

# *Work, Unemployment and Overqualification in UK. The measurement trap.*

## **Abstract**

The aim of this research is to evaluate whether people with higher educational attainment are less likely to be unemployed compared to those who classified themselves in lower levels. Particular focus is given to the extent of how much a prolonging economic crisis can influence the decision of potential labourers and generally all the stakeholders involved in this decision making process. 2006, 2008 and 2010 are selected as reference points for our cross-sectional analysis which explores the extent to which a higher educated person finds a job more easily. Specifically we are interested in whether higher education make graduates employable or not and if this can be reliably revealed by the usage of secondary data and econometric techniques. Further interest will be given to the heterodox critique related with the mainstream interpretations of the notion of work and overqualification, the methods implemented for measuring overqualification and how the general economic climate can affect employability in UK.

This research has been conducted using secondary data for the 1<sup>st</sup> quarters of 2006, 2008 and 2010 extracted from the Quarterly Labour Force Survey (QLFS) which provides information on employment and educational level as well data for variables such as, sex, age, ethnic origin, family unit and regional location.

The data is analyzed using SPSS and multivariate analysis (binary logistic regression). Our main aim is to try to explain unemployment among the UK labour force, using sex, age, ethnic origin, region, family unit and educational level as independent variables in order to provide an assessment on the impact of educational attainment, highlighting the employability of those with higher educational attainment compared with those who have lower.

However, the quantitative approach adopted can also be criticised in reference to alternative methodological approaches. Quantitative approaches receive notable criticism from qualitative research for their failure to adequately include interpretation or definition of findings. It has been argued that quantitative research does not provide context to its findings (Bryman, 2004, 79). By using qualitative research techniques insights could be provided into interpretations that are beyond the description of patterns and numbers *per se*. In some sense this may respond to the criticism of deductivism offered by Lawson (1997, 2003) and others. Use of a qualitative approach could provide greater depth to the analysis, and allow a more nuanced understanding of why patterns emerge in the quantitative data analysis. However, qualitative approaches do suffer from a number of criticisms including problems of reliability relating to qualitative findings made using a small sample, including the representativeness and external validity (generalisability) of investigating a particular sample (Bryman, 2004, 273).

Future research will attempt to combine quantitative and qualitative methods in order to overcome some of the main methodological problems and will concern a first step towards a more complete mixed-methods analysis

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# 1. Introduction

The principle aim of this research is to evaluate whether educational level is associated with higher percentage of employability. Moreover, important factors of overqualification and graduate unemployment are being discussed. We are interested in establishing what factors are correlated with unemployment and if a higher educational attendance makes someone better off.

This research aims:

- To investigate the classic and current literature on the definitions of work as related to various unpaid human tasks and education and learning as well as to explore how overqualification and underemployment can be defined as an important determinant of graduate employability comparing individuals in terms of their educational attainment in UK before and during the ongoing economic recession. To this extent we will try to investigate possible interactions between higher educational attainment and unemployment in order to identify evidence of overqualification and underemployment.
- To choose an appropriate method for data collection and administer a study that can reveal a clear conceptual framework and methodological strategy.
- To use multivariate statistical techniques (binary logistic regression) to analyse secondary data extracted from the QLFS 2006, 2008 and 2010.
- To evaluate the methods for data collection and analysis used.

From the last half of the previous century the economics of education and the field of labour economics have, for some time, been systemically attempting to comprehend the particular relationship between education and the labour market (Schultz, 1963; Mincer, 1970; Becker, 1964, 1993). Detailed theories have been offered which highlight the economic value of education in terms of employability. Other empirical studies have tried to unravel the role of education as “added value” to the employee. Mainstream economics approaches strongly advocate that this added value is highly beneficial for the employees and can be latter used when entering the labour market as suppliers of labour and during their career (Blaug, 1992; Cohn & Geske, 1998; Mace, 2000; Johnes, 1993).

The correlation between educational attainment and pay has been expounded upon within three broad conceptual frameworks. The alpha coefficient approach directly links individual earnings to the differences in their educational attainment (Psacharopoulos, 1999). The filter, or scanner hypothesis, sees schooling as a filter that can be used by employers to discover those that are more capable than others (see Cohn & Geske 1998, Johnes 1993, Psacharopoulos 2004, Checchi 2006). Finally, the diploma hypothesis (related to 'diploma disease') is an alternative hypothesis which uses a different perspective on human capital accumulation. It suggests credentials rather than the skills are being obtained by individuals through their studies. The added value of education reflects the value that a specific credential can add to a potential employee when looking for or changing a job (Dore, 1997, 2009).

Educational levels have been related to higher pay (and productivity) in human capital

theory, via investment mechanisms. Nevertheless, there are alternative interpretations. The notion of common cause mechanisms suggest that the ways in which education is related to pay is not causal, and that it can be attributed to other factors which affect both. In contrast we can think about institutional mechanisms which relate education and pay via well-established practices which can be influenced by both the investment and common cause mechanisms (Monk, 2003; Cohn & Geske, 1998).

There are however, further questions which remain unanswered about other factors which may influence education, employment and pay. In business and management studies the individuals' decision to undertake higher education is generally reduced to an optimisation problem with respect to salary, career progression, skills and productivity, focusing on the economic value of education and its contribution to efficiency (see: Becker, 1993; Cohn and Geske, 1998; Mace et al, 2000). In this context once we acknowledge the social and cultural elements in this decision-making process, the rationale for mixed methods analysis becomes apparent. This also raises issues about the purpose of education.

There may be an economic basis underpinning this individual choice, but an intrinsic notion — which views the purpose of education as being to 'equip people to make their own free, autonomous choices about the life they will lead' (Bridges, 1992, p.92) — permits other subjective motivations. An alternative, instrumental, view of education sees business and the State as playing a more doctrinal role. This view suggests education involves inculcation of specific 'facts in order to effect a specific worldview' (Clarke and Mearman, 2003). The term 'McDonaldisation' has also been recently used to capture functional similarities and trends in common between higher education and ordinary commercial businesses. Thus efficiency, calculability, predictability and maximisation are high priorities in the US and UK educational system, and because of their global influence these characteristics are being expanding worldwide (Ritzer, 2010; Garland, 2008; Hayes, 2006).

The relationship between education, employment and pay becomes more complicated once we take into account the prevailing situation in the labour market as well as the particular features of labour markets at different locations and different times. Even if a more educated person can receive higher pay than a less educated one, we cannot infer this will make her more employable. This fact makes it necessary to deepen the theoretical research into this topic.

## 2. Work, overeducation and underemployment. Theoretical and empirical aspects in a contemporary Labour Market

### 2.1. *Work*

Before investigating on whether overeducation consists of a major determinant of unemployment in UK, I will try to have a closer look on contemporary approaches and definitions of the notion of work.

There are numerous studies which try to provide a definition of Work beyond solely interpreting it as the human effort merely exercised for and translated to money in the form

of wage. (Hardill, 1997; Wheatley, 2008). All these studies revolve around identifying a broader meaning of Work including unpaid work in their definitions. Glucksman (1997) sees Work as a part of social reproduction where Weiss (1978) consider Work, especially paid work, as the performance of an arduous cognitive task (Wheatley, 2008). As Spencer (2009) suggests, Work does not only have a “bad” meaning but can also be a major provider of positive sentiments like self-achievement and self-fulfilment. On the other hand, institutional definitions confine the meaning of Work into explaining it within the frames of paid employment and mode. ILO defines full-time work as that of 30 hours or more per week and part-time as that of less than 30 hours. Moreover, anyone who is working for at least one hour per week is being considered as employed and anyone who is not as being unemployed. In that context ILO also raises issues of overqualification and underemployment but no official definitions has been provided to date as scientifically correct. (ILO, 2010).

Concerning the different schools of thought, in mainstream economics the notion of Work has been merely determined by paid labour and specifically by the labourer’s trade-off between income from work and leisure for not working. Heterodox economics, mainly influenced from Marxian theory, distinguish between paid and unpaid work, including surplus-value to their analysis as the part of the value created by the workers but accumulated by capitalist employers as being part of their “generic gross profit” (Marx, 1976). In that sense unpaid work exists not only outside but also within the production process reflecting capitalists’ exploitation of the working class’ labour. Spencer (2000, 2009) argues that mainstream economics can only offer a narrow meaning of Work as they ignore capitalist exploitation and power. Given this, within a capitalistic society, any attempt for reducing wage and social inequalities is foredoomed to failure.

The concept of Work, traditionally defined as mainly determined by paid employment, ignores or at least devalues the experience that people occupy in “unpaid” jobs, including voluntary work and non-standard employment within a family environment (Taylor, 2004). Although unpaid labour is culturally integrated in many societies and generally accepted as a moral duty of people worldwide, mainstream neoclassical economics rarely include it in their empirical analysis. Typically, voluntary work has been excluded from sociological research on work.

