e. this allows the analysis to focus on migration that is economically driven)[53]. In choosing the time period of observation, we are constrained by the data availability in the LFS. In particular, it is only since the 2010 January-March quarter that the LFS asks respondents to report whether their entry is for employment purposes so our descriptive analysis focuses solely on this time period. This information is then matched to the occupational code that corresponds to each respondent thus simultaneously providing information on migration from the EU for employment purposes and the regulation status of the respondent's occupation.

Although we would expect some correlation between the stock and flow indicators the stock measure is clearly imperfect as it does not account for any changes in the regulation status of occupations themselves during this period[54]. It further does not account for non-UK nationals who have moved to the UK for reasons other than employment. Nevertheless, is the stock measure is the only one available in the LFS which enables us to produce a time series that extends prior to 2010. Neither measure is ideal in as much as we would like to

[52] Since 2011, the QLFS has switched to the most recent version of the Standard Occupational Classification, the SOC2010. We address this by compiling a spread-sheet that shows the correspondence between SOC 2010 and SOC 2000, and we recode the QLFS data for 2011 onwards from SOC 2010 to SOC 2000 (to fit with our map of occupational Regulation).

[53] The analysis uses the WHYUK10 variable. Data confidentiality restrictions on some of these variables meant that the analysis had to be carried out by BIS statisticians. We are grateful for their assistance with these estimates.

[54] Although we know that such changes have not been substantial.

focus on individuals who obtain their qualifications in another EU member state (and thus will face a different regulatory regime in the UK). No such question exists in national surveys and so we are confined to using nationality as an approximation.

4.2.3 Econometric Analysis

The methodology used for the cross-sectional analysis to estimate the impact of occupational regulation on labour mobility into the UK is as follows. To determine if licensing is having an impact on the number of migrants in a given occupation a model of migration is estimated using data from Annual Survey of Hours and Earnings (ASHE) and the QLFS. All the estimates generated from ASHE are based on the median rather than the mean in order to prevent results becoming skewed by small groups of high or low earners. Explanatory variables included from the ASHE dataset include median gross hourly pay, median total paid hours per week, proportion of women in the occupation, percentage change in employment in the last year, and the median age of workers, while skill level of the occupation and lagged migrant stock estimates were taken from the LFS.

The models we estimate here are broadly based on those by Kleiner *et al*. (1982)[55] and explore how licensing affects the proportion of migrants in an occupation. As before, data on the regulation status of occupations is taken from the updated map of occupational regulation discussed above. To provide a more in-depth analysis of the impact of licensing on migration, the regression results are disaggregated into major occupation groups, different levels of stringency and coverage of the licensing regime. In each disaggregation the base group are unlicensed workers. The models are produced using Ordinary Least Squared (OLS) regressions. Unfortunately insufficient data means the regression cannot be run for specific professions. Finally, two models are generated (for 2005 and 2010 respectively) to give an insight into any changes that may have occurred as a result of the MRPQ Directive and over time with regard to the impact licensing has on migrant workers entering into an occupation.

It is important to note that our analysis is based on the LFS not because more detailed data on migration is not available in the UK[56], but rather because other data sources fall short of including certain variables key for our analysis such as information about the occupation (and thus its regulation status) within which the migrants are employed after arrival to the UK or other human capital characteristics such as wages, employment and skills needed to produce the mobility estimates. As such, the model presented here does not aim in providing a justification for observed levels of migration, but rather it focuses on exploring the links between licensing and migration. Therefore, while the model specification employed here is appropriate for the purposes of this study, this is not necessarily the case with other research work on migration in general.

[55] Kleiner, M., Gay, R. and Green, K. (1982) 'Barriers to Labour Mobility: The case of Occupational Regulation', Industrial Relations, 21(3) pp. 383-391

[56] For measures of flow see for example the Migration Statistics Quarterly Report and the International Passenger Survey and for measures of stock the Annual Population Survey, all produced by the Office of National Statistics.

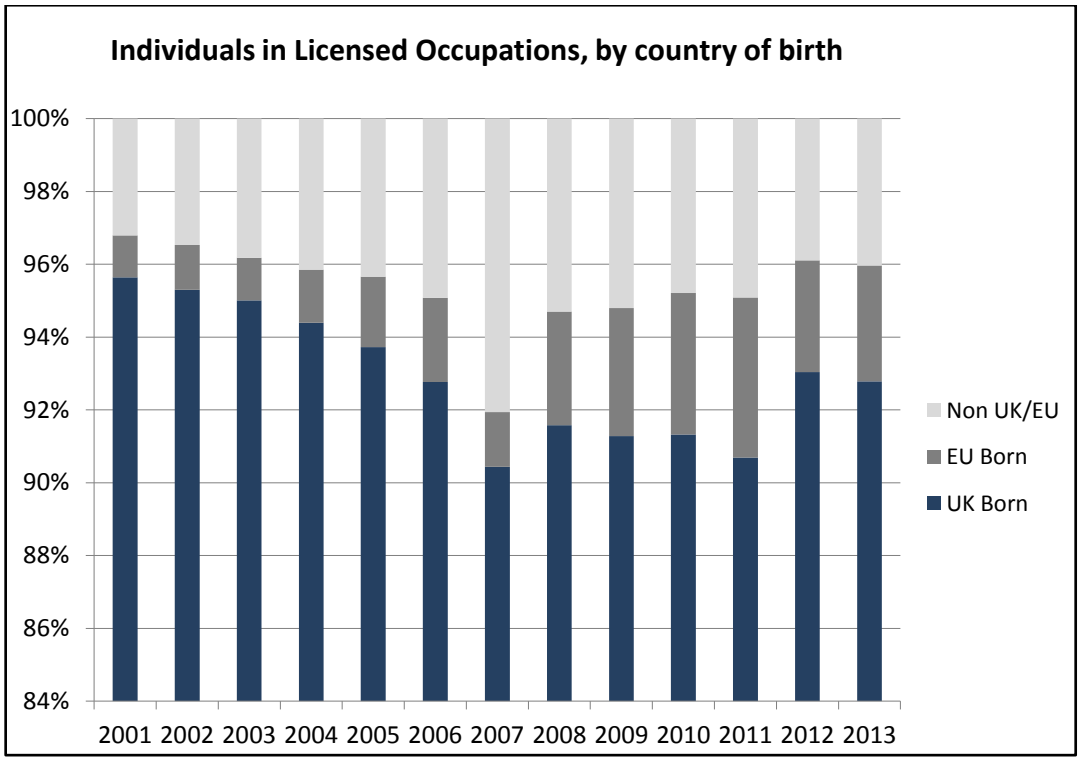
4.3 Descriptive Analysis of EU-Migration to Regulated Occupations in the UK

4.3.1. Stock of Migrants in Licensed Occupations

Figure 4.6a below depicts the results from the estimates based on stock of migrants[57]. Overall, the proportion of EU-born workers within occupational groups where licensing is present is less than figure for non-EU born workers. However, EU-born migrants in regulated occupations have been on the increase since a sustained fall in the early 2000s and a sharp but proportionally small fall in 2007, the first year the Directive became fully operational.

While as noted before the MRPQ Directive 2005/36/EC mainly consolidated existing legislation, this short-lived drop is either indicative of the labour market adjusting to the revised provisions or a one-off exit of EU-born workers from licensed occupations as a result of other factors.

Figure 4.6a: Individuals in Licensed Occupations, by country of birth 2001-2013

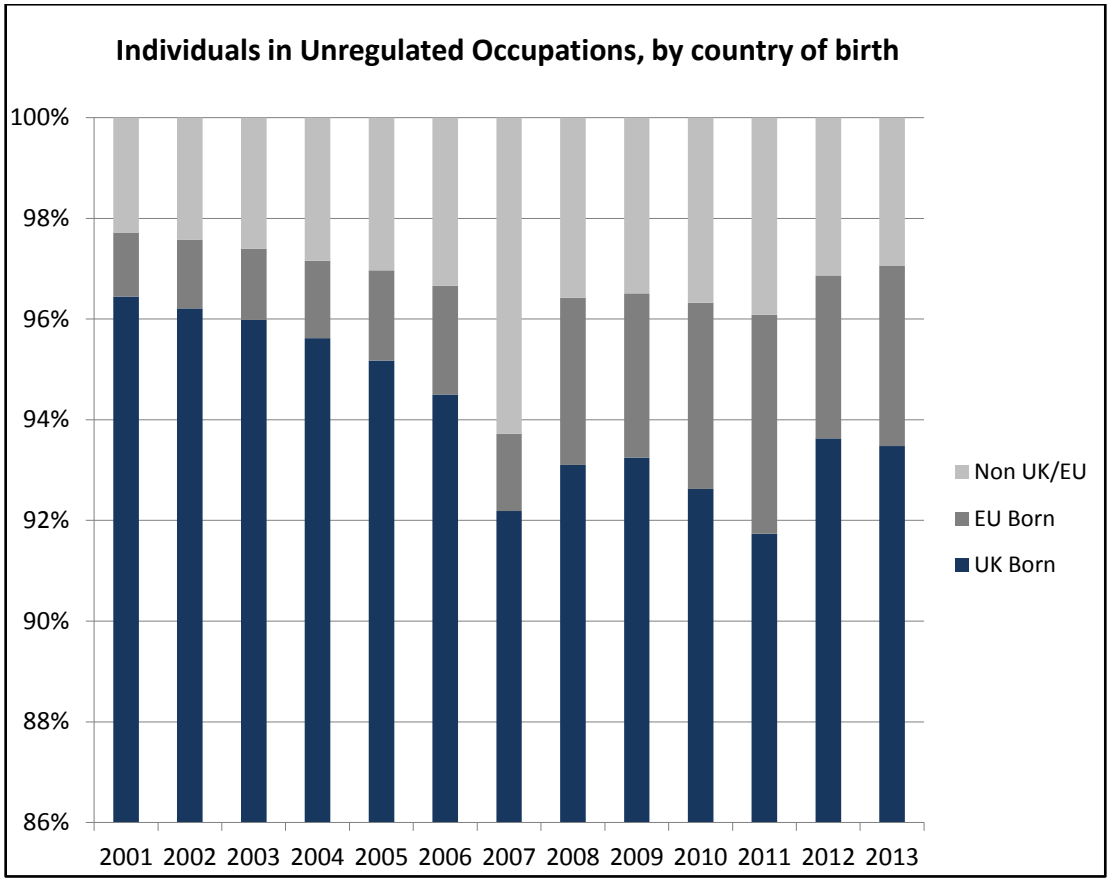


Source: QLFS 2001-2013

In comparison, Figure 4.6b depicts the share of individuals in unregulated occupations for the same time period. As it can be seen, especially since 2008, the proportion of non-EU born migrants is comparable to those from the EU. As before, the proportion of EU-born workers within unregulated occupations also dropped in 2007, thus perhaps indicating that other labour market factors were in operation that year.

[57] These estimates are produced by taking the mid-point between lower and upper bound estimates of licensed individuals (see section 4.3.2 for a discussion of upper and lower bounds).

Figure 4.6b: Individuals in Unregulated Occupations, by country of birth 2001-2013



Source: QLFS 2001-2013

4.3.2 Flow of Migrants in Regulated Occupations

We turn to the flow measure of the share of EU migration in regulated occupations. As noted in the previous methodology section the key advantage of this approach is the ability to screen for only those migrants who have entered the UK for employment reasons.

However, as with estimates in Chapter 3 of the prevalence of occupational regulation across the EU, this approach has potential for measurement error because even at the most detailed level of measurement available to us (4-digit level) only some of the occupations might be subject to regulation. This data limitation means that it is necessary to produce both an upper and a lower bound estimate of the share of EU migrants within regulated and unregulated occupations, within which the true estimate of mobility from the EU to regulated occupations will lie.

The upper bound estimate assumes that all jobs at 4-digit level are subject to the regulatory status in question while the lower bound estimate assumes that none of them are. In the case of licensing and registration our estimates do not account for non-compliance by individuals, while for **accreditation and certification our estimates depict migration in jobs**

that individuals have the option of becoming certified or accredited, rather than actual certification and accreditation amongst these individuals.

It is important to emphasize that the LFS measure employed in this section is an estimate of the *flow* of individuals into the UK labour market for employment purposes by the regulation status of the occupation they are moving into over the time period covered. This contrasts to the estimates of the preceding section and the estimates in Chapter 3 for all countries in the EU which measures the total stock of workers.

The results are shown in Table 4.1 and are plotted in Figure 4.2. Based on our upper bound estimates, between January 2010 and March 2013, while the majority of EU migration into the UK for employment purposes is accounted for by unregulated occupations (48 per cent), this is followed by licensed occupations (36 per cent). Accredited occupations are the third most popular destination (21 per cent), while registration and certification attract the least number of EU-migrants (7 per cent and 3 per cent respectively). The margin between unregulated and licensed occupations is even smaller if lower bound estimates are taken into account (31 per cent versus 30 per cent respectively). Further, as it is evident from Figure 4.2, there is very little variation during the period 2010-2013. According to this 3-year snapshot the strictness of regulation does not appear to be linked to employment-related movement to the UK or else, licensing, compared to other forms of regulation, has not deterred entry during this period.

Although we have no way of knowing the counterfactual, i.e. how the trend would look like if licensing arrangements were simplified, the fact that licensed occupations are the second most popular destination is clearly an encouraging finding and alludes to the existence of a recognition regime (through the MRPQ Directive) that is conducive to labour movement. This is further in line with previous empirical work. Evidence from studies on migration patterns for example show a positive correlation between the choice of destination and the recruitment process, and in particular the ease of recognition of qualifications and registration with the country's Competent Authorities. Anarfi *et al*. (2010)[58] for example find that the reason why nurses from Ghana are more likely to move to the UK, while for doctors to the US, is the ease with which their qualifications can be recognised in these two countries respectively.

However, it is possible that licensed occupations are correlated with other determinants of migration such as it being a direct response to the presence of wage differentials resulting from disequilibrium between supply and demand, an explanation that the data does not allow us to explore.

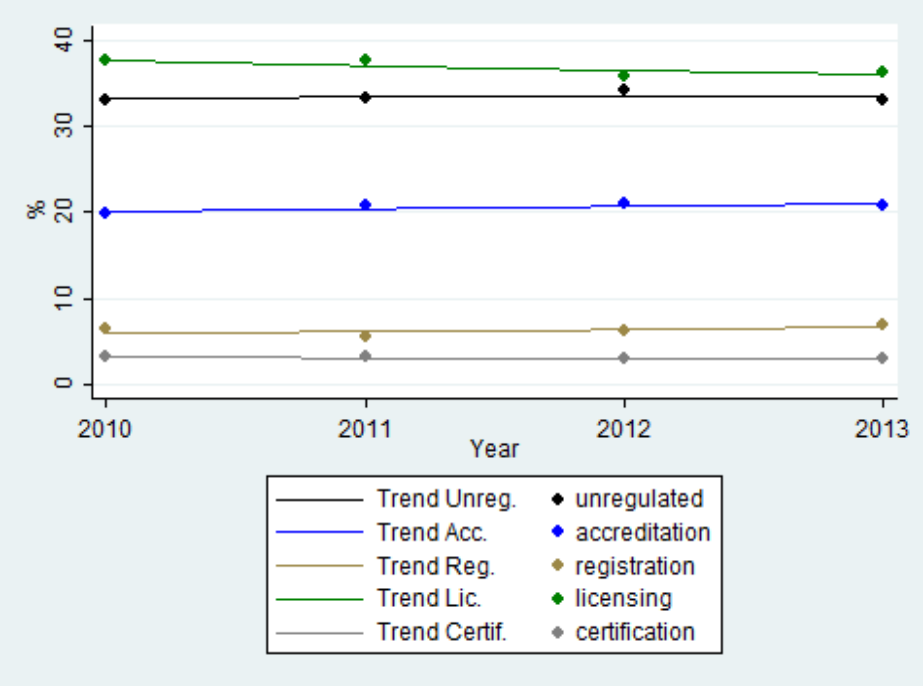
[58] Anarfi, J., Quartey, P. and Agyei, J. (2010 Key Determinants of Migration among Health Professionals in Ghana), Development Research Centre on Migration, Globalisation and Poverty, available at http://www.migrationdrc.org/publications/research_reports/Quartey_et_al_Health_workers.pdf

Table 4.1 Share of EU workers which came to UK for employment by regulation status of profession, by year.