The notion of Work has always existed amongst the main concerns of labour economists. Ackerman et al. (1998) provide a further extension on the factors that influence human labour by the inclusion of social and psychological components of work in their analysis. These components are inextricably tied with the discipline of economics as social science and any attempt to neglect this connection leads to sketchy and haphazard results. They also support a general restructuring of society’s perception of Work through the establishment of human values such as emancipation, happiness, self-expression dignity and participatory or self-management of the product of Labour.

Another critical study of the notion of Work is being offered by Baldoz and others (Baldoz et al, 2001; Berberoglu, 2002). They try to offer a holistic approach of the notion of Work highlighting the connections between geography, technology, gender, race with Work as

well as the importance of human relations in various workplaces and in the production process. Market capitalism and its worldwide triumph, the collapse of the Soviet bloc countries, the huge boost of computer-based production and the surge of new technologies and management command-and-control systems in the production process along with the introduction of the concept of flexicurity which appeared relatively lately as an alleged remedy for reconciling job flexibility and security, have brought a radical change to the notion of Work dictating the utilization of more technocratic definitions.

In that context it is clear that unpaid work is distinguished from Work but nevertheless some believe that it can take different forms. Feminist economists include women's unpaid housework and care in their definition of Work (Himmelweit, 1995), whereas Marxist economists classify unpaid work as the unpaid overtime in the sense of unremunerated work within the production process (Wheatley, 2008).

However, empirically, far too little attention has been paid to how workers view the purpose and the meaning of learning at work. Taylor (2004) investigated the lives of five volunteers from two voluntary sector organizations arguing that the meaning of learning at work can be extended in many different spheres. He also distinguished paid and unpaid work by virtue but without differentiating them outside the main notion of human labour. The purpose of work cannot be solely isolated under the meaning of an activity for economic benefit. He moreover advocates that researchers and policy makers should explore and understand the inherent perplexities of Work by defining labour more broadly. This is not possible if they persistently reduce their analysis of Labour by defining it as a task that has a specific price merely determined by the market.

Fenwick (2006) presented this different perspective after having conducted an overview of the related literature from 1999-2004. He concluded that the term "learning" in work is used to refer to learning as a "product", a process, or generally, a human experience. He also noticed that workers are very keen of using the notion of Work to describe both paid and unpaid activities.

Accordingly, Freeman and Rogers (2006, 2007) provide useful insights on employees' attitudes about participation, representation, and regulation at work based on two extended surveys conducted in the "Anglo-American" area. Both studies were based largely on surveys that were conducted as a follow-up to the influential Worker Representation and Participation Survey (WRPS). The findings revealed that there is a large gap between what workers want and what they actually have. What they want is to influence, direct and transform the workplace. The authors' main claim is that workers are dissatisfied and discontented with labour-relations at the workplace. The main reason for that were the American labour system's inherent flaws and its inadequacy to dealing with the labour problems of the twenty-first century. Therefore, the large gaps between the extent of representation and participation persist. Moreover, there is a tendency for the employees to prefer cooperative relations with management workers and for an increasing demand for union and non-union forms of representation. All the aforementioned issues cause a general misunderstanding of the notion of Work which can be defined differently within the occupational and social stratum. However, both of these studies and especially the book

titled *What workers want* (Fenwick, 2006) have been criticised for analytical gaps and problems regarding the credibility and reliability of the sample used (Hutchison, 2008).

Geographically the notions of Education and Work cannot be reduced to the provision of interpretations which apply solely to economically developed countries. McCowan (2003) provided a different interpretation by examining an agrarian community called the Landless People's Movement of Brazil (MST). MST is a social movement which called for agrarian reform as alternative to the mainstream governmental agrarian plan. Radical democracy and social justice were high priorities in the MST community and were established by the creation of a communal educational network which aimed to provoke civic participation and critical thinking. The main idea is that the participatory process in education and the development of skills and knowledge of the MST people establish a pedagogy which in turn influence various political, economic and cultural aspects of their life.

Livingstone (2003) sees Work within the dynamics of capitalistic society parallelise it with Education. These dynamics have undermined the role and meaning of unpaid work and informal learning. However, the commodification of contemporary society did not annihilate the social aspect of Education and Work through informal learning and unpaid work. Both still consist of an ample part of our social life and continue to represent very substantial resources for progressive change in established forms of paid work and formal education. Other researchers focus on Education as a public good and the incessant decline to serve public needs. Smith (1998) emphasises the contradictory view of the capitalistic system when acknowledging the great importance of women's unpaid work while stressing the need for a 2-tier income dependence of families. He concludes by arguing that the new forms of capital-accumulation distorted the role of public schools, transforming them into engines of inequality.

## *2.2. Overqualification and underemployment. The measurement trap*

One possible problem which may contribute to disequilibrium in the labour market is the problem of overqualification. This creates questions on structural unemployment and degrades the internal added value of education, in terms of potential employability.

However, we think that we cannot provide any answer to this topic before firstly trying to define underemployment and overqualification and possibly measure them. There has been a great variety of measurements used to capture overqualification and underemployment across different disciplines and schools of thought and below we present a literature accordingly.

Lenton (2011) overviewing the contemporary empirical literature suggests that overeducation is commonly measured by four separate methods; the analysis of the expertises required for a particular job, the self assessment of the commensurability of one's educational attainment with the job performed, the direct mismatch perception of an individual irrespectively of her education, and the realised matches method which can be statistically revealed by the comparison of a labourer's obtained education with the mean or

mode level within the occupation as that can be retrieved by the data. No measure seems to prevail against others and researchers' decision is exclusively dependent upon the properties of any data available.

Overqualification can be measured as a pay penalty for those with a particular qualification not performing the task they are qualified to undertake. Their pay is compared to that of those performing tasks at their own level (Sloane, 2002). Sloane estimates the penalty as approximately in the range of 10% to 25%, dependent on the data and the definition used. There are though other studies in which overeducated workers are also found to have slightly higher pay than their less educated, matched, co-workers. However, vast research showed that overqualification can be associated with substantially lower job satisfaction and well-being at work (Allen and Van der Velden, 2001; Pollmann-Schult and Buchel, 2004; Vaisey, 2006; Maynard et al., 2006; Green and McIntosh, 2007).

Bevan and Cowling (2007) in a mixed – method study, commissioned by the Sector Skills Development Agency, are interested on identifying which skills of workers are the most demandable in the Labour Market of UK and Europe, and what factors lie behind the issue of job mismatch. Initially the authors offer a statistical analysis of the European Working Conditions Survey, conducted in 1996 and 2000 where employees assess their experiences regarding job mismatch. Furthermore, in depth interviewing with HR managers are also conducted in four organisations in the UK to test their prior statistical findings as well as to offer qualitative insight on why, and how, the issue of job mismatch occurs. Their conclusions, derived by both quantitative and qualitative analysis, are being conceptualised into the following major findings:

- Job mismatches (both over-skilling and under-skilling) are highly related to the significant low rate of labour utilisation and labour productivity growth. Job mismatch has negative implication to salary progression, as well as to employee's career and skill development and job satisfaction.
- The rates of improvement regarding job mismatching are considerably higher in EU15 than in UK
- Demand-side are often neglected related to supply – side causes
- On-job training can offer a considerable alleviation of job mismatch especially to under skilled workers.

There is however no specific evidence which can allow us to generally accept that overqualification is a permanent state for individual workers. Still, many empirical studies indicate that this condition seems to be continuous (Dolton and Vignoles, 2000; Rubb, 2003; Frenette, 2004). We also have limited evidence of what the costs of overqualification are in the long term. Nevertheless, all these studies suggest or imply that being overqualified is associated with a significant deterioration of worker well-being.

Other studies enhance our understanding of the dynamic aspect of the graduate labour market: is overqualification growing or falling? Research conducted by Hartog (2000) has investigated the Netherlands (1960-1995), Spain (1985-1990) and Portugal 1982-1992, and found some evidence of growing overqualification in those countries. For Britain, Chevalier

(2003) and Chevalier and Lindley (2007) have tried to define overqualification by dividing it into two categories: “apparent overqualification” is where a graduate is in a non-graduate occupation, but satisfied with the match between qualification and job and “genuine overqualification” is where a graduate in a non-graduate occupation is dissatisfied. These two types of overqualification have different associations with pay, unemployment and other outcome variables. Longer-term evidence for Britain shows a continual increase in overqualification and job mismatch in the period 1986-2001, for both graduates and non-graduates (Felstead et al., 2002). Thus, the issue of overqualification and disequilibrium in relation to supply and demand for graduates has attracted growing interest in Britain.