	Unregulated		Accreditation		Registration		Licensing		Certification	
	Upper bound	Lower bound	Upper bound	Lower bound	Upper bound	Lower bound	Upper bound	Lower bound	Upper bound	Lower bound
2010	35.9	33.1	18.9	17.1	5.8	5.5	36.0	34.4	3.4	2.9
2011	48.6	32.5	20.7	14.9	5.4	2.9	37.6	31.2	3.1	2.4
2012	53.7	29.1	24	14.5	8.1	2.2	35.8	27.3	3.0	2.3
2013 (Q1-Q3)	53.1	31.2	20.6	14.1	7.9	3.8	36.2	26.5	4.1	2.5
Average 2010-2013 Q3	47.8	31.4	21	15.1	6.8	4.7	36.4	29.8	3.4	2.5

Note: The estimates are based on the QLFS: Jan 2010- March 2013, numbers in percentages

Figure 4.2 Trends in EU migrants entering the UK by regulation status (January 2010-March 2013)



Note: The estimates are based on the QLFS: 2010- March 2013, numbers in percentages

Table 4.3 explores the nationality of respondents in relation to the regulation status of their occupation when they enter the UK for employment purposes. Lithuanians, Portuguese, Latvians, Slovakians and Spanish display the highest percentages of movement into licensed occupations, possibly signaling some correspondence in educational requirements between these countries and the UK. Further research would be needed to establish if this is the case.

For the remaining 14 nationalities, the figures are too low to produce robust estimates. Migrants from the Czech Republic, Sweden and Hungary are more likely to be found in unregulated occupations, while the same is true for Romanians and Irish with respect to accreditation.

4.3 Share of workers that come to the UK for employment, by country of origin

	Unregulated	Accreditation	Registration	Licensing	Certification	Proportion of Total Migration
Austria	*	*	*	*	*	n/a
Belgium	*	*	*	*	*	0.5
Bulgaria	39.9	29.0	*	28.8	*	2.4
Croatia	*	*	*	*	*	1.2
Cyprus	*	*	*	*	*	n/a
CzechRepublic	45.6	*	*	*	*	0.53
Denmark	*	*	*	*	*	0.5
Estonia	*	*	*	*	*	n/a
Finland	*	*	*	*	*	n/a
France	27.9	28.1	*	21.0	*	4.2
Germany	36.9	20.5	*	21.3	*	4.2
Greece	*	*	*	*	*	0.7
Hungary	45	*	*	37.4	*	2.9
Ireland	30.2	29.2	*	29	*	9.7
Italy	35.1	17.1	*	28.9	*	3.5
Latvia	43.3	12.6	*	39.2	*	4
Lithuania	37.6	15.7	*	43.3	*	7.2
Luxembourg	*	*	*	*	*	n/a
Malta	*	*	*	*	*	n/a
Netherlands	43.2	*	*	*	*	1.5
Poland	39.8	15.7	2.3	39	3.2	38.5
Portugal	36.8	16.5	*	39.6	*	4.6
Romania	33.2	38	*	23.2	*	4.9
Slovakia	43.1	*	*	38.9	*	3.1
Slovenia	*	*	*	*	*	n/a
Spain	37.6	*	8	30.9	*	3
Sweden	51.2	*	*	*	8	1

Note: The estimates are based on the QLFS: January- March 2013, numbers in percentages, * weighted figure below 4,000 and therefore unreliable (and in some cases disclosive)

We move on to explore in more detail how migration flows are distributed within specific occupations. According to our estimates, out of the 353 SOC2000 codes, 109 demonstrate an average figure of migration of more than 4,000 individuals for the period 2010-2013[59]. While the majority of occupational codes that attract migrants fall within the unregulated

[59] The figure of 4,000 is the threshold imposed to us by the dataset. In particular, due to the perceived unreliability of the data and risk of identifying respondents in the LFS, information for when 4,000 or less individuals are migrating to a specific occupation cannot be disclosed. This affects a total of 244 SOC codes

category (31 SOC codes), licensing follows closely (28 SOC codes). A total of 20 occupational codes where accreditation arrangements exist have attracted individuals from the EU, followed by just 8 and 2 for registration and certification respectively.

The data enables us to further explore which licensed occupations account for the majority of this movement. Table 4.4 shows the eleven licensed occupations that EU migrants enter ranked according to the size of the observed migration (Columns 1 and 2)[60] for the period 2010-2013. We find no substantial descriptive differences in the mobility of occupations subject to the automatic system of recognition of the MRPQ Directive (the route that harmonizes minimum training requirements) vis-à-vis their general system counterparts. In particular, four out of the 11 occupations in the list are covered by the automatic recognition route. These are nurses and nursing auxiliaries, medical practitioners, dentists and architects.

The remaining seven occupations on the list are all subject to the general system of recognition. With the exception of dental practitioners, architects and medical practitioners, EU migration in these occupations constitutes less than 10 per cent of total employment (Column 4), but as Column 5 shows for all occupations apart from senior care workers, the EU migration levels within these occupations are still above the average rate of EU migration within their Major SOC Group (i.e. occupations comparable to them). The final column looks at whether migration to licensed occupations is linked to labour shortages in these occupations. The information on labour shortages is based on the latest UK Border Agency's (UKBA) shortage list[61]. As it can be seen, with the exception of nurses, medical practitioners and secondary school teachers, none of the EU-related migration is in response to excess demand for practitioners in the UK labour market.

[60] Reported estimates are based on the 3-year average (2010-2013).
[61] The list can be accessed via the following link: http://www.ukba.homeoffice.gov.uk/sitecontent/documents/workingintheuk/shortageoccupationlistnov11.pdf

Table 4.4 Migration to Licensed Occupations, by SOC2000

Licensed Occupation (SOC2000)	EU Employment-related Migration	Total UK employment	EU migration as Percentage of Total UK Employment	Average Rate of EU-Migration within SOC Major Group[62]	Included in the UKBA Shortage List (2013)
Nurses (3211)	66,848	755,000	8.9%	1.4%	Yes, some job titles
Care Workers (6115)	29,835	659,000	4.5%	1.7%	No
Medical Practitioners (2211)	29,187	242,000	12%	1.7%	Yes, some job titles
Nursing Auxiliaries (6111)	15,746	369,000	4.2%	1.7%	No
Secondary Education Teaching Professionals (2314)	13,069	441,000	2.9%	1.7%	Yes, some job titles
Security Guards (9241)	12,053	133,000	9%	6%	No
Senior Care Workers (6115)	9,354	659,000	1.4%	1.7%	No
Motor mechanics, auto engineers (5231)	8,150	106,000	7.7%	2.9%	No
Primary and Nursery Education Teaching Professionals (2315)	7,606	396,000	1.9%	1.7%	No
Dental Practitioners (2215)	4,468	9,000	50%	1.7%	No
Architects (2431)	4,055	29,000	14%	1.7%	No

Note: Respondents aged 16+, employees and self-employed only.

We further explore labour movement by the regulation status of the SOC2000 main occupational group. Table 4.5 shows that licensed EU nationals are found across the board of the skills distribution. In particular, EU-nationals migrating to the UK for employment purposes are disproportionally found in licensed occupations in the case of managerial (30%) and professional occupations (38%), those working in personal services (47%), sales and customer service occupations (59%) as well as process and machine operatives (64%).

Overall, it is clear that when EU migrants enter licensed occupations this is not confined to high skilled occupations (where one would expect barriers to be higher) but also medium and low skilled ones. Further, EU migrants compared to UK nationals are disproportionately found in licensed occupations in the case of skilled trades, sales and customer representatives as well as process and machine operatives. We do not observe any

[62] Using the LFS we estimate the average rate of migration between 2010-2013 from the EU for the SOC-Major Group that the occupation belongs.

significant differences as to how EU migrants are allocated depending on the type of regulation within these occupations. Therefore, unregulated practitioners are more likely to be in administrative occupations, certified in professional occupations, accredited in skilled trades and licensed in machine and process operatives, and this holds true for both EU and UK nationals. The only exception is registration, where EU migrants are more likely to be found in managerial occupations, while UK nationals in personal services.

Table 4.5 Share of EU and UK workers in regulated occupations, by main occupation

	Unregulated		Certification		Accreditation		Registration		Licensing	
	EU Migrants	UK Nationals	EU Migrants	UK Nationals	EU Migrants	UK Nationals	EU Migrants	UK Nationals	EU Migrants	UK Nationals
Managers	22.7	30.3	0.4	0.8	23.1	23.0	23.4	19.3	30.4	26.6
Professionals	27.2	25.3	8.3	7.8	27.0	23.2	0.0	0.0	37.6	43.8
Associate Professionals	44.7	39.5	6.1	5.2	26.7	26.2	13.7	9.0	8.9	20.1
Administrative Professionals	72.8	69.0	0.0	0.0	19.9	20.6	7.3	10.3	0.0	0.0
Skilled Trades	14.5	19.1	0.0	0.0	53.8	51.2	0.0	0.0	31.7	29.7
Personal Services	24.1	13.5	5.3	7.2	1.4	2.3	21.9	25.7	47.3	51.3
Sales and Customer Representatives	35.8	37.9	0.0	0.0	0.0	0.7	5.0	2.7	59.2	58.8
Process and Machine Operatives	27.6	27.7	4.8	5.9	4.1	7.3	0.0	0.0	63.6	59.1
Elementary Occupations	63.4	63.7	0.0	0.0	6.6	11.9	0.8	2.0	29.3	22.4

Note: The estimates are based on the QLFS (2011 to 3rd Quarter 2013), numbers in percentages

4.4 Results of the Cross-Sectional Analysis: Occupational Regulation and Labour Mobility

We proceed beyond the preceding descriptive analysis by focusing on licensing only and explore its relationship to labour migration. Regression analysis is applied to examine this relationship on a number of levels of disaggregation:

- First, for all occupations in the UK
- Next, by broad professional classification (e.g. professional, managerial and crafts).
- Then by the level of barrier the regulation is estimated to impose (low, medium or high).
- Then the broad professional classification and level of barrier are combined together.
- Finally by whether the migrant was born in or out of the EU and by regulatory system under the MRPQ Directive (i.e. whether a profession qualifies for automatic recognition or is under the general system).

As previously noted the limited amount of data available means it has not been possible to examine the link between occupational regulation and mobility into the UK for any specific professions.

4.4.1 Methodology

To determine the relationship between licensing and migration into the UK we estimate a regression model with the following specification. Licensing is the key explanatory variable of interest and we also control for a number of labour market variables that are known to affect migration. The earnings variable (median pay) reflects differences in market conditions across occupations, while paid hours per week is a proxy for demand for the occupation. Each is taken to have a positive effect on migration. We also include a lagged migrant stock variable as a measure of the average propensity of individuals to migrate, since previous research has shown that it is significant in affecting current migration via reducing the information costs of moving (Dunlevey and Gemery 1977[63]). Female-dominated occupations tend to be less migration-responsive to economic variables than male-dominated ones given that women are more likely to be secondary incomes earners (Polachek 1975)[64], so we also control for the proportion of women in the occupation. The model enables us to distinguish between the effect of licensing and that of other relevant factors. Throughout our analysis, the dependent variable is the proportion of migrant stock within each occupation[65]. We employ this measure of migration as previous studies suggest that migrant stock is among the most statistically significant variables affecting current migration and is also a good measure of the average propensity to migrate (Dunlevey and

[63] Dunlevey, J.A. and Genery, H.A. (1977), 'The Role of Migrant Stock and Lagged Migration in the Settlement Patterns of Nineteenth-Century Immigrants', Review of Economics and Statistics, May, pp. 137-144.

[64] Polachek, S. (1975) 'Potential Biases in Measuring Male-Female Discrimination', Journal of Human Resources, pp.205-229.

[65] A detailed account of the variables and method that are used in the regressions that follow are presented in Appendix B.

Gemery 1977[66]).This specification is in-line with previous economic research on the relationship between licensing and migration (see for example Pashigan 1977[67]; Kleiner, Gay and Greene 1982[68]).

4.4.2 Aggregate Results

The aggregate results at occupational level are displayed in Table 4.7. Licensing has a significant positive association with the proportion of EU migrant workers in an occupation before controls are added. However, once control variables are included this association ceases to be significant thus suggesting that the licensed status of an occupation is not related to the levels of migration in that occupation. These results are in contrast to those found in the US (see for example Pashigan 1977; Kleiner, Gay and Greene 1982), where licensing has been shown to reduce the interstate migration of professionals[69]. One explanation relates to the nature and stringency of regulatory requirements between origin and host country. For example, the US studies cited above attribute the reduced geographical mobility between jurisdictions to the high levels of discrepancy in licensing requirements and show how these contribute to structural unemployment. It is possible that this discrepancy in the findings is due to the legal restrictions in the US being greater than those in the EU. According to Kleiner (2006)[70] for example, while the focus of US licensing is on controlling entry to the occupation and mobility across states, in most EU countries entry and mobility are less burdensome. It is therefore plausible that the heterogeneity in the licensing regimes translates to heterogeneity in the labour market outcomes of licensing, including levels of migration.

Interestingly, with the exception of proportion of migrants in the profession, none of the other variables are making an important contribution in explaining migration to the UK. This would suggest that other factors that we have not captured in this model such as language or development of local reputation and physical capital might be more important explanatory variables than institutional barriers enacted by licensing. Data limitations have not enabled us to test a model that includes these explanatory variables. In particular the LFS does not include any questions on language proficiency. The difficulty of obtaining relevant data is even greater in the case of development of local reputation or physical capital, and also widely recognized in the migration literature.

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[66] Dunlevey, J. A. and Gemery, H.A. (1977) 'The Role of Migrant Stock and Lagged Migration in the Settlement Patterns of Nineteenth-Gentury Immigrants', Review of Economics and Statistics, 59(2) pp. 137-144.

[67] Pashigan, J. (1977) 'The Market for Lawyers: The Determinants of the Demand and Supply of Lawyers', Journal of Law and Economics, 20, pp.53-67.

[68] Kleiner, M., Gay, R. and Green, K. (1982) 'Barriers to Labour Mobility: The case of Occupational Regulation', Industrial Relations, 21(3) pp. 383-391.

[69] These studies are comparable to the one presented here, as the estimates are also conducted at aggregate level (as opposed to occupational),using large and representative datasets.

[70] Kleiner, M. (2006) Licensing Occupations: Ensuring Quality or Restricting Competition? Michigan: W.E. Upjohn Institute for Employment Research

Nevertheless, the aim of our model is to explore the links between licensing and migration, and not to fully account for the determinants of migration. In that sense, it has achieved its goal. At the same time however, it alludes to the fact that other variables are more important in explaining the variance in migration. For example, the fact that proportion of migrants in the occupation is significantly and positively related to migration supports the assertion that networks amongst existing and potential immigrants are important in encouraging mobility amongst the latter. Future research should take these points into account when exploring such relationships. Further, our model is UK-specific, so whether the same results hold in other EU Member States is not known.

Finally, these results hold true for both time periods of interest, i.e. before the implementation of the MRPQ (2005) and after (2010), suggesting that the previous legislative arrangements were already conducive to labour movements.

Table 4.7: Regression Results Overall Association between EU Migration and Licensing

	2005		**2010**	
	No Controls	Controls	No Controls	Controls
Licensing	0.020**	0.013	0.024**	0.009
Median Pay		0.002*		0.001
Median Total Paid Hours per Week		-0.001**		0.001*
Skill Level		-0.005		-0.011*
Median Age		0.000		-0.001
Proportion Women		0.004		0.016
Percentage Change in Employment		-0.028		-0.019
Lagged Proportion of Migrants		0.517***		0.620***
R^2	0.014	0.213	0.015	0.384
Observations	353	353	353	353

Source: ASHE 2004, 2005, 2009 and 2010, LFS 2004, 2005, 2009 and 2010;

Note: * significant at 10%; **significant at 5%; ***significant at 1%

4.4.3 Results by Major Occupational Group

The next step is to disaggregate this analysis by SOC major occupational group to explore any heterogeneous effects of licensing on migration. In particular, given that different groups are subject to different licensing requirements, it might well be that some licensing affects migration for some professions but not others. The same model as before is used to produce these estimates. Results are shown in Table 4.8. Once the results are divided into occupation major groups, licensing is shown only to have a significant association with the ratio of migrants in occupations within the process, plant and machine operatives group and skilled trades group and only in 2005. In all other groups no significant association is found at both time periods.

Table 4.8: Regression Results: Association between licensing and EU-migration by SOC major group

Major Occupational Groups (SOC)	2005	2010
1. Managers and Senior Officials	0.007	-0.009
2. Professional Occupations	0.005	-0.001
3. Associate Professional and Technical Occupations	-0.033	-0.020
4. Administrative and Secretarial Occupations	-0.003	N/A
5. Skilled Trades Occupations	0.047	0.028
6. Personal Service Occupations	0.022	0.057
7. Sales and Customer Service Occupations	0.121	-0.044
8. Process, Plant and Machine Operatives	0.037*	0.027
9. Elementary Occupations	0.005	0.049

Source: ASHE 2004, 2005, 2009 and 2010, LFS 2004, 2005, 2009 and 2010.

Controls: Median gross hourly pay, median total paid working hours per week, SOC skill level, median age of workers, proportion of women in the occupation, percentage change in employment in the past year, proportion of migrant workers in the occupation last year;

*Notes: Missing variables in the 2010 dataset for administrative and secretarial occupations meant that the model could not be run; * significant at 10%; significant at 5%; ***significant at 1%*

4.4.4 Results by Barrier to Entry

While in general licensing regimes create a barrier to entry for potential workers, in practice each regime varies with regard to stringency of the entry requirements. For example a doctor must study for a minimum of 8 years in order to qualify for their licence to practice but a security guard need to only attend a 3 day course. The expectation is that the higher the barrier to entry the greater the restriction to the occupation. We have reviewed the stringency of the licensing regime for each occupation that is subject to such arrangements. Based on the educational requirements placed by licensing regulations on the occupation we developed a three level categorisation (low, medium and high). High stringency occupations typically involve a lengthy training process at NVQ Level 4 or above (i.e. a minimum of a Bachelor's degree) followed by exams and requirements relating to work experience. Medium stringency occupations commonly expect perspective practitioners to attain qualifications at NVQ Levels 2 and 3, while low stringency at NVQ Level 1[71]. We proceed by running the same models on each of the three categories of stringency.

Results are presented in Table 4.9. As it can be seen, there are no significant associations between licensing and proportions of migrants in the occupation at any level of stringency and for neither of the two years of interest. It would transpire that occupations with low

[71] The resulting classification table for each of the 353 SOC Groups is available from the researchers upon request.

barriers to entry do not differ in attracting EU-migrants from their medium and high barrier counterparts. However, the lagged proportion of migrants in the occupation correlates highly with EU-migration.

Table 4.9: Regression Results: Association between licensing and EU-migration by level of barrier to entry imposed by licensing

	Low Barrier to Entry		Medium Barrier to Entry		High Barrier to Entry	
	2005	2010	2005	2010	2005	2010
Licensing	0.007	0.012	-0.004	-0.019	0.029	0.020
Median Pay	0.000	0.001	0.001	0.002	0.002*	0.002*
Median Total Paid Hours per Week	-0.001	0.001*	-0.001	0.001	-0.001	0.001
Skill Level	0.002	-0.011	-0.001	-0.015*	-0.004	-0.140*
Median Age	0.000	-0.002	0.000	-0.002	0.000	-0.002
Proportion Women	0.004	0.018	0.003	0.010	0.003	0.013
Percentage Change in Employment	-0.012	-0.016	-0.017	-0.016	-0.027	-0.017
Lagged Proportion of Migrants	0.598***	0.592***	0.522***	0.430***	0.427***	0.487***
R^2	0.381	0.367	0.338	0.222	0.202	0.288
Observations	305	305	284	284	294	294

Source: ASHE 2004, 2005, 2009 and 2010, LFS 2004, 2005, 2009 and 2010

Note: * significant at 10%; **significant at 5%; ***significant at 1%

4.4.5 Results by Major Occupational Group, Barrier to Entry and Coverage

Table 4.10 considers the results where the data is disaggregated by major occupational group, level of barrier to entry and coverage. In relation to the latter, due to the coding system of occupations in the UK, there are many cases where licensing is present in an occupational group but it may not be required for all the occupational codes within it. For example, licensing covers security guards but lollipop ladies, who are in the same occupational group, are an unregulated occupation. As a result licensing can be disaggregated into regimes that have full coverage over an occupational group and regimes

that have only partial coverage of a group. As before, we test our model according to these characteristics for 2005 and 2010.

Significant associations are found between licensing and the proportion of migrants in an occupation in three situations: (a) in 2005 where licensing has partial coverage in the skilled trade occupations and provides a low barrier to entry a positive association is found, (b) in 2010 where licensing has full coverage in the associate professional and technical occupations and demands medium entry requirements, a negative association is found, and (c) in 2005 where licensing has partial coverage in the associate professional technical occupations and requires high entry requirements to be met a negative association is found. In all other situations no significant association is found between licensing and the proportion of migrants within an occupation.

Table 4.10: Regression Results: Association between licensing and migration disaggregated

	Low Barrier to Entry				Medium Barrier to Entry				High Barrier to Entry			
	2005		2010		2005		2010		2005		2010	
	Partial Coverage	Full Coverage	Partial Coverage	Full Coverage	Partial Coverage	Full Coverage	Partial Coverage	Full Coverage	Partial Coverage	Full Coverage	Partial Coverage	Full Coverage
1. Managers and Senior Officials	0.063	0.033	0.048	-0.002					-0.098	-0.031		-0.017
2. Professional Occupations						-0.024			0.015	0.040	-0.006	-0.004
3. Associate Professional and Technical Occupations	-0.061	-0.078	-0.037	-0.064*	-0.053	-0.032	0.001	-0.05	-0.054*	0.043	0.041	0.032
4. Administrative and Secretarial Occupations												
5. Skilled Trades Occupations	0.05*		0.028		0.009							
6. Personal Service Occupations	-0.002		0.088		0.037		0.051					
7. Sales and Customer Service Occupations	0.121		-0.044									
8. Process, Plant and Machine Operatives	0.052	0.032	0.119	-0.024								
9. Elementary Occupations	0.008	-0.005	0.059	0.005								
Observations	283	285	283	285	272	275	272	275	289	268	289	268

Source: ASHE 2004, 2005, 2009 and 2010, LFS 2004, 2005, 2009 and 2010. Controls: Median gross hourly pay, median total paid working hours per week, SOC skill level, median age of workers, proportion of women in the occupation, percentage change in employment in the past year, proportion of migrant workers in the occupation last year;

Note: * significant at 10%; **significant at 5%; ***significant at 1%

4.4.6 Results by EU Regulatory system – automatic or general recognition

The final set of models, look at differences in migration levels between occupations subject to automatic recognition (namely architects, dentists, doctors, midwives, nurses, pharmacists and veterinary surgeons) versus those subject to the general system (all other occupations). This is of interest because it is generally thought that the automatic system is less burdensome for professionals than the general system.

We undertake this analysis at two points in time. First, in 2005, before the Directive 2005/36/EC on the recognition of professional qualifications came into force in 2007, and then again in 2010, three years after the Directive has been in place. Results are presented in Tables 4.11 and 4.12 respectively. We include migrants outside the EU as comparators, even though such individuals are not covered by the Directive's provisions.

The results for 2005 indicate that working for licensed occupations subject to automatic recognition is associated with higher presence of EU migrants. However, this does not appear to be the case with professions under the general recognition system, while the recognition status of the occupation does not appear to be a correlate of migration for non-EU practitioners. This indicates that automatic recognition occupations were more likely to be mobile even before the provisions of the Directive came into force.

The picture has not changed in 2010. Automatic recognition professions were still associated with higher levels of migration, and while the opposite is the case for general recognition the results are not within the levels of significance that would enable us to be confident that this relationship exists within the population at large. Interestingly, automatic recognition is also positively associated with migration from outside the EU, which alludes to the conclusion that rather than the Directive driving the results, it is perhaps a characteristic endemic within these occupations that drives migration. For example, the automatic recognition status was not assigned randomly to the seven occupations in question, but rather it was driven by the fact that similar qualification requirements were already present across EU-member states and they were already characterised by relatively higher level of movement compared to those under the general system.

Table 4.11 Association between Licensing and Migration by type of recognition arrangement, 2005

	Migrants Born Within EU		Migrants Born Outside EU	
	Automatic Recognition	**General Recognition**	**Automatic Recognition**	**General Recognition**
Licensing	0.036***	0.005	0.021	-0.003
Median Pay	0	0	0.002	0.001
Median Total Paid Hours per Week	-0.001***	-0.001	-0.001	0
Skill Level	0.005*	0.003	-0.002	0.004
Median Age	0	0	0	0
Proportion Women	-0.005	-0.005	0.004	0.004
Percentage Change in Employment	-0.006	-0.014	-0.009	0
Lagged proportion of Migrants	0.285***	0.285***	0.468***	0.514***
R^2	0.395	0.167	0.366	0.317
Observations	272	346	272	346

Source: ASHE 2004, 2005, 2009 and 2010, LFS 2004, 2005, 2009 and 2010.

Note: * significant at 10%; significant at 5%; ***significant at 1%

Table 4.12 Association between Licensing and Migration by type of recognition arrangement, 2010

	Migrants Born Within EU		Migrants Born Outside EU	
	Automatic Recognition	**General Recognition**	**Automatic Recognition**	**General Recognition**
Licensing	0.150*	-0.01	0.056*	0.001
Median Pay	0.001	0.001	0.002	0.001
Median Total Paid Hours per Week	0.001	0.001*	-0.001	0
Skill Level	-0.016**	-0.012*	-0.007	-0.004
Median Age	-0.003	-0.002	-0.005	-0.003
Proportion Women	-0.023	-0.012	0.012	0
Percentage Change in Employment	-0.045	-0.025	-0.025	0.01
Lagged proportion of Migrants	0.346***	0.216**	0.234***	0.316***
R^2	0.184	0.135	0.269	0.317
Observations	272	346	272	346

Source: ASHE 2004, 2005, 2009 and 2010, LFS 2004, 2005, 2009 and 2010.

Note: * significant at 10%; **significant at 5%; ***significant at 1%

4.5 Limitations

Our analysis is not without limitations. First, a key drawback of the licensing-migration model presented in this chapter is that it is unable to directly distinguish between individuals moving due to the lack of language barriers or because their investment in local reputation and physical capital in their home country is minimal, rather than the lack of barriers enacted by the licensing arrangements present in the UK. Unless the availability of such information in national labour market surveys improves, such knowledge gaps will not be bridged. We are further not able to compare the MRPQ with previous incarnations of regulatory regimes relating to skills and mobility in the EU. As such, while we find some evidence that the current arrangements are not obstructing movement of professionals, it is not known to us whether the present levels are an improvement on the ones that were in existence before.

A second important caveat in any work that attempts to produce estimates like the ones shown above is that while national data are crucially important in producing them, there is the general issue around sample size with many national surveys, in that sample sizes of EU migrants rapidly diminish once disaggregation is attempted, such as by occupation,

nationality sector or skill level, or by distinguishing 'migrants from non-migrants. This places a constraint on the estimates that can be produced and the level of detail that these estimates can include. In particular it means that analysis on a single profession basis is not possible. **Heterogeneity of impact among particular professions cannot be ruled out.**

A further limitation is the nature of the data forces researchers to produce upper and lower bounds estimates of regulation and thus migration into regulated occupations. As it can be seen in Table 4.1, the range between the upper and lower-bound estimates is relatively small in the case of certification and registration, slightly higher for licensing and accreditation and considerably large in the case of unregulated occupations. Previous research has shown that the true estimates are likely to be closer to lower bounds than to the upper bounds (Forth *et al*. 2012)[72], however the true estimates remain unknown.

Finally, we would like to reiterate that our approach of using the SOC enables us to classify regulated jobs not workers. Therefore, it cannot account for non-compliance (in the case of licensing and registration) or for lack of take up (in the case of certification and accreditation). Thus in relation to mobility, at the most what the data shows is the proportion of EU professionals entering regulated and unregulated occupations, rather than their individual regulation status. Unless the nature of information included in datasets improves, the current SOC-based approach is the only option available to researchers. Information on how this can be improved is included in the final section of this report.

4.6 Summary

Our descriptive results show licensed occupations to display the highest levels of movement to the UK for employment purposes over the last several years. We further find **no substantial differences in the mobility of occupations subject to the automatic system of recognition compared to those under the general system**, possibly signalling that while the general system might be more onerous it is at least as effective as the automatic in facilitating movement.

We move on to examine whether licensing arrangements in the UK are associated with the level of migration to these occupations in two time periods, 2005 and 2010. We perform various heterogeneity analyses by major occupational groups, stringency of licensing requirements, and coverage of legislation but no robust trends are found. We therefore conclude that (a) there is **no evidence of licensing being an important determinant** in explaining the levels of migration to an occupation in the UK (b) these results hold true for both 2005 and 2010 and (c) no substantial differences in movement exist between occupations under the automatic and general systems.

How can these results be explained? One possibility is that the mechanisms in the MRPQ Directive, and in the preceding legislative framework that it consolidated, have been

[72] Forth, J., Bryson, A., Humphris, A., Kleiner, M. and Koumenta, M. (2012) A Review of Occupational Regulation and its Impact, UK Commission for Employment and Skills, London.

operating sufficiently well so as not to impede movement. If this is the case, it is perhaps not surprising that no particular changes were detected before and after the implementation of the Directive. Unfortunately it has not been possible to examine previous legislative regimes as the data does not allow for easy analysis to a period so far back.

Interestingly, the proportion of migrants already in the occupation is more powerful in explaining labour movement from the EU than the licensing status of the occupation. The same might be the case with variables that we were not able to include in our model such as language skills and investment in local reputation and set up costs. The results might also be indicative of the ability of migrant workers to meet the existing requirements due perhaps to similar requirements being present in the country of origin, something that is strengthened by the finding that automatic recognition is also positively associated with movement from non-EU countries.

5. Case Studies of Licensed Occupations in the UK

Chapter Summary

- Dental Practitioners; pharmacists; secondary education teaching professionals; social workers; plumbers, heating and ventilating engineers; security guards; architects and chartered accountants are selected as case study occupations to provide an in-depth analysis of the regulatory arrangements within them and their impact.
- Using data from the QLFS, we provide a time series of UK, EU and non-EU born workers within these occupations covering the period 2001-2013. With the exception of dentists and security guards, the remaining occupations have been relatively stable in terms of their share of EU-born workers over the period. However, there are substantial fluctuations year to year, suggesting a good degree of labour market flexibility.
- Wage premiums as a result of occupational licensing are estimated for all case study professions. The wage premium is higher for occupations that have been licensed for a longer period of time and those with higher educational and training requirements (e.g. dentists, pharmacists, accountants and architects).
- Licensing is positively associated with higher skill levels compared to unregulated occupations, with the relationship being strongest for security guards, secondary teachers and plumbers.
- Interviews with Competent Authorities revealed the need for harmonisation of the regulation vocabulary currently used at EU-level and the establishment of associations of regulators at European level. Respondents also commented on how variations in the operational capacity and resources available to Competent Authorities at EU level might be having an adverse effect on labour mobility, and while they showed support for the Common Training Frameworks initiative they question its compatibility with the deregulation pressures that underlie the transparency exercise.

5.1 Introduction

Studies on occupational licensing tend to adopt a macro approach and investigate its aggregate effects on various labour and product market outcomes. However, licensing regimes vary considerably, so it is believed that an examination on a case-by-case basis will provide a more detailed picture of how licensing operates in the UK labour market.

Therefore, this chapter aims to:

- Consider how employment within the selected case study occupations has varied over the last decade or so. Examine the extent to which there are any differences in the wages levels and qualifications between workers in the case study licensed occupations and workers in unregulated ones.
- Provide an in-depth evaluation of the regulatory arrangements within them, including the views of relevant UK Competent Authorities regarding the barriers to the movement of licensed professionals across the EU.