Moreover, approaching employability at the regional level, there is a significant volume of empirical studies that focus on inter-regional wage and unemployment differentials. Research based on UK and US data highlighted that institutional factors such as wage bargaining structures and workers’ characteristics such as education are related to the aforementioned inter-regional disparities (Gabriel, Marquez, and Wascher, 1993; Elliot and Hemmings, 1991; Farber and Newman, 1987; Shah and Walker, 1983; Goldfarb and Yezer 1976). Some researchers argue that regional disparities indicate a strong persistence in unemployment that may have adverse consequences for those regions occupying the bottom positions in rankings (Martin, 1997); Pekhonen and Tervo, 1998); Dixon et al., 2001). Aragon et al., (2003) argue that the increase in unemployment disparities cannot be solely imputed to labour market disequilibrium. The objective of the presented study is to measure the possible educational gap existing for university graduates when they access their first job as well as to establish the possible determinants of this situation. The obtained results show that a situation of overeducation exists in Spain where graduates initially take on jobs that are in a category inferior to what would correspond to their education.

Jensen and Slack (2003) suggest that underemployment should be used from governmental statistic agencies instead of unemployment. Alternatively they argue that both measurements should be imposed rather than solely unemployment as it fails to provide adequate measurements of important individual characteristics of the labour force. There are also seminal institutional failures of labour market to respond to labour force’s talents and competencies. For example involuntary part-time work, job insecurity or working poverty (wages more than 25% below the official poverty threshold) consist of major components of underemployment and unfortunately are not adequately measured. Moreover, the authors allocate underemployment especially amongst belonging to vulnerable population (women, minorities, first entrants, low-skilled), adding that individuals resident in rural areas or central cities face underemployment more often and in greater severity. These inequalities should consist of a high priority of the polity and policies to ameliorate inequality should be immediately imposed. Finally, they observe reluctance on behalf of Federal data agencies to collect data and create variables regarding underemployment but they admit that this is more a problem of the complexity of underemployment measurement and less a governmental unwillingness to do so since they are already gather data for equally sensitive topics such as the displacement of workers.



A study conducted by Maynard et al (2006) shows that the sense of underemployment or any negative job stance are mainly expressed from full-time employees. On the other hand temporary workers do not show such negativity towards job.

In a case study focused in Northern Ireland McGuinness and Bennett (2007) investigated whether overeducation is more frequent within individuals who belong in lower level of graduate wage distribution. Their findings reveal only a partially support of the hypothesis that overeducation is linked with lower levels of ability as gender seems to be an equally important determinant of overeducation. The impacts on female portion of the sample found to be more persistent and constant irrespectively of their ability. This does not apply to men as overeducated males with low and mid-ability who earned significantly less than their high-ability male counterparts.

In a study conducted by Nabi (2003) there are significant evidence that graduate underemployment consists of a major problem in UK labour market. He is based on a sample of 203 business graduates in the UK and his findings showed that graduates that are considered as underemployed reported a decline of their skills utilisation in their jobs which in turn influence their job performance, their career and salary progression and even their satisfaction on their living standards.

Many researchers believe on the great importance that first job has on graduate's subsequent occupational career. Evidence of first job as a stepping stone are being presented in several studies (Cockx, and Dejemeppe, 2005; Gagliarducci, 2005) but during the last decade there is a growing literature which supports the 'entrapment hypothesis'. Brown (2003), Brown and Lauder (2008) and Lauder et al (2009) acknowledge the social and cultural elements revealing the hidden pattern of 'opportunity trap' in someone's decision to undertake education. Scherer (2004) conducted a cross-national comparative research in three countries; Great Britain, former West Germany and Italy using longitudinal data extracted from the Socio-Economic Panel (SOEP) for Germany, the British Household Panel (BHPS) for Great Britain, and the Indagine Longitudinale sulle Famiglie Italiane (ILFI) for Italy. She mainly focus to the impact that 'under-qualified' jobs and temporary contracts have to graduates' career development in countries with different labour market structures. The stepping stone hypothesis is not strongly supported by the data. Contrariwise the 'opportunity trap' hypothesis seems to fit the data better but again there are no robust findings that can significantly support that hypothesis. Great Britain labour market seems to be more flexible for graduates in order to make up potential initial disadvantages. Italian and West German rigidities of labour market do not allow for such thing and 'entrapment hypothesis' finds greater application there. In terms of the contract type there are not any negative effects for graduates subsequent careers in any of the countries examined.

Underemployment has also been examined under a more local context. The study of Van Ham et al (2001) investigate the 'discouraged worker effect' on local underemployment on deprived geographical areas in terms of the job opportunities available. The authors based on the Dutch Labour Force Surveys conducted in 1994, 1995, 1996 and 1997, mainly focus on geographical aspects of spatial job mismatch and how this affect employment outcomes. The 'discouraged worker effect' can be considered as valid and well applied to the Dutch

labour market as poor chances on finding a good job (or just a job as well) leads to individuals decision for poor participation on job searching procedures.

In terms of the conceptual basis for studies which try to capture the notion of overqualification in the contemporary world, Sattinger's (1993) "assignment theory" indicates the possibility of close matches between workers and firms, providing a basic comprehensive framework for how we can approach qualification mismatch (McGuinness, 2006). However, not all studies conceive overqualification in the same way. Psychologists use the idea of skill underutilisation in order to interpret job mismatch. (Johnson et al., 2002). Even if there was not a clear distinction in the past, subsequent studies, have made explicit distinction between overqualification and skill underutilisation. Green and McIntosh (2007) and Green and Zhu (2010), for example, show that there is a positive but imperfect correlation between overqualification and skill underutilisation suggesting a clear distinction between these two conditions. Moreover, findings from a studies conducted by Green and McIntosh (2007), Green and Zhu (2010) and Allen and Van der Velden (2001) suggest that there are negative effects of skill underutilisation on wages and job satisfaction, even after conditioning for overqualification.

Livingstone (2009) argues that there is no inherent reason for someone to believe that education and labour market should match each other as they have different philosophical departures and institutional purposes to fulfil. Education at all levels and contemporary labour market are rather contradictory than complimentary and any attempt to see them as the latter leads to arbitrary and ambiguous outcomes, which are very difficult to stand as methodologically robust and therefore to inform policy making. He moreover distinguishes underemployment from overeducation (overqualification) by placing the former within the framework of segmented labour market theories and thus within the structural inability of the labour market to generate well matched jobs, and the latter within the ongoing tendency of educational institutions to produce a growing number of highly-qualified workers, intensifying labour market's problem of underemployment, especially in periods of economic downturn. This distinction is very difficult to be clearly defined in practise and more difficult to be measured. The love-hate relationship between education and labour market persists, while making this gap chronically unfilled. Livingstone (2009), therefore focus on investigating on why and how this gaps accrued within the labour market and whether they can be classified into well-defined categories. He sees six different classes of gaps and these are: The talent use gaps, the credential gaps, the relevance gaps, the performance gaps, the general working knowledge gaps and lastly the subjective gaps. For the two first education is the culprit whereas the labour market for the next three while leaving subjective gaps to be defined in an individual level which in turn interact with all the aforementioned five.

Van der Meer (2006) provides a test of the classification system first introduced by Conen and Huijgen (Huijgen, Conen & Riesewijk., 1983) regarding overeducation and the levels of required education for a specific job. For doing so, he juxtapose Conen and Huijgen classification system with another one, developed by the official statistical agency of Netherlands (Statistics Netherlands). Specifically he offers a comparison of the standards errors of both measurement methods, between the rate of return for overeducation and

undereducation in order to test validity on the implementation of statistical comparison techniques. Findings showed that even if both methods seem to reveal similar trends of overeducation and undereducation, the Statistics Netherlands approach provide a more robust and adequate measurement of this trends.

There are still other researchers who try to measure over- and undereducation by the usage of various techniques and classifications. Two empirical studies conducted by Verhaest and Omey (2006, 2010) using data from Flemish school leavers, confronts with the issue of measurement. Even if the 2010 study resembles very much the previous one, we can still find useful insights of the measurements of over and undereducation to both of them. In both studies measurements are being distinguished in terms of job satisfaction, mobility, training participation and pay. They argue that different measurements methods provide different outcomes, regarding the magnitude and the significance of the statistical effect. Findings reveal that overeducated workers cannot feel satisfied with their work, when attained education is being used as a control variable. But, when controlling for required education the findings are not statistically significant. For undereducation findings proved to be vague and no statistical explanation could be provided. Previous job experience along with higher schooling grades are major determinants of not being someone overeducated in his work but this is not true when we deal with issues of surplus of skills more generally. Regarding sex, women are more unlikely to be overeducated, at least in terms of the standard RM (realised classification i.e measures within the same occupation and if the educational level of a worker is more than one standard deviation above the mean educational level within his occupation). However, when more detailed occupational codes and additional observations are being used this statistical effect is not valid anymore. Surprisingly, technology biased mismatch does not seem to being supported by the data.

For Australia, Wilkins (2006) tried to identify the factors related to underemployment. He defines underemployment as the willingness of part-time employees to work for more hours. The author uses data collected by the 2001 Household, Income and Labour Dynamics in Australia (HILDA) and mainly focus on personal, social and job characteristics and their effect on both underemployment and unemployment. Findings showed that unemployment and underemployment have many predictors in common. These are: age, educational attainment, disability and labour market history. Housing situation and location of residence appeared not to affect unemployment neither underemployment. In contrast, there are also predictors such as family type, number of dependent children and number of jobs held in the preceding year which affect unemployment and underemployment in different directions. Moreover, this study suggests that supply side factors which cannot be directly related to job characteristics can be considered as more important predictors of underemployment than other employment characteristics or demand-side factors.

A year later (2007) Wilkins enhance his research by the inclusion of income, welfare and subjective well-being for examine them on their significance as predictors of underemployment. Whilst these predictors undoubtedly disclose negative effects regarding unemployment, for underemployment they can produce considerable injurious effects. The negative effects appear to both full-time and part-time employees who are willing to work

for long hours. Generally, for part-time workers who prefer to work for more hours the effects on underemployment resembles those of unemployment.

A cross-national study conducted by Wolbers (2003) examines the effects of job mismatches within EU using EU LFS 2000 ad hoc module on school-to-work transitions. Apart from individualistic, structural and job characteristics, that affect the probability for someone to be mismatched, there are significant evidence which reveal the major influence of the educational system orientation to job mismatches. The author suggests that individuals whose educational system is vocationally oriented are more likely to be mismatched than those whose educational system can be considered as a more generic one. Moreover, this study shows that mismatched workers, who suffer from a low occupational status, are more prone in participating to life-long learning programs while looking for another job far more frequently than matched workers. Those effects seem to be smoother in countries with a vocational oriented educational system.

Until now there is no official definition of overeducation and underemployment, generally accepted by the majority of academic community and policy makers, and this is mainly caused by the heterogeneity of Labour Market and educational systems around the world. The chaotic complexity of the decision making process in the individual level as well as the different approaches followed by various institutions in a national and international level to address overqualification, renders any attempt to define both overqualification and underemployment inefficient and methodologically futile. So far the only thing that is generally accepted from various studies conducted worldwide as true is the absence of a credible cross-applicable definition as well the lack of methodological robust instruments which will allow the capture of the basic characteristics and determinants of overeducation and underemployment in a single quantifiable framework in an aggregate level. Therefore, based on the data available (QLFS) we decided to focus on investigating employability in terms of educational level as mismatches cannot be adequately revealed. However, Lenton (2011) has recently used pooled data from QLFS over the period of 2002 to 2008 investigating issues of the realised mismatches as well as providing an estimation of overeducated male workers “pay penalty”. She used modal educational level within industries and occupation across UK regions as the correct level of education required for a job and each one standard deviation more or less than the correct level is being considered as overeducation or undereducation respectively. Even if such methodology is supported by the literature (Verdugo and Verdugo, 1989) we think that QLFS is not adequately applicable because it does not provide comprehensible information on earnings and no consistent estimation can be proceeded, especially when pooled data is used. Secondly, the assumption that the modal or mean educational level of a job is the “correct” one fails to recognise the structural defects of Labour Market in recession periods when workers struggle to find a job commensurable to their educational level and are likely to accept a non-matched one. When credential inflation is in operation then the methodology of realised mismatches is upward biased and mean or modal educational level required for a job may include a big proportion of already overeducated individuals. The same bias can be assumed for declined industries due to the negative general circumstances or trends of Labour Market on behalf of a specific sector such as the impact of deindustrialisation process and the gradual increase of services over manufacturing.

### 3. Data and Methodological Strategy

The great majority of recent empirical studies examining the relationship between education and employment use secondary, as opposed to primary, data. These secondary data sets, being conducted by governmental bodies, have been repeatedly tested and controlled for the minimisation sample bias and statistical error, producing samples that are more likely to be representative of the population.

Economic science, as with other sciences, has its “disciplinary norms”. In applied economics the techniques of econometrics have increasingly been used to make statistical inferences capable of being generalised to a much larger population than that used for the study. The characteristics of an econometric approach can be summarised as follows:

- (a) *“Formulating an **economic model** appropriate to the questions to be answered*
  - (b) *Reviewing the available **statistical models** and the assumptions underlying this model, and selecting the form more suitable for the problem to hand;*
  - (c) *Obtaining appropriate **data**, properly defined and matching the concepts of the economic model;*
  - (d) *Finding suitable **computer software** to enable the calculations necessary for estimation and testing of the model to be carried out”.*
- [Stewart and Gil, 1998, p. 1]

This study will focus upon applying these principles to investigate the research aims and objectives. It will therefore attempt to explore the conditions under which econometrics could be applied successfully to this research topic.

We will conduct secondary data analysis from UK QLFS data sets and particularly from the 1<sup>st</sup> quarter (January to March) of 2006, 2008 and 2010. Before get into depth report of the problems related to our particular research of underemployment and overqualification in terms of employability, we deem it policy to make an overview of the limitations arise from secondary data analysis in general.

Governmental data sets such as QLFS conduct a rigorous data-checking before release their data sets to the public by following strict principles for achieving the best reliability and applicability possible. Those principles rely to checking on possible duplication of records as well as ensuring that certain key variables have valid values. For example, since the UK LFS has been designed to follow participants for 5 consecutive quarters checks has been conducted for the consistency of their response regarding key variables such as age, sex, household members, activity status or geographies (also known as “imputation checks”) and checks for possible “outliers” (e.g. very old, old workers) which could result to several biases.

Even if the aforementioned issues are applied with scrutiny, problems of sampling – and principally non-sampling – errors and variance, as well as measurement and processing errors are mainly unavoidable. For addressing this issue LFS has constructed several proxies and weight variables which can be used to alleviate this problem and ensure validity of all cases. Inevitably, on the other hand, some values of key variables such as those related to income, self-employment, unemployment and types of inactivity have been significantly truncated.

Therefore, recognising all aforementioned general limitations of the secondary data analysis and especially that conducted by UKLFS we agreed that it is worth using it, relying to the rigorous data-checking procedures applied. But how useful can the UKLFS data be on addressing patterns of underemployment and overqualification amongst its participants? Can we assume generalisability to a broader population?

Before proceeding in constructing an econometric model for investigating issues of overqualification and underemployment of UKLFS respondents in terms of the employability rate in the UK Labour Market we need to present some descriptive statistics which can be proved helpful in informing our subsequent econometric analysis. The main aim of this is to display some basic patterns of the data used which can reveal trends that can be conceivably elaborated further by the conduction of econometric analysis. In the tables shown in the Appendix participants who declare themselves as ILO inactive have been excluded from our analysis and thus cases examined have been decreased. Because in the variable regarding the educational level of the participants (levqual) in the QLFS data sets, all information for graduates and postgraduates are bind together in a single value (‘‘NQF Level 4 and above’’) we had to generate a new variable which includes NQF Level 5 as a separate value which corresponds to participants of postgraduate educational attainment.

Table 1 (see Appendix for all Tables from here thereafter) represents a pivot table which shows the difference in the unemployment rate on respondents declared as ILO unemployed<sup>1</sup> in terms of their usual regional residence and their educational level for the biennia of 2006-2008, 2008-2010 and the quadrennium of 2006-2010. Decreases of unemployment rate between the aforementioned periods are depicted in red and as negative numbers. Having a closer look to that table we can see that there are not striking differences observed on the unemployment rate of respondents of higher educational attainment and the major increases are mainly due to a shrink of the jobs usually generated for people with lower educational attainment. The latter can be also shown in Table 2 once we exclude NUTS1 classification from our analysis. Table 3 shows the change in unemployment rate throughout the same periods.

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<sup>1</sup>International standard ILO measure:

- In employment, as employees, self-employed, on Government supported training and employment programmes or as unpaid family workers.
- ILO unemployed, defined as all those who were without a job at the time the survey was conducted and who were able to start work within the next fortnight and had actively looked for work in the last four weeks or had recently found a job and were waiting to start.
- Economically inactive, including those looking after a house, those in retirement and children aged under 16 years, but also including those without work who are not actively seeking or available for employment.
- ILO employment rates are calculated by expressing the number of ILO unemployed residents in an area as a percentage of that area's resident and economically active population (i.e. the total of persons who are either in employment or ILO unemployed).

From the descriptive statistics presented in Tables 1,2 and 3 (see Appendix) there is a clear trend that unemployment has not affected people in higher educational levels, at least as much those with lower educational attainment; but is that really the case? Our objective is to run a binary logistic regression model trying to allocate differences in employability that might exist in UK in terms of the educational level. By estimating the regression coefficients it is possible to evaluate the impact of several independent variables. Multivariate analysis has been used to explain possible differences in the employability between holders of secondary, high and higher degrees in the UK labour market. This will allow us to assess whether there has been a change in UK unemployment in terms of education level, and if the latter can be explained by overqualification. The aforementioned analysis consists of a cross-sectional one and has been carried out using UK's QLFS data sets from the 1<sup>st</sup> Quarter of 2006, 2008 and 2010.