The eight occupations that are examined here are selected based on their broadest application to those commonly found in the UK economy including representativeness in terms of skill levels (e.g. high, medium and low skilled), and sectors (e.g. health care, education, construction, personal services). The list also includes occupations subject to the automatic recognition provisions of the MRPQ Directive (e.g. dental practitioners and pharmacists) as well as occupations under the general system (e.g. teachers and security guards). Further, some occupations were selected due to the varying levels of observed EU-related migration (e.g. high in the case of secondary education teaching professionals and security workers, but low in the case of pharmacists).

Two of the selected occupations (social workers and secondary teachers) feature in the UK government's 2013 Shortage Occupation List, so any regulation-related obstacles to mobility are likely to be of interest. In theory we would expect occupations in more mature stages of regulation to be in a better position to experience the full effects of licensing compared to recent entrants. As such, the list of selected occupations further includes some relatively recent switchers (e.g. security guards, who while previously unregulated, became licensed in 2003) and other who have been subject to licensing for a number of decades (e.g. pharmacists).

The final list of selected occupations is shown in Table 5.1. In considering the evidence, the approach adopted in this analysis is as follows. We combine data from the analysis of national surveys with evidence collected by us through desk-research and engagement with and evidence submitted to us by professional associations and competent authorities. For each selected occupation examine the impact of existing regulatory arrangements on wages, employment and the average skill levels of practitioners. This is followed by a detailed background description of the regulatory arrangements and the provisions regarding the recognition of skills.

Table 5.1 List of Selected Case Study Occupations

Occupation	SOC2000	Sector	Regulatory System*	Skill Level
Dental Practitioners	2215	Health	Automatic	NVQ Level 4 / Bachelor degree equivalent
Pharmacists	2213	Health	Automatic	NVQ Level 5 / Master's degree equivalent
Secondary Education Teaching Professionals	2314	Education	General System	NVQ Level 4 / Bachelor degree equivalent
Social Workers	2442	Health	General System	NVQ Level 4 / Bachelor degree equivalent
Plumbers, Heating Ventilating Engineers	5314	Construction	General System	NVQ Level 2 or equivalent
Security Guards	9241	Security	General System	NVQ Level 2 or equivalent
Architects	2431	Construction	Automatic	NVQ Level 4 / Bachelor degree equivalent
Chartered Accountants	2421	Finance & Accounting	General System	NVQ Level 4 / Bachelor degree equivalent

**Refers to the regulatory system the profession falls under for the Mutual Recognition of Professional Qualifications Directive.*

5.2 Case Study Occupations: Employment

We begin our analysis by considering how employment within the case study occupations has varied over the last decade or so. Using the QLFS, we estimate the proportion of individuals within each of the SOCs of interest that are accounted for by UK, EU and non-EU occupations in the period 2001-2013. This time frame allows us to explore various policy developments related to regulation such as the implementation of the Directive 2005/36/EC on the recognition of professional qualifications, but as before our measurements are confined to stock rather than flow of migrants. Results are shown in Table 5.2.

Dentists and security guards are the two occupations who have seen their share of UK-born workforce to change. With regards to dentists, since 2006 there has been a decline in the proportion of UK-born practitioners and a gradual increase in the number of EU ones. We further observe a spike in the proportion of non-EU practitioners in the period 2007-2009, but this does not seem to be consistently sustained until 2013. The proportion of UK-born security guards also drops in 2006, the year that the licensing regulations came into force, and remains below the 2001-2005 year average until 2012. During the same period, the share of employment accounted for by EU and non-EU practitioners increased, perhaps indicating that non-UK born practitioners were more likely to meet the licensing qualification requirements, while in the period 2007-2011 there were more non-EU than EU-born security guards in the UK workforce.

For the remaining occupations, the proportion of EU-born workforce has remained relatively stable over the course of the period. Interestingly, for occupations such as social workers, pharmacists and chartered accountants the proportion of the non-EU workforce is higher than the EU-born one, while the split is broadly equal in the case of plumbers and secondary teachers. A more general comment related to the high observed volatility in the UK and EU share of employment between individual years. This is particularly the case with dentists after 2005, and to some extent with security guards, pharmacists and architects. The EU-related employment of dentists for example more than tripled between 2007 and 2008, while between 2010 and 2011 it fell by around 52 per cent, thus providing an indication of a flexible labour market enabling EU-born migrants to work within licensed occupations in the UK.

Table 5.2 Proportion of UK, EU and Non-EU born in selected occupations, 2001-2013

Occupation (SOC)		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Average 2001-2013
Dental Practitioners (2215)	UK	90.3	89.6	92.1	93	91.3	85.1	82.4	77.6	78.1	81.1	83.6	84.9	8.8	85.4
	EU	2.8	4.6	3.1	2.1	3.1	6.8	3.0	9.4	13.0	13.9	6.6	11.4	10.4	7.2
	Non-EU	6.7	5.7	4.7	4.8	5.5	8.0	14.4	12.8	8.8	4.8	9.6	3.6	1.5	7.3
Plumbers (5314)	UK	99.2	98.9	98.6	97.4	97.6	97.9	95.4	97.5	95.4	97.4	96.8	97.7	98.6	97.4
	EU	0.3	0.3	0.3	0.7	0.9	0.8	0.5	1.6	2.3	1.6	1.5	1.6	1.3	1.1
	Non-EU	0.4	0.7	0.9	1.8	1.3	1.1	4.0	0.8	2.1	0.9	1.6	0.6	0.0	1.4
Security Guards (9241)	UK	95.4	92.6	91.6	91.7	91.2	89.3	85.9	88.7	86.7	84.8	87.1	91.2	92.2	89.5
	EU	0.5	0.3	0.8	1.1	1.7	3.1	1.2	2.0	3.0	4.6	4.0	2.0	0.8	2.0
	Non-EU	4.0	7.0	7.5	7.1	7.0	7.5	12.7	9.2	10.1	10.5	8.7	6.7	6.9	8.3
Social Workers (2442)	UK	96.6	94.7	95.3	94.3	92.1	90.8	91.5	93	94.4	93.7	96.6	96.2	94.1	93.7
	EU	0.1	1.0	1.2	1.2	1.6	1.9	0.7	1.2	1.5	1.7	0.8	1.4	2.6	1.3
	Non-EU	6.2	4.1	3.3	4.3	6.1	7.1	7.7	5.7	4.0	4.4	2.4	2.2	3.2	4.9
Secondary Teachers (2314)	UK	96.5	95.4	95.0	96.0	95.5	96.5	94.3	95.0	95.4	94.9	93.9	94.5	94.7	95.2
	EU	1.9	2.4	2.2	1.3	2.0	1.4	1.	2.0	2.7	2.2	2.6	2.4	2.7	2.
	Non-EU	1.5	2.0	2.6	2.6	2.4	2.0	4.6	2.9	1.8	2.8	3.3	3.0	2.5	2.6
Pharmacists (2213)	UK	97.6	96.1	92.3	95.6	93.6	92.3	86.6	91.6	88.0	89.9	87.9	89.9	98.3	91.4
	EU	0.0	1.0	2.2	1.0	2.7	2.0	1.4	2.7	3.4	4.6	5.5	4.0	1.6	2.7
	Non-EU	2.3	2.8	5.4	3.3	3.5	5.5	11.8	5.6	8.5	5.4	6.	6	0.	5.7
Architects (2431)	UK	93.5	95.7	95.8	83.1	84.5	86.8	84.8	82.8	88.6	88.6	90.1	87.0	81.1	88.0
	EU	3.2	1.9	1.4	4.2	7.5	1.6	2.4	6.6	6.9	7.6	6.5	8.5	9.5	5.0
	Non-EU	3.2	2.3	2.7	12.6	7.9	11.4	12.7	10.4	4.4	3.6	3.2	4.4	9.2	6.9
Chartered Accountants (2421)	UK	95.5	94.4	95.2	94.7	94.3	93.8	92.0	95.0	93.2	92.7	95.2	93.7	95.9	94.1
	EU	1.5	1.0	0.9	0.7	0.8	0.8	0.6	1.4	1.6	1.6	0.8	1.8	1.0	1.1
	Non-EU	2.9	4.5	3.7	4.4	4.8	5.2	7.3	3.5	5.0	5.5	3.9	4.4	3.0	4.6

Source: Labour Force Survey, 2001-2013

5.3 Case Study Occupations: Wages

As noted in Chapter [2], licensing is likely to restrict the supply of labour in the occupation while it may simultaneously enhance consumer confidence regarding service quality and hence demand. Economic theory therefore predicts that occupational licensing is likely to be associated with higher wages for incumbents vis-à-vis their unregulated counterparts. Research has broadly confirmed such assumptions, although our latest UK estimates find heterogeneous effects by skill levels, sector of employment and the length of time that the licensing regime has been in operation[73].

Due to data availability, the majority of empirical studies on the impact of licensing on wages are found in the US and methodologically we can distinguish between four approaches. First, cross-section estimates of the wage premium associated with licensing have been produced using the Westat survey, a large nationally representative self-reported survey[74]. Westat has been designed to measure occupational regulation in the US and as such it overcomes some of the aforementioned measurement problems associated with the SOC-based approach commonly employed by UK researchers.

A second approach to estimating wage premia entails over-time comparisons of individuals switching from licensed to unregulated occupations across the whole economy. While methodologically robust, such studies commonly present licensing as having a homogeneous wage effect and as such they do not distinguish between different types of licensing regimes and occupational classifications.

A third approach focuses on comparisons across occupations. This typically involves estimating the wage premium associated with licensing by comparing employees in licensed occupations with their counterparts in states where licensing does not apply. While this approach has clear advantages such as controlling for occupational characteristics and selection effects, it is not easily applicable to other countries such as the UK and EU because the lack of regional variations in licensing does not permit the establishment of a counterfactual.

A fourth approach is the possibility to undertake a before-after study of switchers, i.e. occupations that have experienced a switch in their regulation status from unregulated to licensed. The superiority of this approach is evident, however in practice researchers are confronted with the following issues. First, a lot of licensed occupations have been so for a number of years and data availability does not stretch so far back. Even when one identifies

[73] Bryson, A., Forth, J., Humphris, A., Kleiner, M. and Koumenta, M. (2012) 'The Effects of Occupational Licensing on Wages, Paper presented at the Labor and Employment Relations Association, Chicago, January.

[74] Kleiner, M. and Krueger A. (2010) The Prevalence and Effects of Occupational Licensing', British Journal of Industrial Relations, pp. 676–687.

occupations that have recently experienced a switch in their regulation status, wage premiums take a long time to emerge and as such are not immediately picked up by empirical studies. Therefore, it is the case that in order to study the wage effects of licensing in the UK, we have no option but to resort to cross-sectional estimates of licensed occupations using comparable non-licensed occupations as the comparator group.

To examine whether licensing is associated with higher pay for those working within the case study occupations, we match our database of regulated occupations to the QLFS and pool together observations between April 2001 and March 2013. We augment a standard earnings equation to include a dummy variable indicating the licensed status of each of the occupations of interest[75]. These estimates include standard human capital controls such as age, educational attainment, experience, gender, ethnicity, type of contract (full-time or part-time), sector of employment and location of work. This enables us to estimate log wage regressions for each occupation and in particular to identify whether these licensed occupations are different from unregulated ones in the same SOC Major Group in terms of average wage levels. Unregulated occupations are chosen as the 'counterfactual', the default state that occupations find themselves in prior to regulatory intervention. As discussed earlier, our approach follows other cross-sectional analyses of wage premiums in the labour economics literature given the data availability in the UK.

Results are shown in Table 5.3. Licensing is associated with a significantly higher hourly pay for dentists (13.7 per cent) pharmacists (9.5 per cent), architects (8.7 per cent) and accountants (19.1 per cent) and has also a positive but much smaller impact on the hourly pay of security guards (1.7 per cent). On the other hand, licensing is not associated with a wage premium for plumbers and social workers, while the figure for teachers is negligible.

In line with previous research, the licensing wage differential appears to be higher for occupations that have been licensed for a longer period of time and those with higher educational and training requirements compared to their low skill and low wage counterparts (Humphris *et al.* 2011[76]; Bryson *et al.* 2012). While we confirm economic theory that licensing is positively correlated with higher wages, it would be misleading to equate licensing with a universal wage premium that all individuals across the occupational hierarchy enjoy. Instead, the data points to the conclusion that licensing has a differential impact across occupational categories. Overall, these results indicate that there is variation in the ability of licensing to raise wages or less that there is heterogeneity in the monopoly effect of licensing in the labour market.

[75] A detailed account of the method used in the regressions that follow is presented in Appendix C.
[76] Humphris, A, Kleiner, M. and Koumenta, M, (2011) Occupational Regulation in the UK and the US: Issues and Policy Implications, in Marden, D. (ed.) Employment in the Lean Years: Policy and prospects for the next decade, Oxford University Press.

Table 5.3: Regression Results: Wage Premium for Case Study Occupations (Ln(Gross Hourly Wage))[77]

	Dental Practitioners (2215)	Plumbers (5314)	Security Guards (9241)	Social Workers (2442)	Secondary Teachers (2314)	Pharmacists (2213)	Architects (2431)	Chartered Accountants (2421)
Comparator Group	**Unregulated occupations in the Major Occupational SOC Group**							
Regulation Status	Licensing							
Regulation status	0.137***	0.003	0.017***	-0.006	0.009*	0.095***	0.087***	0.191***
R^2	0.42	0.39	0.50	0.48	0.40	0.36	0.44	0.30
Observations	58,786	93,707	210,878	65,058	92,488	59,654	57,826	69,852

*Note: * significant at 10%; significant at 5%; ***significant at 1%; control variables gender, age, ethnicity, age squared, disability, highest qualification, whether on temporary or permanent contract, whether full-time or part-time, whether union member, industry sector, workplace size, region of workplace, whether public or private sector employer*

Base: All employee jobs

Source: QLFS 2001-2013

[77] See Table C1 (Appendix C) for a detailed breakdown of the regression results.

5.4 Case Study Occupations: Qualifications

In addition to wages, another labour market outcome that we would expect regulation to have an impact on is skill levels. Since entry to the occupation is governed by the attainment of certain skills levels workers must engage in training to meet such standards. Further, lower skilled individuals are excluded from the occupation which further contributes to the maintenance of a high skill equilibrium within the occupation vis-à-vis non-regulated counterparts. Such an effect is likely to be more pronounced in the case of licensing since it is those occupations that are subject to mandatory requirements. US evidence shows that licensing in particular is not associated with higher vocational class enrolment (Klee 2010[78]), while in the UK, analysis of the LFS has shown that there is a positive association between licensing and the qualification levels of professional and associate professional groups only (Forth *et al*. 2012[79]).

We use the QLFS dataset to identify whether the case study occupations differ from unregulated occupations in terms of the average skill levels of job holders after controlling for a range of demographic and job characteristics[80]. We measure skill levels using the level of the highest qualification attained since birth[81]. The results of the cross-sectional analysis are shown in Table 5.4.

In line with expectation, the results indicate that licensing is positively associated with higher skills levels compared to no regulation for most occupations after controlling for other characteristics. The relationship is strongest for security workers, followed by secondary teachers and plumbers, while no significant relationship is found for social workers and chartered accountants. These findings are encouraging as they indicate that licensing is positively correlated with pushing up the skill base of low and medium skilled occupations in the labour market, rather than only those at the top.