The model that is used in this study consists of a dependent variable ( $U$ ) as a function of six independent variables. Where  $U$  is unemployment,  $S$  is sex,  $E$  is ethnic group,  $A$  is age,  $R$  is region,  $F$  is family unit and  $Q$  is the level of qualification, we hypothesise that for individual  $i$ :

$$U_i = f(S_i, E_i, A_i, R_i, F_i, Q_i) \quad (1)$$

Statistically, where  $a$  and  $(b_1...b_6)$  are our parameters and  $\varepsilon_i$  is the error term, for agent  $i$  we will estimate:

$$U_i = a + b_1S_i + b_2E_i + b_3A_i + b_4R_i + b_5F_i + b_6Q_i + \varepsilon_i \quad (2)$$

Since we are interested in graduate's unemployment (though recognise that other factors may contribute to unemployment) our hypothesis is as follows:

$H_0 : b_6 = 0 \rightarrow$  Level of education have no effect in someone's unemployment

$H_1 : b_6 \neq 0 \rightarrow$  Level of education does affect someone's unemployment

Following that, we can extend the analysis of alternative hypothesis into distinguish it in two separate fragments. If  $b_6 > 0$  then there is a positive relationship between level of education and unemployment and therefore the most educated experience higher rates of unemployment compared with those with lower levels of educational attainment. If, on the other hand  $b_6 < 0$  then the correlation is negative and thus, it is more likely for someone with lower educational attainment to be unemployed than a more educated one. The same applies to all other independent variables examined.

The research presented here attempts to demonstrate the impact on the employability of individuals who possess qualifications, in comparison to those who do not, using 2006, 2008 and 2010 as reference points. Additionally we aim to distinguish between pre-recession and during recession eras. The reason of using two data sets from during-recession era is to investigate issues related with graduates employability within the prolonged economic crisis started at the end of 2007. So, our analysis has been focused on comparing employability in terms of educational level between pre and during recession time periods as well as within the ongoing recession using 2008 and 2010 as reference points.

This research is a typically variable-oriented research as it compares the behaviour of variables drawn from a large number of observations (large number research). It is also generally accepted that government surveys, like the QLFS, have been constructed robustly. As a result, the use of a large and reliable data set will probably facilitate the generalisability of the findings of this study.

This project uses econometric methods, particularly logistic regression. Binary logistic regression is similar to linear regression except that it is used when the dependent variable is dichotomous. Binary logistic regression assumes that the dependent (or outcome) variable is dichotomous and, like most other statistics, that the outcomes are independent and mutually exclusive; that is, a single case can only be represented once and must be in one group or the other (Tabachnick and Fidell, 2007).

The study uses odds ratio as a measure of effect size. The ratio of odds ratios of the independent variables is the ratio of relative importance of the independent variables in terms of effect on the dependent variable's odds. Unstandardised logit coefficients may also be used, but then one is discussing the relative importance of the independent variables in terms of effect on the dependent variable's log odds which, under specific circumstances, cannot provide an adequate statistically significant explanation and thus is less explanatory and intuitive (Field, 2009). This notwithstanding, in order to be consistent with my research explanation, I have also tried to interpret the coefficients wherever needed. The latter has been done only for particular coefficients, for which there is significant statistical evidence that identifies both the sign and the magnitude of the influence of my independent variables upon the dependent one (for more details regarding the application of the latter to my research project see Section 5 and Table 5 in the Appendix).

The data sets used provide information on individual variables such as sex, age, ethnic groups, region, family unit and educational level. QLFS has started to collect data from 1973 (until 1991 annually, and then by quarters) and includes a wide variety of questions which can be applied to this research topic.

In sum, logistic regression, among other requirements such as the measurement of factors on the interval level and the creation of dummy variables, needs large samples to be accurate (Field, 2009). These requirements are met when using the QLFS, owing to the large sample size. The data has then been analyzed using SPSS. The “recoding into different variables” function and the creation of dummy variables were necessary procedures in order to test my research hypothesis in a more adequate way.

Particularly, we transformed our dependent variable into a binary one. We therefore create 2 values: The one which takes the zero value comprise respondents who are employees, self-employed, government-employed and those who consider themselves as unpaid family workers. The alternative hypothesis is being supported by the value 1 which represents ILO unemployed. All other values which corresponds to all kinds of inactive persons have been



excluded from the analysis<sup>2</sup>. Furthermore we have also filtered out cases of respondents belonging to age groups over 60 and below 25. The latter sample restriction has been borrowed by Green and Zhu, (2010) and implemented in order to control for the educational level of the respondents and for balancing the retirement age of men and women<sup>3</sup>.

In terms of our predictor (independent) variables we provide some transformations to the original ones found in 2006, 2008 and 2010 data sets in order to meet the requirements of a logistic regression analysis and offer a more comprehensive inferential analysis of their statistical effect over the outcome (dependent) variable. All dummies' transformations and their properties are shown in table 4 on the Appendix.

## 4. Discussion of Results

Logistic regression in SPSS is provided by the interpretation of three main parts of an output. First, two tables provide descriptive information. Next, there are three tables in Block 0 (see Appendix Tables 7a, 7b, 7c for 2006, Tables 8a, 8b, 8c for 2008 and Tables 9a, 9b, 9c for 2010) that provide information about the baseline situation, when only the constant is in the equation. That is how well can we predict **ILO Revised** variables (*ILO2006*, *ILO2008* and *ILO2010*) without using **Sex** (*Sex2006-2008-2010*), **Age** (*AGECAT06-08-10*), **White/Non-white** (*Ethnic06-08-10*), **type of family unit** (*Fam206-208-210*), **Region** (*RegNuts06-08-10*), and **Educational Level** (*Educ2006-2008-2010*)<sup>4</sup>, if we predicted that all the respondents would be employed. The last section of four tables is below **Block 1** (see Appendix Tables 7d, 7e, 7f, 7g for 2006, 8d, 8e, 8f, 8g for 2008 and 9d, 9e, 9f, 9g for 2010). They show the results when all predictors are entered simultaneously. The Omnibus Test of Model coefficients and the H-L goodness of fit Test have been used to test the statistical significance of the model. The Model Summary Table (See Appendix as above) shows that there is a relatively modest fit for all models (**Cox & Snell R Square = .013, .016, .025 and Nagelkerke R Square = .050, .056, .071**) for 2006, 2008 and 2010 respectively. Regarding the H-L Test we found a non-significance for 2006 and 2010 models ( $\chi^2(8) = 6.299$   $p = .614$ ,  $\chi^2(8) = 7.488$ ,  $p = .487$ ) respectively and a significance for 2008 model ( $\chi^2(8)$ ,  $p = 0.001$ ). When H-L tests shows p values more than the confidence interval used (**95% i.e. p value < .005**) is indicative of a model that does not predict the real world data so well and does suggest a lack of good fit. However, this test (which is based on a chi-square) is affected by continuous variables as these add more sampling zeros to this and that is why we tried to transform all continuous variables into categorical ones. The

<sup>2</sup> Students, inactive individuals due to long term disability, early retired, those under 16 year old as well as those who respond that they are seeking or not seeking for a job either because they like or don't like or they think that there no jobs available or those who respond that they don't need one, have been excluded from the analysis To that extend our sample cases has been significantly decreased compared with the initial number of valid cases. So in terms of percentage, in order to achieve the best applicability of our dependent variable we had to increase the missing cases from 3% to more than 50% on average.

<sup>3</sup> We assume that by 25 the very large majority will have finished full-time education and by the age of 60 women –at least for the time this research has been conducted (2010) – were reached the retirement age and the great majority of them choose to do so. Total valid cases have been further decreased by approximately 10% on average to all data sets examined. The sample albeit truncated, however still remains reliably large.

<sup>4</sup> Thereafter called as Sex, Age, Ethnic origin, Family unit, Region and Educational level respectively shown in italics, denoting the year referred by the two last digits of that year. For example sex variable for 2006 is shown as *sex06* and sex variable for all periods examined as *sex06-08-10*.

difference on H-L Tests is somehow quite surprising because of the same data and variable properties used (for all the statistical tables see Appendix).

In Table 5, all variables are statistically significant and **Exp (B)** gives the odds ratios for each variable.

Although there are a number of independent variables in the equations, including *sex06-08-10*, *age06-08-10*, *ethnic origin06-08-10*, *family unit06-08-10* and *region06-08-10*, we have focussed on the interpretation of the educational level variable since the main hypothesis of this research concerns this aspect of overqualification. Table 5 show that for all periods examined, sex variable is insignificant so no inferences for the effect can be made. Non-white people are more likely to belong to the unemployed category compared white people respectively. Statistical significance is high for 2010 but very low for 2006 and 2008. Moreover older people are more likely to be unemployed than younger ones although the statistical effect doesn't seem to be large. For the family variable the table shows that a person belonging to a family unit with dependent children is more likely to be unemployed than one with independent children. This may be explained by the great number of women that are on leave to take care of their children combined with the fact that this study used data only from the first quarter of 2006, 2008 and 2010 and a cross-sectional study like this cannot provide information on the distinction between short and long term unemployment. The latter doesn't seem to apply to 2010 which the statistical effect changes its sign.

Particularly, concerning the *age06-08-10* variable, statistical significance is very high (.000 for all periods examined) and for people aged 41-60 the odds of being unemployed rather than in the work status category, controlling for other variables in the model are decreased by .675, .603, .679 for 2006, 2008 and 2010 respectively. The negative effect (even quite small) can show a trend in the data examined; Younger people are more likely to be unemployed than older ones. This of course is something that one could expect as employers are more likely to employ people with more years of experience than younger ones. However, the effect of years of work experience, even existent, is relatively small and does not make a huge difference per se. Once of course educational level is also been taken into account, the combined effect is very high.

Non-White people odds of being unemployed compared to white people are increased by a factor of 2.396, 2.284 and 1.671 for 2006, 2008 and 2010 respectively. As discussed regarding the *age06-08-10* variable above, the positive sign of the b coefficient (.874, .826 and .514 for 2006, 2008 and 2010 respectively) shows that there is a positive correlation between being non-white and being someone unemployed which means that it is more probable for someone who belongs to a non-white group to be unemployed than someone from the white group. The effect is very high for 2006, 2008 but becomes smaller in 2010 which means that non-white people are better off in 2010 compared with previous years. This is a result that needs further analysis as people belonging in a worse off category in boom periods, like non-white people, are those who are first hammered by a deterioration of the general economic climate. Here we found the opposite (even with a small downward difference), but no claim can be made once we are not aware of the actual number of non-white long term unemployed people of foreign nationality who decided to return to their

countries, the general trend of immigrants to accept lower paid jobs more easily than their UK's counterparts who in turn is more likely to be entitled for unemployment or any other social benefit. These are only few of the reasons which might caused the 2010 decrease of non-white unemployed people, but it certainly calls for further research and the enhancement with migration time series data available.

*Fam206-208-210* variable does not imply so straightforward interpretation. The odds for a family unit with non-dependent children to become unemployed increases by 1.237, 1.099, for 2006 and 2008 respectively. The measure is statistical significant for 2006 but not for 2008 where the recession had already started. Therefore for 2008 we cannot provide any significant statement on whether an individual who belongs in a family unit with no dependent children can experience unemployment or not in the future. Having a closer look on 2010 equivalent variable which scores a negative  $b$  coefficient of -.742 and an  $\text{Exp}(b)$  of .476 we can clearly see that data shows a shift from 2006 trend. Significance is high and therefore the odds for an individual belonging to family unit with non-dependent children to become unemployed decreases significantly by a factor of .476. The statistical significance is very high for 2006 and 2010 but not for 2008. It is an unexpected result and evidently needs further research for investigating other factors which caused this change. The shift of the general economic climate from boom to recession may have contributed to that but we cannot provide any reliable interpretation until further research will be conducted.

In terms of the regional effect (NUTS 1) of unemployment we can imply that after using London as a reference category there are more odds of being unemployed while living in all other British regions than in London. For 2006 Northeast, Northwest, Eastern and Scotland regions the statistical significance is very low. For 2008, only South East and South West are significant and for 2010 the hit rate remains very low with only Eastern and South West Regions to be significant. For the same year West Midlands regions provide a striking negative score of .000 and 1.000 for  $b$  coefficient and odds ratio respectively which implies that West Midlands respondents does not effect the outcome variable at all! Because of so many regions being statistical insignificant we chose not to proceed to further analysis of the results.

There are important findings regarding our research hypothesis, i.e. concerning whether or not obtained educational level makes someone more or less employable. "No qualifications" is the default reference category. For the postgraduate level (NQF Level 5) the  $b$  coefficient is negative and relatively large (-.1635, -.1651, -1.858) and the log odds (logit) of being unemployed rather than employed are .195, .192 and .156 for 2006, 2008 and 2010 respectively. We would therefore say that the odds of being unemployed compared to having a job are decreased by the aforementioned factors for a respondent who belongs in the NQF Level 5 category compared to one who does not, controlling for other variables in the model. For those holding a first degree or equivalent (NQF Level 4) the odds of being unemployed are decreased by a factor of .258, .219, .218. Regarding those with Trade Apprenticeships qualifications the odds of being unemployed decreases (.377, .409 and .343) compared with those who do not have any qualifications. The same trend applies for all participants belonging to all other levels even for those whose qualification cannot be easily defined (Other qualifications). All values of  $b$  coefficients are negative with an  $\text{Exp}$

(B) ranged between .608 and .156 ( $.599 > \text{Exp}(B_{2006}) > .195$ ,  $.608 > \text{Exp}(B_{2008}) > .192$ ,  $.575 > \text{Exp}(B_{2010}) > .156$ ) and are statistically significant. We therefore could be sure that the sign is negative within a confidence interval of 95%. The closer the  $\text{Exp}(B)$  value is to zero the bigger the effect of the predictor variable to the outcome one (for all measures see Appendix).

All measurements related to qualifications are statistically significant. The same inferences can be drawn if we were solely focused on the interpretation of the  $b$  coefficients of the qualifications. Hence, we can observe that the more qualified someone is the less the possibilities of her being unemployed. To this extent we reject our null hypothesis (educational level has no effect to someone's employability) concluding that there is not any evidence of overqualification at least in terms of employability and not in terms of wage differentials which is something that needs further research.

Lastly, we have made our statistical analysis based on the QLFS data for the first quarter of 2006, 2008 and 2010. As the data files were large we did not want to make our analysis more complicated by merging the rest of the quarters. Moreover, merging huge data files, meeting all the requirements needed can sometimes be extremely time-consuming and can lead to unexpected results which can cause problems of data validity; hence for this study we have adopted a (relatively) simple cross-sectional analysis though not overlooking its inferential limitations which we discuss below.

## 5. Methodological Critique and Discussion

This study provided the opportunity to delve deeper into the process of scientific enquiry. To this extent it is an important opportunity to explore methodological issues which will inform subsequent studies. The approach adopted here has been a quantitative approach using conventional econometric analysis within the disciplinary norms of economics and especially those of applied mainstream economics.

But it is mainstream neoclassical economics which still prevail today and their assumptions on utility maximisation by individuals, rational expectations related to a specific money value or perfect and abundant information, to mention the most important of those. But what if people behave irrationally, affected by their emotions or choosing to identify themselves within a group where decisions are interrelated among its members?<sup>5</sup> However, the purpose of the current study is not to delve into critiques of mainstream economics as school of thought but to provide an assessment of the “fair” usage of econometric techniques within the broader Economics realm. We reckon though that Econometrics are useful tools for “doing the job” but can be strongly associated with mainstream economics since both rely on assumptions and certain conditions which cannot easily stand as true in the real life. Certainly, this analytical tool has been excessively misused despite the general acceptance within the Econometrics society that certain conditions should be met, otherwise all conclusions derived from a study where conditions fail to be met can lead to erroneous

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<sup>5</sup> In Varoufakis et al (2011) there is an extended analysis of why neoclassicism's “meta axioms” of methodological individualism, instrumentalism and methodologically imposed equilibrium had failed to provide an adequate explanation of the “real world”.

results. Data should be carefully studied before any econometric technique will be applied and should it proved reliable and acknowledging the “*ceteris paribus*” factor, then can one proceed doing inferential analysis of the results (Bryman, 2004, Barreto H, and Holland M. F, 2010).

This approach has been subject to criticism from a number of economists within, and on the fringes of mainstream economics (Lawson 1997, 2003; Archer et al., 1998; Downward and Mearman, 2002). Essentially the approach adopted has been deductivistic, defined as: ‘...any form of explanatory endeavour which assumes or posits or constructs regularities (deterministic or stochastic) connecting actualities such as events or states of affairs’ (Lawson, 2003, p. 13). Such approaches to economics involve an epistemology of predicting using the closure assumption of *ceteris paribus*. This has been criticised as being unrealistic by leading critical realists, such as Lawson (1997, 2003). Such concerns, however, are more philosophical than operational. Econometric techniques are merely based on conditional assumptions and when these cannot be adequately met then all the outcomes accrued are usually wrong, and can only lead to non-erroneous results by simply an accident! On the other hand, challenges like this can give the impetus for a better understanding of social sciences methodology as well as a better insight on alternative approaches. This notwithstanding, our focus will now switch to operational issues concerning the methods used.