To the extent that qualifications of individuals in the labour market are an indicator of their skills and therefore a proxy for productivity and output quality then these results demonstrate a positive and significant correlation between the presence of licensing and these positive outcomes. While it is common in the research literature to make such links, two caveats require caution in interpretation. First, the introduction of licensing is based on the assumption that by increasing competence, on-the-job performance will also improve. However, in reality, there is no guarantee that educational inputs acquired through licensing will translate to outputs, not least due to the other contextual factors that are likely to influence one's work performance. Therefore, while we can conclude that licensed workers

[78] Klee, M. (2010) 'How do professional licensing regulations affect practitioners? New Evidence', Department of Economics, Yale University, Mimeo.
[79] Forth, J., Bryson, A., Humphris, A., Kleiner, M. and Koumenta, M. (2012) A Review of Occupational Regulation and its Impact, UK Commission for Employment and Skills, London.and its Impact, UK Commission for Employment and Skills, London.
[80] A detailed account of the method used in the regressions that follow is presented in Appendix D.
[81] The QLFS variable we use is LEVQUAL which maps qualifications to one of six categories using the National Qualifications Framework.

have higher qualifications so there is a correlation between licensing and upskilling of the workforce, the effect of licensing on worker productivity and quality of service remains unknown. For licensing to improve not only the stock of qualifications but also the productivity policy-makers should at the very least ensure that when licensing is introduced the educational requirements are set at such a level that they improve on the existing skills base in the labour market. Second, results reported here are cross-sectional and cannot account for unobserved factors, thus causality has not been proven. However, they are a first important step in identifying links between these variables in the UK.

Table 5.4: Regression Results: Level of Qualifications in Case Study Occupations[82]

	Dental Practitioners (2215)	Plumbers (5314)	Security Guards (9241)	Social Workers (2442)	Secondary Teachers (2314)	Pharmacists (2213)	Architects (2431)	Chartered Accountants (2421)
Comparator Group	**Unregulated occupations**							
Regulation Status	Licensing							
Regulation status	0.051***	0.050***	0.139***	-0.035	0.065**	0.059***	0.050***	-0.06
R^2	0.30	0.29	0.35	0.31	0.43	0.40	0.35	0.22
Observations	58,786	93,707	210,878	65,058	92,488	59,654	57,826	69,852

*Note: * significant at 10%; **significant at 5%; ***significant at 1%; control variables gender, age, ethnicity, age squared, disability, highest qualification, whether on temporary or permanent contract, whether full-time or part-time, whether union member, industry sector, workplace size, region of workplace, whether public or private sector employer*

Base: All employee jobs

Source: QLFS 2001-2013

[82] See Table D1 (Appendix D) for a detailed breakdown of the regression results.

5.5 Case Study Occupations: Regulatory Arrangements

5.5.1. Dental Practitioners

The profession of dentistry is a licensed profession in the UK, that both the function of dentistry is regulated and the title is protected. Entry is restricted to those that fulfill certain educational requirements and provide valid copies of character references and health certificates. Under the arrangements in the Dentists 1984 Act, dental practitioners are regulated by protected title, which means that the title can only be used by those legally entitled to it. The General Dental Council (GDC) is the regulator and it is responsible for setting standards in relation to training and access to the profession, subsequent conduct and advertising. It is also responsible for maintaining the register of licensed practitioners. The Act gives the GDC rules and regulation-making powers generating seconding regulation and statutory instruments. The GDC further regulates and maintains registers for six dental care professions (DCPs), namely clinical dental technicians, dental hygienists, dental nurses, dental technicians, dental therapists, and orthodontic therapists.

Dentistry is a sectoral profession with automatic recognition under the Directive 2005/36/EC. Dentists from the EU can enter the register so long as their qualifications have been accepted by another EU Member State qualifying them to practice in that State. Once European migrants are registered with the GDC, they are subject to continuing professional development rules and fitness to practice assessments. As of January 2014, the GDC has a total of 39,161 registered dentists of whom 6,386 (16%) are EEA-qualified. As shown in Table 5.5, this number has remained broadly consistent since 2009. Movement to the UK for DCPs on the other hand is subject to the general systems regime. Currently, out of a total of 66,938 DCP practitioners in the register held by the GDC, less than 1% comes from the EU.

Table 5.5 Registered Dentists from the EEA

Year	EEA Registered Dentists	Proportion of total dentists register
2009	842	15 %
2010	952	16 %
2011	830	17%
2012	650	17%
2013	665	17%

Source: Council Performance Report Q3, 2013, General Dental Council

A notable difference between them is that while dentistry is licensed in all EU-member states, this is not the case with the DCP professions. Indeed, one can find a high degree of heterogeneity in the regulation status of these professions in various countries (ranging from licensed, to accredited, to unregulated), as well as the qualification requirements set by state-specific competent authorities. Given that these are neighboring professions to dentistry and thus subject to similar labour and product market conditions, it is possible that the lack of homogeneous training requirements across the EU, thus making the recognition

process onerous for individuals wishing to move, can account for the lower levels of EU-related migration.

More recently, an important policy change has taken place within these professions. Previously, only dentists could prescribe treatment by dental hygienists and dental therapists which meant that patients had to be seen by a dentist first, before being treated by any other member of the dental team. In March 2013, the Direct Access provisions were introduced by the GDC whereby the requirement to receive prescription for treatment by a dentist was removed[83]. Similar provisions were introduced for dental nurses, who are now allowed to participate in preventative programs without the patient having to see a dentist first but not for orthodontic therapists and clinical dental technicians. These developments echo similar ones that have been taking place in the US regulatory regime, where previously hygienists were not allowed to work without the direct supervision of a dentist. What are their likely implications?

Dentists and dental hygienists are two occupations that are complementary and competitive at the same time. In line with the previous regulation, hygienists' income and work were tied to referral by the dentist. To the extent that the dentist could provide some of these services and in a profit-maximizing context, we would expect referrals to hygienists to be lower than if such regulations did not exist. As a result, the hygienist's wage is determined by decisions taken by the dentist and, assuming profits are constant, then the wages of the hygienist and employment levels within this occupation would go down while those of the dentist's will go up. According to Kleiner (2013)[84], this equates to a monopsony market for hygienists who are under the control of dentists.

Empirical work in the US finds that the relaxation of such regulations resulted in a 10 per cent higher wages and a 6 per cent increase in employment growth of dental hygienists while dentists have experienced a 16 per cent reduction in their hourly earnings and a 26 per cent reduction in their employment growth. It is too early to be able to empirically observe such an effect in the UK, but broadly speaking we would expect the new Direct Access provisions to have a similar effect to that in the US, although perhaps not at the same high levels observed in the US. Further, assuming no impact on the quality of services, we would expect certain redistribution effects and economic losses to emerge, for example under the previous arrangements there would be an output loss as a result of these artificial restrictions to the employment of hygienists as well as losses to consumers who allocated their resources towards dentistry and away from other purchases in the economy.

[83] Available at http://www.gdc-uk.org/Aboutus/Thecouncil/Meetings%202013/Item%204%20Direct%20Access.pdf

[84] Kleiner, M. (2013) Stages of Occupational Regulation: Analysis of Case studies, W.E Upjohn Institute for Employment Research, Michigan

5.5.2. Pharmacists

The profession of pharmacists was established over 150 years ago. Many of the titles associated with the profession such as pharmacist and chemist are restricted. In 2010, and under the arrangements put forward by the Pharmacy Order 2009, the General Pharmaceutical Council (GPhC) replaced the regulatory functions of the Royal Pharmaceutical Society of Great Britain (RPSGB). The GPhC now overlooks the registration of pharmacists. In order to apply for registration individuals need to obtain a degree in pharmacy from an accredited school of pharmacy followed by a 52-week preregistration period and passing the registration examination. These procedures include the requirement for a signed declaration of the fitness to practice, payment of a designated retention fee and an undertaking to maintain up-to-date professional knowledge and keep records of continuing professional development activities undertaken. In order to continue to practice as a pharmacist registration with the GPhC is compulsory. Since entry to the occupation is restricted to those that fulfill the above requirements, this occupation is categorized as licensed.

The course curriculum for accredited pharmacy degrees in the UK must meet the requirements of the relevant European Directives (85/432/EEC and 85/433/EEC). By implication, pharmacists that fulfill these criteria and are registered in countries that are part of the EU are eligible to register and practice in the UK. The GPhC requires EU applicants to provide documentation from their Competent Authority certifying the completion of an approved pharmacist course and registration (or eligibility of registration) in their home country alongside documents confirming a clear police record. The total cost of this process currently stands at £483. At the moment the GPhC cannot ask for evidence of English language competency from EEA nationals who want to register with the GPhC as a pharmacy professional.

Despite such arrangements, mobility of pharmacists from other EU countries to the UK remains low. According to our latest LFS estimates, the employment related migration of pharmacists stands at less than 4,000 practitioners during the period 2010-2013[85], while the total number of practitioners in the GPhC registry currently stands at 48,748. Therefore, the current percentage of EU nationals in the UK is somewhere between 5 and 8 per cent of total registered practitioners.

5.5.3. Secondary Education Teaching Professionals

While secondary teachers have been licensed for many years, it was the Higher Education Act 1998 formalised the regulatory arrangements within the occupation. The Department for Education oversees the regulatory arrangements for entry to the profession. Currently, such arrangements include the attainment of a Bachelor degree, the possession of a clear criminal record and an initial teacher training undertaken in a school or a Higher Education

[85] Precise estimates are not available without special permission due to problems with potentially disclosive estimates

institution. The regulatory arrangements have been stable since 2001. There are currently approximately 441,000 secondary teaching professionals in the UK and entry to the profession for EU nationals is through the general system. According to the latest LFS estimates, there are currently 13,069 EU nationals working as secondary teachers in the UK, while the occupation frequently features in the government's shortage list.

5.5.4. Social Workers

The Care Standards Act 2000 was the first Act to regulate the social care profession in England, the Regulation of Care (Scotland) Act 2001 in Scotland and the Health and Personal Social Services Act (Northern Ireland) 2001, all giving the social worker profession a protected title status. Currently, social workers there are four separate regulators responsible for different regions in the UK, namely the Health and Care Professions Council for England, the Scottish Social Services Council for Scotland, the Care Council for Wales and the Northern Ireland Social Care Council for Northern Ireland.

According to data from the LFS, in 2013 there were a total of 659,000 social workers in the UK. The regulators are responsible for maintaining the register, setting professional standards, setting education and training requirements as well as accrediting relevant courses. Since 2005, entry to the register requires attainment of a Bachelor degree rather than just a diploma, while since 2005 practitioners have been required to engage in continuous professional development activities. No other major changes have taken place with regards to the regulatory environment. Entry to the profession for EU nationals is through the general system of recognition of qualifications, and while the proportion of EU migrants working as social workers is less than 5 per cent of the total employment within this occupation, they are currently second highest in terms of mobility to the UK. However, not all social care workers entering the UK will be registered with these regulators, as their remit does not cover non-regulated social care staff such as adult social care workforce and those working in domiciliary care organisations.

5.5.5. Plumbers

The occupational title of plumbers can cover a variety of different tasks. However, some tasks are restricted by law to only those individuals who are part of the Gas Safety Register and it is for this reason that these individuals are categorised as licensed. However, we would expect a high discrepancy between the number of individuals that appear under this SOC category in the LFS and the actual number of licensed practitioners. The main piece of legislation concerning individuals whose work involves gas instillation is the Gas Safety (Installation and Use) Regulations 1998. The regulations require individuals to obtain a licence issued by the Health and Safety Executive (HSE) who oversee the register. In order to qualify for a licence individuals must obtain the necessary levels of qualifications and be awarded evidence of competence for the areas of gas work of interest. Qualifications and evidence must be provided through the Accredited Certification Scheme (ACS) or by

attaining relevant NVQ/SVQ levels. The total cost of obtaining the license will vary because of the variety of courses on offer across the country. However, the final application fee costs £228 and the registration fee is £210.

Under the EU Directive 2005/36/EC, EU citizens who wish to hold a licence must apply to the Gas Safety Register under the general system. The Gas Safety Register will consider qualifications and any practical experience under the provision of the directive. If there are substantial differences between the training undertaken and the compulsory training required by the Gas Safety Register, compensatory measures may be required before a license is issued. Currently, there are approximately 130,000 individuals in the Gas Safety register; however data on what proportion of these are EU nationals is not available.

5.5.6 Security Guards

Security guards are one of the few occupations in the UK that has recently experience a switch from being completely unregulated to licensed. The introduction of licensing was instigated by various high profile cases involving members of public being assaulted by door supervisors with a variety of previous convictions, as well as the increasingly large role that the private security industry played in the public sector. Following a period of lengthy public consultations and heavy lobbying by security providers who saw this as an opportunity to improve the industry's image, the Private Security Industry Act received royal accent in May 2001. From March 2006, all individuals working in the contract security sector in England and Whales has to comply with the requirements and the Security Industry Authority (SIA) was established as the regulator.

The Private Security Act 2001 requires individuals to obtain a license if they are working within the security sector in any of the following titles: cash and valuables in transit, close protection, door supervision, public space surveillance (CCTV), security guard, and vehicle immobilisers. To qualify for a licence an individual must be at least 18 and will need to pass an identity and a criminal record check. In addition applicants must attend an SIA approved training scheme. The training schemes consist of up to three modules including conflict management, physical intervention and a specific module linked to the job title in question. The training courses are equivalent to an NVQ level 2 or 3 depending on the type of license applied for. The cost of a licence is currently £220, which also is repayable when the licence needs renewing. Each license only covers a specific security task but an individual can apply for more than one license if they will work across many different security tasks. Each additional license currently costs £110.

Under the EU Directive 2005/36/EC, EU citizens who wish to hold a licence must apply to the SIA under the general system of recognition. The SIA will consider qualifications and any practical experience under the provision of the directive. If there are substantial differences between the training undertaken and the compulsory training required by the SIA, compensatory measures may be required before a license is issued.

Research on the impact of licensing in the security industry is limited. Fernie (2011) finds no detrimental impact on employment levels and discusses evidence that the competency requirements for approved training courses are very low, thus raising doubts with regards to the impact of licensing on improving the quality of service offered. However, due to the scarcity of good quality data at this stage the true impact of regulation is unknown.

5.5.7. Architects

An individual may not use the title 'Architect' unless they are registered in accordance with the Architects Act 1997. An individual can join the register if they have gained relevant qualifications and practical (work) experience. In addition to qualifications in architecture the Architects Registration Board (ARB) may require registrants to pass prescribed examinations in architecture. The application fee for joining the register is £35 if applying within 2 years of passing the exams and £110 if applying after. A further registration fee is then payable in addition to the application fee: this varies between £30 and £105 depending on the time of year when an individual joins the register. The cost of each prescribed exam is £1,671.

Architects are one of the occupations subject to automatic recognition. Under the MRPQ Directive, EU citizens who wish to practise in the UK must apply for registration with the Architects Registration Board. The ARB will consider qualifications and any practical experience under the provision of the directive. If there are substantial differences between the training undertaken and the compulsory training required by the ARB, compensatory measures may be required before completing registration.

5.5.8. Chartered Accountants

To become Chartered Accountant individuals must enter into a training contract with an authorised employer. In addition to joining a training scheme, to be eligible for membership individuals must meet the ICAS entry requirements, achieve relevant work experience, study for and pass three stages of examinations and complete a course and assignment in Business Ethics. The three stages of qualifications are separated into tests of competencies, tests of professional skills and tests of professional expertise, all of which must be completed and passed. The work experience required must be equivalent to a minimum of 450 days practical work experience. It does not include in house or time spent studying. The cost of sitting exams and attending relevant courses varies across the country but can cost up to £500 per module. In the majority of cases the employer covers these costs. The Financial Reporting Council (FRC) is the industry regulator with the specific responsibilities for overseeing the regulation of statutory auditors and, more widely, the regulation of the accountancy and actuarial professions in the UK by agreement with their professional bodies.

Under the EU Directive 2005/36/EC, EU citizens who wish to use designatory letters must apply for membership to one of the seven professional associations regulated by the FRC.

These associations will consider qualifications and any practical experience under the provision of the Directive. If there are substantial differences between the training undertaken and the compulsory training required by ICAS, compensatory measures may be required before designatory letters can be used. Under the MRPQ Directive, the professional associations have a legal obligation to give EU nationals full access to the title as long as the full syllabus comparison between EU and UK qualifications has taken place and the candidate has successfully passed the relevant exam.

An interesting recent development within the accountancy profession at EU and international level has been the launch of the Common Content Project (CCP) in 2006, aiming in harmonising education and training requirements and internationalising the skills of accountants. Participation to the project is open to any institute of accountants worldwide, and at the moment there are nine participating institutes across seven different member states (France, Denmark, Germany, Italy, Netherlands, UK and Ireland). This is an industry-based initiative that bears many similarities to the Common Training Schemes initiative that is currently under consideration by the EU Commission and one that is expected to facilitate recognition and thus movement.

5.6 Evidence from Competent Authorities

Through engagement with Competent Authorities and professional associations we collected evidence relating to the operation of the licensing and recognition regimes, as well as more generally views in relation movement of professionals in the EU. We received a total of 12 responses to our general queries, and we further conducted a total of 5 telephone and face-to-face in-depth interviews with Competent Authority policy official from the selected occupations. Respondents also provided us with supporting documentation ranging from documents outlining the design or implementation of the regulatory regime and any information published on evaluation of the operation of the regime.

5.6.1 Findings

Discussions with Competent Authorities that oversee the regulation of these occupations revealed some characteristics that are considered as barriers to the movement of licensed professionals across the EU. First, a common issue appears to be the variability in the regulation 'vocabulary' employed by different Member States. In particular, respondents remarked on the lack of a shared set of regulatory concepts that are widely recognized and uniformly understood by individuals wishing to engage in the recognition process. This is both in relation to basic terms relating to the nature of the regulatory regime (e.g. registration is often used when referring to licensing) as well as the vocabulary employed by Competent Authorities during the recognition process. Further, it was pointed out that while efforts have been made to keep bureaucracy at low levels, there is still a certain level of paperwork in terms of documents and identity checks that are slowing down the process of movement. In some cases, it was mentioned that the rising cost of applying for recognition

and registration could further act as a deterrent, especially in cases where the individual in question is not in employment around the time of migration.

A key theme that emerged from our discussions was the great heterogeneity in the operational capacity and resources amongst competent authorities within the EU. This results in some member states (e.g. the UK) to be in a position not only to finance the cost of recognition (e.g. when this is done through the compensation measures route) but also provide more than one examination sittings per year (e.g. UK, Germany, and France). In contrast, the resources allocated to some Competent Authorities are not sufficient to enable them to make such provisions, thus reducing the ease with which professionals can move across the EU.

A specific example was given to us in relation to accountants, where movement to another EU member state is often linked to a job offer that cannot be accepted until the relevant Competent Authority exam is passed. In the case of the UK, this does not appear to create an obstacle since such exams are held regularly, but resource restrictions in other countries mean that only one exam per year takes place the timing of which does not necessarily coincide with the job offer. Even in the case of the UK, it was pointed out to us that while there is a regular influx of recognition applications, the cost of processing each application is considerable so any future substantial increases in their volume are going to present a significant resource challenge to Competent Authorities processing them.

In relation to the establishment of Common Training Frameworks schemes, Competent Authorities responded with a qualified enthusiasm. While there was a general agreement with the spirit of the initiative; there was also a lot of uncertainty in relation to issues around quality assurance as well as their role in setting standards. Professional associations on the other hand appeared more enthusiastic and were keen to see such arrangements to receive formal regulatory recognition and state funding.

Regulators further noted a potential tension between Article 59 *Transparency* and Article 49 *Common Training Frameworks and Tests* in that while the former requires the undertaking of a mutual evaluation exercise that is biased towards deregulation (as long as a non-regulating state demonstrates that the general interest is served without creating barriers to mobility through regulation), the latter expects a common training principle to be established, and the impetus is towards regulation. As such, regulators were unclear as to which of these two principles should take primacy, especially when the occupations in question are subject to a variety of regulatory arrangements at EU member state level (e.g. ranging from licensed, to accredited, to unregulated).

Finally, some regulators were keen to see the establishment of European associations of regulators that operate in the same or similar industries. This would enable the exchange of information and experiences, as well as facilitate harmonization in the procedural aspects that govern movement, over and beyond that offered by the Directive. This would also help overcome the aforementioned language differences in the regulation vocabulary. However, overall respondents were satisfied with the provisions of the Directive and made very

positive comments with regards to the impact it has had on facilitating the movement of EU professionals to the UK.

5.7 Summary

This chapter investigates the wider labour market implications of licensing with reference to eight occupations. As before, we are largely working with data that was not designed to explore issues around occupational regulation. Nevertheless, some of the results shown here are in line with previous research on the impact of licensing on wages and qualifications, and as such they, at the very least, point towards the conclusion that **some heterogeneity in the effect of licensing** exists and this is likely to depend on the labour market context and the characteristics of the licensing regime in question.

While the case-study approach adopted here allows for a more detailed analysis of such links, its cross-sectional nature places constraints on the conclusions that can be drawn on this occasion in that there might be other unobservable worker characteristics that might explain differences between regulated and unregulated jobs which are not captured by the existing data. Further, regulation is not randomly assigned to occupations; there are underlying factors that account for its introduction and these factors cannot be controlled for in a cross-sectional research design. Given the prevalence of this labour market institution in the UK it is imperative that relevant measures are introduced in national surveys. We return to this theme in Chapter 7 of this report.

6. The Product Market Effects of Licensing

Chapter Summary

- Through its impact on skills and the supply of labour, licensing is expected to affect quality and prices. Such product market effects of licensing are the most difficult to estimate and where our knowledge base in the UK is at its lowest.
- With respect to quality, existing approaches to measuring such effects in the US use measures of process, measures of outcomes and value-added proxies, while prices charged for the product or service are used to estimate price-effects.
- This chapter explores the feasibility of conducting such analysis in the UK, identifying a number of potential candidate case study professions including security guards, social care workers and childcare workers. These professions have all experienced a change in regulation in the recent past.

6.1 Introduction

Economic theory predicts that occupational licensing is likely to affect product market outcomes, and in particular quality and prices. However, data on such effects in the UK is largely absent. The main reason for this gap in the literature is the absence of datasets specifically designed to collect information on occupational regulation. The section that follows explores how existing data can be used to this end. It begins by investigating how researchers in the US (where a number of studies have been conducted) have measured such effects. It then focuses on three occupations for which licensing arrangements have recently been introduced in the UK and discusses how existing data can be employed and what methodologies can be used to evaluate the product market impact of occupational regulation.

The intention of this chapter is to provide a basis for further research; it is not within the scope of this current research to examine product market effects.

6.2 Existing approaches to measurement

6.2.1 Quality Effects

The concept of quality in the context of regulation poses several complex problems of definition and measurement. Typically, the link between regulation and quality has been investigated by looking at the following: (a) measures of process or the procedures involved

in providing services; (b) measures of the outcome of the services provided; and (c) other value-added proxies. These are discussed in detail in the sections that follow.

Measures of process

Process measures have included elements such as number of customer complaints, consumer ratings of practitioner behaviour, malpractice insurance rates, number of malpractices cases and number of disciplinary actions. Evidence is mixed and often contradictory. Maurizi (1980)[86] compared consumer complaints received by the California Contractor's State License Board to restrictiveness of entry measured by the annual proportionate increase in the number of licenses. His evidence shows that as the stock of licenses increased, so did the number of complaints per licensee. Holen (1978)[87] also found low pass rates on entry examination (his measure of restrictiveness) to be related to low malpractice insurance rates. Maurizi found similar results when he compared customer complaints for 32 licensing boards in the US. Using pharmacist malpractice suits as a measure of quality, Martin (1982)[88] on the other hand finds no links between restrictiveness of entry and the incidence of malpractice.

Such measures of quality have the advantage of being easy to access. A number of regulatory bodies and professional associations keep records of such incidents and these should, in theory, be reliable. However, many have pointed out the limitations of using such data as proxies for quality. Maurizi (1980) for example accepts that voiced complaints are an imperfect measure of customer dissatisfaction and argues that factors such as proportion of income devoted to the good or service, frequency of purchase and the damage resulting from poor quality are likely to be stronger predictors of customer complaints. For example, a typical consumer is unlikely to voice a formal complaint for receiving a bad haircut. Further, the propensity to file a formal complaint is likely to be a function, not only of the quality of service, but also of the ease and opportunity to voice such complaints.

If consumers face difficulties in filling complaints or the regulator has developed a reputation of failing to adequately address grievances, then individuals are likely to be put off from reporting wrongdoing. Indeed Maurizi's own work shows an increase in complaints after the regulator opened more branch and district offices. Others have noted that there is a positive link between the complaints procedure being advertised, or mass-media publicity

[86] Maurizi, A. R. (1977) '*Quality Impact: Complaints to the Contractor's Board: An Economic Analysis of the Regulatory Impact of Selected Boards, Bureaus and Commissions*', A Report to the Office of the Director, Sacramento, California, Department for Consumer Affairs.

[87] Holen, A.S. (1978) *The Economics of Dental Licensing*. Arlington, VA: Public Research Institute of the Center for Naval Analysis

[88] Martin, S. C. (1982) '*An Examination of the Economic Side Effects of the State Licensing of Pharmacists'*. PhD Dissertation, University of Tennessee

about cases of malpractice, and the number of complaints being received; they consequently urge caution when employing such measures (Schuck 1980)[89].

Similarly, malpractice insurance rates can be affected by lawyers' willingness to represent clients, the size of the damage awards and statutory restrictions on the size of the awards (Gross 1984). According to Hirschman (1970), when consumers are faced with goods or services of deteriorating quality, the exercise of voice (in this case via complaints) would depend on the availability of exit (perfect or near perfect substitutes in the market). The more monopolistic the market, the less able consumers will be to use the exit option and thus the more likely they will be voice their concerns (an argument clearly in favour of licensing when the latter is having such an effect in product markets).

Measures of outcomes

Outcome measures have typically looked at the quality of the end product or service for individual consumers. The assumption is that, since occupational regulation improves the stock of skills, then on-the job-performance and quality should also improve. Angrist and Guryan (2003)[90] for example, investigate the effect of the requirement imposed by some US states for teachers to pass a standardised test before practising in a US public school on the subsequent quality of their teaching (the latter measured by student exam grades). The results suggest no such effect. This confirms previous work by Kleiner and Petree (1988)[91] who also found no link between the educational attainment of teachers and student achievement scores. However, using teacher educational inputs as a proxy for outputs can be flawed. Success in a professional exam does not necessarily translate into higher on the job performance, or else the relationship between inputs and outputs is not always consistent. Outcome measures of quality can also be influenced by other variables such as student effort and ability (some of which are beyond the practitioners' control), so ultimately the robustness of findings would rest on the ability to control for such factors.

'Value Added' Proxies

In an attempt to overcome some of the weaknesses of the above measures, as well as capture some of the unintended outcomes of regulation discussed earlier, researchers have

[89] Schuck, D. (1980) 'A Reply to Alex Maurizi' in Rottenberg, S. (ed.) *Occupational Licensure and Regulation,* Washington, DC: American Enterprise Institute for Public Policy Research.

[90] Angrist, J. and Guryan, J. (2003) 'Does Teacher Testing Raise Teacher Quality? Evidence from State Certification Requirements' *NBER Working Paper No. 9545*. Cambridge, MA: National Bureau of Economic Research.

[91] Kleiner, M. and Petree, D.L. (1988) 'Unionism and Licensing of Public School Teachers: Impact on Wages and Educational Output', in Freeman, R. and Ichniowski, C. (eds.) *When Public Sector Workers Unionize*, Chicago: University of Chicago Press.

adopted more expanded definitions of quality and devised proxies to measure them. Central in these endeavours is the belief that the following issues should be considered: the degree of availability of the product or service in question to consumers; the extent to which consumers can easily access it; and the extent to which it is provided with continuity and at an affordable cost. Studies have subsequently devised the following proxies to assess such outcomes.

- Substitutes for licensed services, such as 'do-it yourself' options. According to Caroll and Gaston (1981)[92], monopoly pricing resulting from restrictions to entry could force consumers to substitute their own efforts in place of expert services. They cite the examples of consumers purchasing hair cutting equipment to replace barbers, or purchasing home electrical repair equipment to replace electricians. In their study, the authors find that the stock of qualified plumbers and electricians is negatively correlated with the retail sales of plumbing equipment and accidental deaths by electrocution.
- Availability of practitioners in regulated versus non-regulated regions/states. In a US study of veterinarians by Carroll and Gaston (1978)[93] show that the stricter the state barriers in obtaining a veterinary license, the fewer the practitioners, which has led to an increase in cases of rabies and brucellosis not being detected. Practitioner availability is therefore linked to service or product availability. For example, other things equal, one would expect that a fall in the number of dentists to lead to a fall in the dental health of the population.

- Access to the service or product by different income groups. Kleiner and Kudrle's (2002)[94] study of dentists finds that higher income groups are the main beneficiaries of the effects of licensing on dental health, while Kleiner and Todd (2008)[95] find that occupational licensing results in negative outcomes for consumers, such as a greater percentage of high interest rate mortgages, possibly affecting low income groups disproportionately.

- Insurance premiums charged to individuals in regulated versus unregulated regions/states. According to Kleiner (2006)[96] a comparison of premiums in regulated versus unregulated states serves as a good proxy for service quality since a reduction

[92] Carroll, S.L. and Gaston, R. J. (1981) 'Occupational Restrictions and the Quality of Service Received: Some Evidence' *Southern Economic Journal*, 47(4), pp. 959-976.

[93] Carroll, S.L. and Gaston, R. J. (1978) 'Barriers of Occupational Licensing of Veterinarians and the Incidence of Animal Diseases', *Agricultural Economic Research*, 30, pp. 37-39.

[94] Kleiner, M., and Kudrle R. (2000) "Does Regulation Affect Economic Outcomes? The Case of Dentistry." *Journal of Law and Economics* 43(2): 547-582.

[95] Kleiner, M. and Todd R. (2009) "Mortgage Broker Regulations That Matter: Analyzing Earnings, Employment, and Outcomes for Consumers" *Labor Market Intermediation* edited by David Autor, MIT,University of Chicago Press.

[96] Kleiner, M. (2006). *Licensing Occupations: Ensuring Quality or Restricting Competition?* Michigan: W.E. Upjohn Institute.

in malpractice lawsuits should lead to lower premiums. Empirical work by Cordes (2005)[97] and Kleiner and Kudrle (2000) shows that licensing has no effect on reducing the risk of a high payout for occupational therapists, nurses, clinical psychologists and counsellors.

6.2.2 Price Effects

Existing estimates of the effect of licensing on price commonly use average prices charged for the service. Shepard (1978)[98] and Kleiner and Kudrle (2000), for example, calculate the average fees charged by dentists for various dental procedures from a national dataset produced by the American Dental Association. A recent study by the Federal Trade Commission (2002)[99] finds that the average price of a six-lens multipack purchased via mail order is 19 per cent less than the average price for contact lenses purchased directly from licensed providers. In terms of findings, most studies of such estimates show positive impacts (Kleiner 2006).

6.3 Estimating Product Market Effects in the UK

As our discussion of the literature has shown, empirical evidence of product market effects is in short supply. Where some data exists it is often contradictory. The difficulty of obtaining suitable data can to a large degree explain this. In this section we investigate the availability of data in the UK context and consider how it can be used. We explore the change in the regulation status that security guards, care workers, social care managers and childcare workers have experienced the last decade as this enables us to create a 'counterfactual' scenario where regulation did not exist and compare before and after. We discuss care workers and social care managers together as the data and methodology will be broadly similar.

[97] Cordes, S. (2005) '*The Impact of Occupational Licensure on Malpractice Premiums in Selected Mental Health Professions'*. Unpublished M.A. thesis, Humphrey Institute of Public Affairs, University of Minnesota.

[98] Shepard, L. (1978) "Licensing Restrictions and the Cost of Dental Care." *Journal of Law and Economics*. 21:1, pp. 187-201.

[99] Federal Trade Commission (2002) '*Declaratory Ruling Proceeding on the Interpretation and Applicability of Various Statutes and Regulations Concerning the Sale of Contact Lenses'*. Office of Policy Planning and the Bureau of Consumer Protection. Washington, DC: Federal Trade Commission.

6.3.1 Security Guards

The problems of measuring the product market effects of licensing among security guards are well-documented in the literature (see Fernie 2011)[100]. The Security Industry Authority (SIA) does not monitor the effectiveness of the licensing regime in a systematic manner. Although some records are kept relating to SIA enforcement activity and prosecutions, most of these data relies on the public anonymously reporting misconduct by security guards, so its availability is likely to depend on the factors discussed in the previous section (e.g. ease and cost of making a complaint). In addition, these data do not date back to the pre-licensing period and cannot be used as a comparative measure of the quality of service offered by the now-licensed practitioners.