There are some weaknesses inherent in the research design, which were not overcome. First, by only using the first quarter of the QLFS data for all periods examined, we were unable to reveal the seasonal effects of unemployment. We could have merged data sets and provided a panel of data sensitive to such dynamic trends and this is something that has been left for research to come. However the cross section contained a sample of 46,074/48,562 and 40866 responses (once missing observations are excluded) for 2006, 2008 and 2010 respectively. Had we instead used the five quarters longitudinal data sets provided by the UKLFS we would only have included approximately 5.000 cases in our analysis<sup>6</sup>. Furthermore, we did not consider the impact of the economic downturn or the increase of unemployment during different quarters of 2006, 2008 and 2010. During a recession it is possible to find more evidence of overqualification in different quarters as the demand for labour is seriously restricted abnormally within a certain year. If we have used summer quarters we may have come up with different results. Future research should use more comprehensive secondary data analysis (with a time-series component) and try to focus mainly on external factors such as the general economic circumstances. This would eliminate some of the disadvantages associated with the regression analysis in the present study, and might improve the “goodness of fit” of the model and thus its external validity.

The quantitative approach adopted can also be criticised in reference to alternative methodological approaches. Quantitative approaches receive notable criticism from qualitative research for their failure to adequately include interpretation or definition of findings. It has been argued that quantitative research does not provide context to its

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<sup>6</sup> QLFS from 1992 onwards, has recently released a longitudinal data set including 5 quarters. To those data sets a great number of cases has been excluded for meeting all methodological issues required. QLFS has used advanced data merging techniques excluding many of cases that existed in quarterly data sets. (For more details see [www.data-archive.co.uk](http://www.data-archive.co.uk))

findings (Bryman, 2004). By using qualitative research techniques insights could be provided into interpretations that are beyond the description of patterns and numbers *per se*. In some sense this may respond to the criticism of deductivism offered by Lawson (1997, 2003) and others. Ziliak and McCloskey (2009) advocate that is of an imperative need to distinguish between statistical significance, scientific verities and economic meaning. When statistical significance prevails over the interpretation of the economic importance of the actual effect of variables, scientific meaning takes the form of arbitrary and ambiguous scientism. “Significant Does Not Mean Important and Insignificant Does Not Mean Unimportant” [Ziliak and McCloskey, 2009, p. 2306]. Conversely, the use of a qualitative approach could provide greater depth to the analysis, and allow a more nuanced understanding of why patterns emerge in the quantitative data analysis. However, qualitative approaches do suffer from a number of criticisms including problems of reliability relating to qualitative findings made using a small sample, including the representativeness and external validity (generalisability) of investigating a particular sample (Bryman, 2004).

An alternative option would be to perform primary data collection using a quantitative questionnaire. This would allow questions to be carefully chosen so that more relevant data could be collected. Administering the questionnaire face-to-face would also go some way towards ensuring potential issues relating to the understanding and interpretation of questions, which could reduce the validity of the data collected, could be avoided. However, the key issue surrounding this method of data collection would be in generating a sample size large enough to be statistically robust, but on the other hand this can be proved extremely costly and time-consuming.

Triangulating methods using a combination of quantitative and qualitative methods (i.e. a dualistic approach) may therefore offer a suitable solution and resolve some of the difficulties associated with the sample limitations. A careful drawing of questionnaires, operated in conjunction with in-depth interviews, would allow the development of a better understanding of qualitative issues (prestige of job, job security, scientific interest, promotion, etc.) in relation to the educational level of the participants. This would provide additional evidence and allow simultaneous investigation of qualitative and quantitative aspects of the issues raised. More specific data may also be provided for quantitative analysis. For example, the analysis could include issues of overqualification in terms of wage differentials and education-occupation mismatches. The data on earnings is quite problematic in the QLFS since it is asked in many ways and many respondents do not complete this section of the form. Such additional quantitative analysis may also be useful from an operational perspective since allows the possibility of triangulation of results. The advantages and disadvantages of different methods thus need to be taken into consideration for the development of good research in the area of the interactions between qualifications and employability.

## 6. Conclusion

The findings from this study yield some insights related to the impact of overqualification upon unemployment relying on data collected by UK LFS. There are a number of structural

and operational problems concerning the data used (as for example, by only using one quarter for each year examined and the technical problems regarding its analysis discussed above), but these had been tried to be minimised within the strict confines of deductivistic methodological approach. In terms of outcome, the findings did give us some reasons to reject our research hypothesis and to support the alternative one. The research hypothesis — that educational level has no effect to employability — has been rejected. Plainly our study did not, given the narrow cross-sectional nature of it, include unemployment seasonal effects and the impact of the current economic downturn on the employability of qualified people, longitudinally, and within all period examined. Besides the above limitations, further inferences were drawn regarding the impact of sex, age, ethnic group, regional level and family unit variables upon unemployment. Our findings revealed that most aforementioned variables do contribute to someone's employability; each of these variables were statistically significant (excluding sex and certain values of specific region) thus, adding to our attempt to seek a reliable explanation of the extend to which education contributes to an individual's ability to find a job.

Our aim now onwards for further research is to include information on wages and income - which are very limited in UKLFS - as well as on supervisory and managerial duties of incumbent employees. In an initial overview we made on the latter, comparing UKLFS participants who hold supervisory posts we found that only 12% on average belong to NQF Level 5 as opposed to greater percentages even to lower than NQF Level 4 which initially shows some research space for investigating skills utilisation of UK graduates. Of course supervisory posts are not solely associated with managerial or senior official occupations but go all over down the main occupation classification distribution. Percentages are higher in the higher levels of occupation classification – as being provided by UKLFS- but are pretty high even to administrative and secretarial or to Skills Trade occupations which both do not presuppose a higher degree for the post holder but rather a high level of skills and expertises, mainly acquired more by experience than from “schooling”. Age (as related to work experience) seems that does play an important role to that but this issue certainly needs further analysis (see Appendix Tables 6a, 6b, 6c).

The disadvantages of using data from only the first quarter of QLFS can, in turn, bring up other methodological issues, such as researcher bias and, generally, a lack of presenting the “real world” as accurately as possible. In this regard, this study tried to fulfil its role of bringing methodological problems to the surface, before a further research is undertaken. This study focused on broaden our insights into social scientific methodology issues, and those associated with research steps and procedures. In particular future research is likely combine quantitative and qualitative methods in order to counter some of the methodological problems revealed here.

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## Appendix/Tables

**Table 1. ILO Revised 2006-2008- 2010 \* NUTS1 Classification 2006-2008-2010 \* Level of Education plus PG Degree 2006-2010 Crosstabulation**

Biennium/ Quadrennium	Level of Education plus PG Degree 2006-2008-2010	Unemployed	NUTS1 Classification 2006-2008-2010													Average
			London	North East	North West (inc Merseyside)	Yorkshire and Humberside	East Midlands	West Midlands	Eastern	South East	South West	Wales	Scotland	Northern Ireland		
2006-2008	NQF Level 5	Unemployed	-0.1%	0.9%	2.2%	-0.7%	0.0%	-0.8%	-0.3%	-0.4%	0.8%	-1.2%	0.2%	1.9%	0.1%	
2008-2010			1.9%	0.0%	-1.3%	2.4%	1.4%	4.4%	-0.8%	1.5%	-0.4%	1.7%	1.6%	-2.8%	1.0%	
2006-2010			1.7%	0.9%	0.8%	1.7%	1.4%	3.6%	-1.1%	1.1%	0.4%	0.5%	1.8%	-0.9%	1.1%	
2006-2008	NQF Level 4	Unemployed	-1.1%	-2.0%	-1.0%	0.3%	0.7%	-0.3%	0.9%	-0.1%	-0.8%	0.9%	0.3%	0.4%	-0.2%	
2008-2010			2.4%	1.1%	2.1%	1.7%	0.8%	1.4%	1.6%	1.6%	1.2%	0.6%	1.5%	1.5%	1.6%	
2006-2010			1.3%	-1.0%	1.0%	2.0%	1.5%	1.1%	2.5%	1.4%	0.4%	1.6%	1.9%	1.9%	1.4%	
2006-2008	NQF Level 3	Unemployed	-1.4%	2.5%	1.1%	-1.1%	-0.1%	1.1%	-1.2%	-1.4%	-1.3%	-1.5%	-2.0%	2.4%	-0.5%	
2008-2010			6.7%	3.1%	2.9%	2.4%	3.6%	2.8%	1.3%	4.2%	3.5%	7.1%	5.0%	0.1%	3.6%	
2006-2010			5.3%	5.5%	4.1%	1.3%	3.5%	3.9%	0.0%	2.8%	2.2%	5.6%	3.0%	2.5%	3.1%	
2006-2008	Trade Apprenticeships	Unemployed	-1.6%	-3.0%	3.2%	0.8%	0.7%	-0.4%	1.2%	-0.3%	0.9%	-1.3%	1.2%	0.0%	0.4%	
2008-2010			4.1%	1.8%	-0.9%	4.8%	2.7%	6.1%	0.1%	0.8%	1.5%	3.7%	2.5%	6.4%	2.4%	
2006-2010			2.5%	-1.2%	2.3%	5.6%	3.3%	5.7%	1.3%	0.6%	2.4%	2.4%	3.6%	6.4%	2.9%	
2006-2008	NQF Level 2	Unemployed	0.2%	2.1%	2.4%	-0.5%	0.8%	2.5%	1.2%	0.2%	-1.2%	-0.8%	2.7%	-3.1%	0.7%	
2008-2010			2.6%	1.6%	4.9%	6.7%	3.1%	0.7%	2.3%	3.4%	5.4%	4.3%	1.7%	6.2%	3.6%	
2006-2010			2.8%	3.6%	7.2%	6.2%	3.9%	3.2%	3.5%	3.7%	4.1%	3.5%	4.4%	3.1%	4.3%	
2006-2008	Below NQF Level 2	Unemployed	3.8%	-1.6%	0.7%	-0.4%	0.7%	0.8%	-1.5%	-0.1%	2.7%	4.1%	-3.6%	5.4%	0.5%	
2008-2010			0.8%	3.9%	4.6%	6.2%	1.6%	5.5%	4.3%	2.3%	2.1%	7.3%	9.5%	1.5%	4.1%	
2006-2010			4.6%	2.4%	5.4%	5.8%	2.3%	6.4%	2.8%	2.2%	4.8%	11.4%	5.9%	6.9%	4.7%	
2006-2008	Other Qualifications	Unemployed	-2.4%	-3.5%	0.0%	1.4%	1.6%	1.1%	-1.6%	-0.4%	-0.5%	1.0%	-1.3%	-0.8%	-0.6%	
2008-2010			2.1%	10.5%	4.2%	7.7%	2.9%	1.1%	0.6%	1.5%	3.6%	3.2%	2.9%	-0.4%	3.0%	
2006-2010			-0.3%	6.9%	4.2%	9.0%	4.6%	2.2%	-1.0%	1.1%	3.0%	4.2%	1.6%	-1.2%	2.5%	
2006-2008	No Qualifications	Unemployed	1.9%	2.4%	0.7%	-0.2%	0.1%	1.5%	-1.1%	-1.0%	2.4%	2.9%	-0.7%	0.6%	0.5%	
2008-2010			-0.5%	8.3%	4.0%	5.7%	3.1%	8.9%	6.5%	4.7%	1.6%	5.7%	4.5%	3.3%	4.8%	
2006-2010			1.4%	10.7%	4.7%	5.4%	3.2%	10.4%	5.4%	3.8%	4.0%	8.6%	3.7%	3.8%	5.3%	