A more useful source of data is police and local authority statistics on violence and disorder in contexts where security guards are required by law to be present (e.g. nightclubs, public events). Details of any reported incident of crime or disorder are recorded in the police's deployment system and, after the investigation, the incident is given a code. We understand that 'Disorder in Licensed Premises' is one of the available codes. The assumption is that licensing has improved the ability of security guards to prevent disorder or deal with such cases from escalating to a situation where police involvement is necessary. This can therefore act as a measure of 'quality'. However, it is not the case that all licensed premises employ door security staff. It is in the discretion of the local authority to attach such a requirement when licensing these premises under the Licensing Act 2003. The 'quality' measure identified previously would thus need to be matched to such local authority records. Doing so would provide researchers with a cross-sectional dataset that would enable them to identify whether the presence of security guards is associated with lower incidents of disorderly behaviour. [101]

Although such an analysis can provide some interesting insights into whether there is any association between these two variables, it would not address the issue of causality, in that any observed improvements in quality might be due to some other unobserved characteristics (other than the presence of licensed workers). This weakness of cross-sectional research can be overcome if one were able to obtain access to police and local authority data which extended a few years before the introduction of licensing, thus enabling a panel research design.

Alternatively, one can compare similar data from different countries within the UK. While licensing was introduced in England in 2003, the same regulations only became effective in Scotland in 2007 and in Ireland in 2009. Using a difference-in-differences analysis one can

[100] Fernie, S. (2011) 'Occupational Licensing in the UK: The Case of the Private Security Industry', in Marsden, D. (ed.) *Employment in the Lean Years: Policy and prospects for the next decade*, Oxford University Press: Oxford.

[101] Permission to access these records would, of course, have to be obtained from the police and local authorities. It is worth noting that any such research would not require the identification of particular establishments, so anonymity can be guaranteed.

evaluate the impact of changes in the regulation status on the product market outcomes of interest. This approach enables the testing of counterfactual outcomes as it compares those individuals which experienced a switch in regulation status from counterparts that did not but who may be considered comparable in every other respect.

Finally, data that captures the 'value added' effects of licensing is not available. This gap can be addressed through the design and administration of a survey targeted at purchasers of security services in the UK. Within the survey, issues relating to how licensing has affected the availability of security guards within the affected industries can be explored.

6.3.2 Social Care Workers

In theory, given the proportion of income that is likely to be devoted to social care (where individuals rather than the state finances this) and the potential risks to health resulting from malpractice, service users should have high propensity to voice complaints. However, a study by the Office of Fair Trading (2005) into the care homes market found low levels of awareness of complaints procedures amongst older people and their representatives. With this caveat in mind the following options are available.

Currently, the Care Quality Commission, who is responsible for carrying out inspections in the sector, does not consider individual complaints. Instead, when care is funded by local councils, individuals are advised to direct such complaints to their local authority or to use the NHS statutory complaints procedure. If these bodies were to grant access to such data (thus providing a measure of process) then the incidence of malpractice could be explored in relation to the proportion of licensed workers within establishments. Further, other things constant, one could assess the degree to which complaints have fallen since the introduction of licensing.

Turning to measures of quality outcomes, the Care Quality Commission currently operates an online directory that enables members of the public to access independent reports and quality ratings relating to care homes and home care services within any region in the UK by postcode.[102] The reports include information on the proportion of those care workers and managers that are qualified to the level specified under the licensing requirements, thus enabling the identification of the number of qualified practitioners within such establishments. This data can be subsequently matched to the 'quality of care' rating awarded by the Commission's inspectors, thus enabling one to test the strength of the correlation between this measure of quality and the proportion of licensed workers present within establishments.

Both the above approaches would also suffer from the causality issue discussed above. However, the Care Quality Commission's directory also provides historical records thus permitting one to compile an establishment-level panel dataset. Nevertheless, while for some establishments these reports stretch back to the period before the introduction of the

[102] Available at: http://www.cqc.org.uk/registeredservicesdirectory/rsquicksearch.asp

licensing regime, this is not the case for all establishments. The sample size will therefore depend on the availability of longitudinal data on the variables of interest.[103] With regard to data from local authorities and the NHS, the scope for longitudinal research would again depend on the availability of such data before licensing was introduced in the sector.

Finally, publicly-available historical information on the fees charged by care homes does not exist, to our knowledge, thus preventing an evaluation of whether and to what extent licensing has impacted on the cost of care.

6.3.3 Childcare Workers

As with the other occupations, data directly measuring the impact of licensing on product market outcomes does not exist. However, Ofsted, the industry regulator, carries out inspections and regulatory visits of childminder's on domestic premises and non-domestic premises, maintained and independent nurseries as well as primary schools on a three year circle. The reports are published on its website and they include judgements on quality and standards of the care and education provided at the setting. Using the information collected during the inspection visits, Ofsted awards a rating based on a four-point scale (ranging from 'outstanding' to 'inadequate'). Reports on individual childminders or nurseries can be traced back to the pre-licensing period, thus providing a before and after measure of overall quality of service delivered by childcare workers. Any 'before and after' estimation would require these quality indicators to be matched to data on with employee qualifications (a measure of licensing).

The pre-licensing inspection reports include information about the qualifications held by members of staff or whether they were registered with Ofsted (another measure of qualifications) at the time of the inspection. Post-licensing, the attainment of such qualifications is compulsory. This information therefore provides us with the following measures: (a) a comparable measure of quality before and after licensing came in (b) an indirect measure of licensing (i.e. qualifications) matched to the establishment or individual provider of such services. By pooling this information from the Ofsted reports, a dataset can be created that would enable us to assess whether the introduction of licensing resulted in any improvements in quality. Endogeneity may be an issue (for example the higher quality establishments in the pre-licensing era may have found it easier to recruit better qualified staff), but this could be addressed if sufficient panel data were available.

An additional approach would be to look for measures of outcomes. In the context of childcare, such measures could include those commonly used in studies assessing the childcare and early-years sector such as children's cognitive and social development. The

[103] Following the new mandatory registration requirements of providers of social care under the Health and Social Care Act 2008 (Regulated Activities) Regulations 2009 and the Care Quality Commission (Registration) Regulations 2009, the Care Quality Commission has informed us that the online Care Directory will no longer be used. We were advised to write to the Commission to obtain advice on the continued availability of the relevant information.

Millennium Cohort Study (MCS) satisfies such requirements. Funded by the Economic and Social Research Council (ESRC), this study has been operating since 2000 and tracks 19,000 babies born in the UK between 2000-2002 through their early childhood years and up to adulthood. So far, four sweeps have been carried out covering issues such as parenting; childcare; school choice; child behaviour and cognitive development; child and parental health; parents' employment and education; income and poverty; housing, neighbourhood and residential mobility; and social capital and ethnicity. The next sweep is planned for 2012.

During the third sweep in 2006, data was collected on children's cognitive and social development which included assessments based on the British Ability Scales (naming vocabulary abilities, picture similarities, pattern construction) as well as other behavioural, communication and emotional development criteria. As part of the MCS, another survey titled 'The Quality of Childcare Settings' investigated the quality of 301 settings in England attended by 631 children participating in the MCS looking at the provision for children aged between three and five. The study took place in 2005, therefore before the licensing requirements were introduced. Information on the number and qualifications of staff employed as well as the quality of provision was collected from the 301 participating settings. Although this data collection took place before licensing was introduced, some settings employed individuals with qualifications comparable to those outlined in the licensing requirements. Therefore, at the very least, a cross-sectional study can be carried out testing the strength of correlation between staff qualifications (as a measure of licensing) and children's cognitive and social development (as an outcome measure of quality). The wealth of the additional data collected by MCS (outlined above) would enable the introduction of robust controls for other explanatory variables, but the usual caveats of cross-sectional research would also apply here.

Finally, a value-added proxy is the extent to which early years education are provided at an affordable cost following the introduction of licensing. Unfortunately, the QCS does not collect data on the cost of providing these services. Other studies however do collect such information. The Daycare Trust conducts an annual Childcare Costs Survey asking local authorities the typical costs of childcare in their area. The survey also collects data from the Family Information Services relating to the extent to which parents had problems finding childcare in their area, thus providing a measure of another value-added proxy, namely 'availability'. The survey begun in 2007, the year licensing was introduced, so this is the only wave representing the pre-licensing period. However, the advantage of this survey over others (e.g. the Family Resources Survey by the Department for Work and Pensions) is that it collects data on fees charged rather than fees paid by parents (since the latter depends on whether in receipt of tax credits). Access to the survey would need to be investigated further, as at the moment, the Daycare Trust charges for obtaining a copy of the annual survey reports.[104]

[104] Details can be found at http://www.daycaretrust.org.uk/pages/childcare-costs-surveys.html

6.4 Summary

The theory of occupational regulation makes some clear predictions with regards to the impact of licensing on product market outcomes, namely service/product quality and price. Drawing on the US literature where such predictions have been empirically tested, this feasibility study explored the mechanisms that are commonly used to this end. In summary, existing estimates of the effect of licensing on price typically use average prices charged for the service or product, while measures of quality typically involve measures of process and procedures in service provision such as customer complaints, customer ratings, malpractice cases and disciplinary actions, measures of outcomes of the services provided and value-added proxies such as substitution effects, access to services and insurance premiums. It was argued that these measures are far from perfect and the robustness of findings would ultimately rest on the ability to combine them and control for other explanatory factors.

7. Conclusions and Future Research

7.1 Introduction

The central aim of this report is to expand the evidence base in relation occupational regulation and labour migration to the UK, produce some preliminary estimates of occupational regulation at EU level and provide new evidence on the economic costs and benefits of occupational regulation in the UK labour market.

The overall aims of the research were to:

1 Review the theory and evidence regarding the operation and impact of occupational regulation, with specific reference to the issue of labour mobility;

2. Provide estimates of the prevalence of occupational regulation in the EU and its links to labour mobility between member states;

3. Provide descriptive estimates of patterns of EU migration to the UK within regulated and unregulated occupations;

4. Attempt to assess the impact of occupational regulation on the mobility of professionals into the UK;

5. Explore regulatory arrangements and their impact on wages and qualifications for regulated occupations in the UK;

6. Assess the availability of data that can be used to estimate the effects of regulation on product and service quality.

7.2 Policy Implications

Occupational regulation is an important labour market institution in the EU, covering up to a quarter of the labour force. Therefore, it deserves more attention than it has currently been receiving by researchers and policy-makers. Further, it is a labour market institution that has the potential to deter labour inter-state mobility. This is particularly the case with licensing.

At EU level, the finding that EU immigrants are less likely to enter professions that are subject to regulation is concerning, given the EU Commission's policy focus on reducing barriers to mobility and fostering labour movement within the EU. While we were not able to account for the observed trends, it is likely that the heterogeneity in regulation regimes and country specific immigration policies, coupled with the administrative procedures that need to be followed to obtain such recognition are also likely to be important determinants.

Indeed, one of the key messages that came out from our discussions with UK Competent Authorities was the high variation in the resource and operational capacity of Competent Authorities across the EU in dealing with recognition requests. However, policy makers should not ignore that becoming licensed involves a cost to the individual, not least in relation to the skill and location specific investments it entails, and while steps towards harmonisation can partly address the former, the latter still remains a key consideration in an individual's cost-benefit analysis to migrate.

Some interesting results also emerged in relation to the labour market outcomes of licensing. The impact of licensing on wages has mainly been analysed in the US and it has largely shown a positive relationship. The results presented here find no generalized premium for licensed occupations, like the one found in the US or the one associated with other labour market institutions like unionisation. Instead, and in line with previous work by members of this team, the licensing wage premium is found to be confined to occupations that have been licensed for a longer period of time and those that are at the top of the skill distribution, thus alluding to the possibility that (a) the labour market effects of licensing differ between different labour market contexts (e.g. US and UK) and (b) that the characteristics of the licensing regime (e.g. the length of time it has been in operation, the stringency of the entry requirements) are better predictors of a wage premium than simply whether the occupation is licensed or not. Although our results are preliminary and subject to the methodological limitations discussed earlier, failure to account for such heterogeneity could lead to a misrepresentation of the impact of regulation and ill-informed policy making.

7.3 Future Research on Occupational Regulation

7.3.1. Limitations of existing research

As this report has highlighted, there is a paucity of evidence on the prevalence, nature and impact of occupational regulation in general and licensing in particular within both the UK and the EU labour market context. This report has made a step towards bridging this gap, but there is still a lot to be learnt for two key reasons.

First, the available data places constraints with regards to what questions can be answered. For example, while we were able to provide the first ever estimates on the prevalence of regulation in the EU, we were not able to say with certainty how much of this is accounted for by licensing and how much for the remaining types of occupational regulation. The same applies to the UK labour market context, where while our knowledge is more advanced as a result of the map of occupational regulation produced by members of this team as part of a previous project, we are only able to produce lower and upper bound estimates of individuals within regulated occupations, rather than be able to estimate with precision the number of workers that are actually regulated. Further, our estimates follow a SOC-based approach which effectively classifies regulated jobs rather than indicating the percentage of workers who are subject to regulation. Similarly, in the case of the EU, we were not able to

produce estimates of relating to the mobility of regulated workers, since such variables are not measured within the ELFS.

The second constraint placed upon us relates to the research methodology that we can employ. So far, our research has been cross-sectional in nature, and we therefore have to accept all the limitations that come with this research design including issues relating to causality and endogeneity. For example, we cannot say with certainty that the wage premiums we observe in certain occupations or the links between licensing and mobility are the causal effect of licensing or some other underlying factor. These data restrictions place further constraints on our ability to provide solid policy recommendations.

In order to address these limitations, we would need to produce more precise estimates of the proportion of jobs that are subject to occupational regulation and the percentage of workers that are in practice licensed, registered, accredited and certified. To further explore the economic impact of regulation, researchers can also benefit from the inclusion of these estimates in nationally representative survey as this would enable them to match information on regulation to other labour market indicators. The section that follows presents some examples of how these recommendations can be operationalized.

7.3.2. A new survey on licensing

As the previous discussion has shown, the goal of researchers and policy makers is to be able to accurately measure the prevalence of occupational regulation in the UK and EU, as well as estimate the effects of licensing (and other forms of regulation) on wages, employment, skills, mobility, quality, prices, welfare costs to society and the distribution of income. In order to do this, we propose a UK wide random digit dial survey. This will be based on a questionnaire that will measure licensing, certification, accreditation, individual characteristics such as age, education gender, nationality, labour market experience, education and other job-specific training, employment and unemployment spells and income. It can further include specific questions on licensing fees, individual attitudes towards regulation, changes in regulatory standards, personal experiences in relation to how regulation has affected entry to the profession as well as migration to other countries or juristictions, the internal organization of the profession and specific behavioural rules mandated by occupational regulation such as post-entry restrictions.

The survey may take different forms depending on the budget. First, it may be a cross-section or a panel, although we would strongly recommend the latter due its superiority as a research design. On the first instance, the survey can be designed to provide UK-level data, but this can also be extended to EU-level or EU country-level estimates and will enable one to capture the large institutional differences across countries in the EU. Similarly, it is important to map the prevalence of occupational regulation across countries from a policy point of view, since policy is typically discussed within a comparative framework. We would expect to have a sample representative of employees and self-employed aged 18-67. The survey approach would pay attention to matching the marginal distributions of some key

variables such as age, gender, education and profession with information from the latest census in each country. The penetration rate and availability of any type of telephone among people aged 18 or above is higher than 90 per cent in the UK and most EU countries, thus providing large coverage of the population. Phone numbers will be selected using a two stage random selection method. First, a sample of numbers will be selected and second an eligible individual will be selected on a random basis from the selected household. While the survey questionnaire will be developed by researchers, we propose the survey to be carried out by a third party institution that has expertise in telephone surveys.

Similar questions on occupational licensing have been tested by the Princeton University Data Development Institute Initiative, a random dial labour force survey designed to measure the prevalence of occupational regulation and the consequences of offshorability of jobs in the US. It was carried out by Westat with great success in providing invaluable information to researchers of occupational regulation in the US. Overall, having recognized the economic significance of this labour market institution, the other side of the US has made significant steps in improving the measurement of occupational regulation, initially with specific surveys to recently gathering data in national surveys such as the inclusion of relevant question in the Survey of Income and Program Participation in 2013. We have already made some progress in developing questionnaire items to be included in the proposed survey, and we have some experience in coordinating surveys of this kind. We strongly believe that the UK and EU should consider following the US example.

7.3.3. Inclusion of occupational regulation questions in existing surveys

A second possible approach is to use existing large national surveys such as the LFS in the UK (and to some extent the EU Labour Force Survey) as channels to collect information on regulation. The LFS for example contains a wealth of information on labour market issues such as demographic characteristics, training, labour market participation, earnings etc., while recently some additional questions have been introduced on migration. At the very minimum, the questions to be included should cover the following:

- If the job requires the attainment of some specific training without which it is illegal to practice;
- If there is a legal requirement to register with a regulator before practicing the occupation;
- If the job holder is accredited by a professional association;
- If the job holder is certified by a professional body;

The inclusion of these questions in the LFS, they would enable researchers to produce accurate estimates of the proportion of the UK labour force that is subject to occupational regulation, which in turn can be matched to other labour market indicators. If such questions cannot be easily placed within the LFS, then we recommend placing them in some

of the smaller but high-quality surveys such as ONS Opinions or the NatCen Omnibus[105]. However, as we have argued elsewhere, great caution is needed when drafting the questions to ensure that the terminology is well-understood by respondents and that responses can be clearly identified as licensing, registration, certification or accreditation. Our research experience within this field has shown that there is a high level of diversity with regards to how professional associations and regulators employ the regulation vocabulary, so we would advise the questions to be based on the two criteria used to categorize regulation namely (a) the requirement to demonstrate a minimum degree of competence and (b) unless this has been demonstrated, it is illegal to practice the occupation or undertake some specific tasks.

[105] For a detailed overview of the suitability of these surveys see: Forth, J., Bryson, A., Humphris, A., Kleiner, M. and Koumenta, M. (2012) A Review of Occupational Regulation and its Impact, UK Commission for Employment and Skills, London.

Appendix A: Prevalence of occupational regulation in selected EU Member States

Table A1 presents the full results from Section 3.4 detailing the prevalence of occupational regulation across in EU member states on the basis of ISCO 1 digit level classifications.

Table A1. Upper and lower bounds to the prevalence of occupational regulation (licensing, accreditation, or certification) by type of activity and country (continued).

	Managers-1		Professionals -2		Technicians and associate professionals -3		Clerical support workers-4		Service and sales workers-5		Skilled agricultural, forestry and fishery workers-6		Craft and related trades workers-7		Plant and machine operators, and assemblers-8		Elementary occupations-9	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
Bulgaria	0.23	0.00	0.46	0.21	0.27	0.00	0.25	0.00	0.00	0.00	0.00	0.00	0.14	0.00	0.02	0.02	0.07	0.00
Cyprus	0.44	0.00	0.72	0.42	0.44	0.00	0.14	0.00	0.10	0.00	0.00	0.00	0.28	0.00	0.65	0.29	0.00	0.00
Denmark	0.14	0.00	0.61	0.36	0.67	0.19	0.00	0.00	0.30	0.00	0.34	0.00	0.49	0.00	0.33	0.00	0.25	0.00
Latvia	0.00	0.00	0.22	0.16	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Portugal	0.04	0.00	0.74	0.48	0.38	0.00	0.00	0.00	0.07	0.00	0.05	0.00	0.31	0.00	0.01	0.00	0.00	0.00
Belgium	0.12	0.00	0.49	0.45	0.29	0.18	0.01	0.00	0.31	0.02	0.00	0.00	0.49	0.32	0.01	0.00	0.02	0.00
Estonia	0.00	0.00	0.12	0.16	0.03	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Finland	0.00	0.00	0.34	0.26	0.27	0.20	0.00	0.00	0.12	0.02	0.00	0.00	0.00	0.00	0.02	0.02	0.00	0.00
Hungary	0.07	0.00	0.47	0.45	0.16	0.07	0.02	0.00	0.18	0.00	0.00	0.64	0.40	0.01	0.00	0.00	0.00	0.00
Ireland	0.00	0.00	0.39	0.35	0.12	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lithuania	0.00	0.00	0.26	0.22	0.07	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Luxemburg	0.00	0.00	0.43	0.27	0.18	0.09	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Malta	0.04	0.00	0.50	0.47	0.18	0.13	0.00	0.00	0.02	0.00	0.00	0.00	0.09	0.00	0.28	0.27	0.00	0.00

Note: The table reports estimates for countries not reported in Table 3.5. The estimates are based on EULFS data for 2012. In this section, we apply the definition of regulated profession used by the EU Single Market Regulated Professions Database and Directive 2005/36/EC, hence including licensing, accreditation, and certification. Figures may not add up to one due to rounding error.

Appendix B: Additional Detail on Licensing and Migration Modeling

The models used in the econometric analysis in Section 4.4.2 follow the specification outlined in Table B1. The models are estimated using data from Annual Survey of Hours and Earnings (ASHE) and the Labour Force Survey (LFS). ASHE is based on a 1 per cent sample of employee jobs taken from PAYE records supplied form HM Revenue and Customs. All the estimates generated from ASHE are based on the median rather than the mean in order to prevent results becoming skewed by small groups of high or low earners.

The LFS uses a rotational sampling method where each respondent is included in five consecutive quarters. Each quarter in which the respondent is included is called a 'wave'. The independent variables included from the datasets are: median gross hourly pay, median total paid hours per week, proportion of women in the occupation, percentage change in employment in the last year, skill level of the occupation, median age of workers and lagged migrant stock. In addition, the licensing status of each occupation is derived from the UK Map of Occupational Regulation. To further analyse the impact of licensing on the proportion of migrants in an occupation, regression results are disaggregated into major occupation groups, different levels of stringency and coverage of the licensing regime at SOC2000 level. As before, this is done using the UK Map of Occupational Regulation. In each disaggregation the base group are unlicensed workers. The models are produced using an Ordinal Least Squared regression, which suits the characteristics of the data.

Table B1: Variables used in the cross-sectional analysis of occupational regulation and labour mobility

	Definition	Source
Dependent Variable		
Stock of Migrants	Number of individuals born outside the UK	LFS 2005 & LFS 2010
Independent variables		
Skill Level	Percentage of the workforce that state their highest qualification level to be equivalent to at least an NQF level 6	LFS 2005 & LFS 2010
Median Age	Median Age of individuals in the occupation	LFS 2005 & LFS 2010
Lagged Migrant Stock	Number of individuals born outside the UK the previous year	LFS 2004 & LFS 2009
Portion of Women	Percentage of employees in an occupation who female	ASHE 2005 & ASHE 2009
Median Hours Worked Per Week	Median hours worked per week in an occupation	ASHE 2005 & ASHE 2009

Median Pay	Median gross hourly earnings of an occupation	ASHE 2005 & ASHE 2009
Percentage Change in Employment	Percentage change in employment from 2011 to 2012	ASHE 2005 & ASHE 2009
Licensing	Presence of licensing within the occupation	UK Map of Occupational Regulation

The variables that were used in the heterogeneity analysis in Section 4.4.2 are described in Table B2 and are based on the UK Map of Occupational Regulation.

Table B2: Variables used in the heterogeneity analysis of occupational regulation and labour mobility

Variable	Definition	Examples
Stringency of Entry Requirements (barrier to entry)	High stringency= NVQ Level 4 or above, exams, requirements relating to work experience.	Ophthalmic Opticians (2214); Veterinarians (2216); Solicitors/Lawyers (2411)
	Medium stringency= NVQ Levels 2 & 3	Police Officers (3312); Air-Traffic Controllers (3511); Nursery Nurses (6121)
	Low stringency= NVQ Level 1	Security Guards (9241); Bus and Coach Drivers (8213); Restaurant & Catering Managers (1223)
Licensing Coverage	Partial Coverage= licensing not present in all occupations within the 4-digit SOC code	Plumbers, Heating and Ventilating Engineers (5314); Care Assistants and Home Carers (6115); Moto Mechanics & Auto engineers (5231)
	Full Coverage= licensing present in all occupations within the 4-digit SOC code	Psychologists (2212); Pharmacists/Pharmacologists (2213; Driving Instructors (8215)
Type of recognition under the MRPQ Directive	Automatic Recognition: Migrant's qualifications automatically recognised in	Architects; Dentists; Doctors; Midwives; Nurses; Pharmacists; Veterinary

	host country	Surgeons
	General Recognition: Qualifications are recognised if the migrant's level of professional qualification is at least equivalent to the level immediately below that required in the host country. Under certain conditions, the host country may impose compensation measures, i.e. an adaptation period of up to three years or an aptitude test.	All other regulated occupations

Appendix C: Additional Detail on Licensing and Wage Premium Modeling

Table C1 presents the detailed wage premium regression results for the case study occupations (Section 5.3). The model specification employed here is similar to those commonly used in cross-section estimates in the literature to estimate the wage differential associated with licensing[106], as well as wage differentials associated with unionization (see for example Booth 1995[107]) and gender (see for example Oaxaca 1973[108]). The model generated took the following form:

$$Y_{wages} = \beta_{ih}X_{ih} + \beta_{ij}X_{ij} + \beta_{ir}X_{ir} + \varepsilon$$

Where: X_{ih} represents human capital characteristics, X_{ij} denotes occupation characteristics, X_{ir} is the licensing variable and ε is the error term

[106] Humphris, A, Kleiner, M. and Koumenta, M, (2011) Occupational Regulation in the UK and the US: Issues and Policy Implications, in Marden, D. (ed.) Employment in the Lean Years: Policy and prospects for the next decade, Oxford University Press

[107] Booth, A.L. (1995) The Economics of Trade Union, Cambridge University Press: Cambridge

[108] Oaxaca, R. (1973) Male-Female Wage Differentials in Urban Labor Markets, I*nternational Economic Review*, 14(3) pp. 693-709

Table C1. Detailed Regression Results: Wage Premium for Case Study Occupations (Ln(Gross Hourly Wage))

Wage Premiums (Ln(Gross Hourly Wage))																	
		Dental Practitioners		Plumbers		Security Workers		Social Workers		Secondary Teachers		Pharmacists		Chartered Accountants		Architects	
SOC(2000) Code		2215		5314		9241/9249		2442		2314		2213		2421		2431	
Regulation Status		Licensed		Licensed		Licensed		Licensed		Licensed		Licensed		Licensing		Licensed	
Comparator Group		Unregulated occupations in the professional occupations major group		Unregulated occupations in the skilled trades occupations major group		Unregulated occupations in the elementary occupations major group		Unregulated occupations in the professional occupations major group		Unregulated occupations in the professional occupations major group		Unregulated occupations in the professional occupations major group		Unregulated occupations in the professional occupations major group		Unregulated occupations in the professional occupations major group	
Regulation Status	β	0.147	0.137	0.009	0.003	0.036	0.017	-0.012	-0.006	0.008	0.009	0.099	0.095	0.199	0.191	0.099	0.087
	(sig.)	(0.000)	(0.000)	(0.650)	(0.131)	(0.000)	(0.000)	(0.000)	(0.078)	(0.000)	(0.004)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Age	β		0.053		0.063		0.031		0.048		0.055		0.055		0.059		0.052
	(sig.)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)
Experience	β		0.001		0.001		0		0		0.001		0.001		0.001		-0.001
	(sig.)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)
Gender (male)	β		0.067		0.206		0.095		0.066		0.065		0.066		0.071		0.072
	(sig.)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)
Ethnicity (white)	β		-0.009		0.066		0.002		-0.017		-0.024		-0.017		-0.001		-0.024
	(sig.)		(0.629)		(0.000)		(0.818)		(0.310)		(0.111)		(0.359)		(0.934)		(0.225)
Qualification Level	β		0.07		0.068		0.026		0.066		0.068		0.072		0.064		0.066
	(sig.)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)
Full-Time	β		0.085		0.188		0.154		0.077		0.039		0.078		0.072		0.071
	(sig.)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)
Sector (private)	β		-0.188		-0.078		-0.073		-0.186		-0.137		-0.185		-0.152		-0.189
	(sig.)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)
Location (south east)	β		0.109		0.133		0.088		0.107		0.074		0.103		0.132		0.109
	(sig.)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)
n		58786	58786	93707	93707	210878	210878	65058	65058	92488	92488	59654	59654	69852	69852	57826	57826
R-Squared		0.14	0.42	0.07	0.39	0.09	0.5	0.03	0.48	0.05	0.4	0.09	0.39	0.12	0.44	0.11	0.3
R-Squared (adj)		0.12	0.42	0.06	0.37	0.09	0.5	0.02	0.48	0.04	0.4	0.09	0.39	0.12	0.42	0.1	0.28

Base: All employee jobs

Source: QLFS 2001-2013

Appendix D: Additional Detail on Licensing and Qualifications Modeling

Table C2 presents the detailed level of qualification regression results for the case study occupations (Section 5.4). We control for observed characteristics known to be related to qualifications attained. The model generated took the following form:

$$Y_{qualification} = \beta_{ih} Xi_h + \beta_{ij} X_{ij} + \beta_{ir} X_{ir} + \varepsilon$$

Where: X_{ih} represents human capital characteristics, X_{ij} denotes occupation characteristics, X_{ir} is the licensing variable and ε is the error term.

Table C1. Detailed Regression Results: Level of Qualifications in Cast Study Occupations

		Dentist		Plumbers		Security Workers		Social Workers		Secondary Teachers		Pharmacists		Chartered Accountants		Architects	
SOC(2000) Code		2215		5314		9241/9249		2442		2314		2213		2421		2431	
Regulation Status		Licensing		Licensing		Licensing		Licensing		Licensing		Licensing		Licensing		Licensing	
Comparator Group		Unregulated occupations		Unregulated occupations		Unregulated occupations		Unregulated occupations		Unregulated occupations		Unregulated occupations		Unregulated occupations		Unregulated occupations	
Regulation Status	β	0.037	0.051	0.067	0.05	0.134	0.139	-0.046	-0.035	0.078	0.065	0.027	0.059	-0.093	-0.06	0.028	0.05
	(sig.)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Age	β		0.017		0.068		-0.039		0.021		0.014		0.019		0.011		0.018
	(sig.)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)
Experience	β		0		-0.001		0		0		0		0		0		0
	(sig.)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)
Gender (male)	β		0.108		0.883		0.271		0.098		0.067		0.117		0.105		0.114
	(sig.)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)
Ethnicity (white)	β		0.242		0.115		-0.073		0.215		0.213		0.204		0.213		0.233
	(sig.)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)
Disability	β		-0.02		-0.065		-0.026		-0.049		-0.016		-0.019		-0.038		-0.024
	(sig.)		(0.166)		(0.000)		(0.004)		(0.000)		(0.080)		(0.179)		(0.006)		(0.097)
Full-Time	β		0.033		0.099		-0.036		0.03		0.033		0.022		0.02		0.026
	(sig.)		(0.004		(0.004)		(0.000)		(0.007)		(0.000)		(0.051		(0.075		(0.024)
Sector (private)	β		-0.168		-0.584		-0.03		-0.169		-0.135		-0.168		-0.147		-0.177
	(sig.)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)
Location (south east)	β		-0.031		-0.003		0.027		-0.037		-0.041		-0.037		-0.041		-0.04
	(sig.)		(0.004)		(0.851)		(0.002)		(0.000)		(0.000)		(0.001		(0.000)		(0.000)
n		58786	58786	93707	93707	210878	210878	65058	65058	92488	92488	59654	59654	69852	69852	57826	57826
R-Squared		0.15	0.3	0.11	0.29	0.16	0.35	0.18	0.31	0.32	0.43	0.15	0.4	0.14	0.35	0.11	0.22
R-Squared (adj)		0.11	0.27	0.11	0.25	0.15	0.3	0.14	0.25	0.25	0.43	0.14	0.37	0.14	0.32	0.11	0.2

Base: All employee jobs

Source: QLFS 2001-2013