**Table 2. ILO Revised 2006-2008-2010 \* Level of Education plus PG Degree 2006-2008-2010 Crosstabulation**

	NQF Level 5	NQF Level 4	NQF Level 3	Trade Apprenticeships	NQF Level 2	Below NQF Level 2	Other Qualifications	No Qualifications	Average
2006-2008	0.1%	-0.2%	-0.5%	0.4%	0.7%	0.5%	-0.6%	0.5%	0.0%
Unemployed 2008-2010	1.0%	1.6%	3.6%	2.4%	3.6%	4.1%	3.0%	4.8%	2.7%
2006-2010	1.1%	1.4%	3.1%	2.9%	4.3%	4.7%	2.5%	5.3%	2.8%

**Table 3. ILO Revised 2006-2010**

2006-2008	0.0%
Unemployment 2008-2010	2.7%
2006-2010	2.8%

**Table 4. Original Variables to Dummies 2006-08-10**

Original Variable			Dummy		
Name	Ref Year	Properties/Values	Name	Ref Year	Properties/Values
Age/Age	2006 2008 2010	Continuous variable with values 0 to 99 and above	<i>AGE06-08-10/AGE BINARY</i>	2006 2008 2010	Binary variable <u>Values:</u> 0 to 25+>60 excluded (‘1’= 26 to 40) ‘2’=41 to 60
Eth01/Ethnic group	2006 2008 2010	Categorical variable with values of: ‘1’=White, ‘2’=Mixed ‘3’= Asian or Asian British ‘4’= Black or Black British ‘5’= Chinese ‘6’=Other ethnic group	<i>Ethic06-08-10/White non-white</i>	2006 2008 2010	Binary variable:  <u>Values:</u> (‘1’=‘1’) and (‘2’ to ‘6’=‘2’)
Futype6-8/ Type of family unit	2006 2008 2010	Categorical variable with values of*: ‘1’= 1 person - male ‘2’= 1 person - female ‘4’= Married couple with no children ‘5’= Married couple, non-dep children only ‘6’= Married couple with dep children ‘7’=Cohab couple with no children ‘8’= Cohab couple with non-dep children only ‘9’=Cohab couple with dep children ‘10’= Male lone parent with dep children ‘11’= Male lone par with non-dep children only ‘12’= Female lone par with dep children ‘13’= Female lone par, non-dep children only ‘14’= Same sex cohabiting couple, no children ‘15’= Same sex cohab couple, non-dep children ‘16’= Same sex cohab couple, dep children ‘17’= Civil Partners with no children	<i>Fam206-208-210/ FU With dependent/non dependent children 2006</i>	2006 2008 2010	Binary variable  <u>Values:</u> (‘1’=‘6’, ‘9’ to ‘12’, ‘16’) and (‘2’= ‘1’, ‘2’, ‘4’, ‘5’, ‘7’ to ‘8’, ‘13’ to ‘15’, ‘17’)
Govtof2/ Government Office Region 2&3 combined	2006 2008 2010	Categorical variable with values of**: ‘1’= North East ‘2’= North West (inc Merseyside) ‘4’= Yorkshire and Humberside ‘5’= East Midlands ‘6’= West Midlands ‘7’= Eastern ‘8’= London ‘9’= South East ‘10’= South West ‘11’= Wales ‘12’= Scotland ‘13’= Northern Ireland	<i>RegNuts06-08-10/Nuts1 classification 2006-2008-2010</i>	2006 2008 2010	Categorical variable indicating London as the first value and thus as a reference category in Logistic regression analysis  <u>Values:</u> (‘1’=‘2’, ‘2’=‘3’ etc until ‘7’=‘8’ then ‘8’=‘1’ and then same as old values)
Levqual6-8/ Level of highest qualification	2006 2008 2010	Categorical variable with values of***: ‘1’=NVQ (NQF) Level 4 and above ‘2’= NVQ(NQF) Level 3 ‘3’= Trade(NQF) Apprenticeships ‘4’= NVQ (NQF) Level 2 ‘5’= Below NVQ (NQF) Level 2 ‘6’= Other qualifications ‘7’= No qualifications	<i>Educ06-08-10</i>	2006 2008 2010	Categorical variable. Higho (Type of higher education already held) variable has been use to compute Educ06-08-10 creating the values below: ‘1’= NQF Level 5 ‘2’= NQF Level 4 ‘3’=NQF Level 3 ‘4’=Trade Apprenticeships ‘5’= NQF Level 2 ‘6’= Below NQF Level 2 ‘7’=Other qualifications ‘8’= No qualifications (Reference category)
* There is no 3 value in the original variable (explanation not given by QLFS) ** There is no 3 value in the original variable (explanation not given by QLFS) ***NVQ in 2006 corresponds to NQF from 2008 onwards					



**Table 5. Variables in the Equation 2006-2008-2010**

Variables in the Equation 2006				Variables in the Equation 2008				Variables in the Equation 2010			
	B	Sig.	Exp(B)		B	Sig.	Exp(B)		B	Sig.	Exp(B)
sex(Male)	-.106	.040	.899	sex(1)	-.045	.349	.956	sex(1)	-.423	.000	.655
AGECAT06(26-40)	-.393	.000	.675	AGECAT08(1)	-.506	.000	.603	AGECAT10(1)	-.387	.000	.679
Ethnic06(White)	.874	.000	2.396	Ethnic08(1)	.826	.000	2.284	Ethnic10(1)	.514	.000	1.671
Fam206(dependent children)	.212	.000	1.237	Fam208(1)	.094	.052	1.099	Fam210(1)	-.742	.000	.476
RegNuts06		.000		RegNuts08		.000		RegNuts10		.000	
RegNuts06(North East)	.026	.838	1.027	RegNuts08(1)	.130	.296	1.139	RegNuts10(1)	.109	.345	1.115
RegNuts06(North West (inc Merseyside))	-.240	.022	.787	RegNuts08(2)	.044	.642	1.045	RegNuts10(2)	-.092	.318	.912
RegNuts06(Yorkshire and Humberside)	-.345	.002	.708	RegNuts08(3)	-.235	.027	.790	RegNuts10(3)	.068	.461	1.071
RegNuts06(East Midlands)	-.410	.000	.663	RegNuts08(4)	-.183	.093	.832	RegNuts10(4)	-.217	.038	.805
RegNuts06(West Midlands)	-.341	.002	.711	RegNuts08(5)	-.045	.659	.956	RegNuts10(5)	.000	1.000	1.000
RegNuts06(Eastern)	-.209	.048	.812	RegNuts08(6)	-.232	.028	.793	RegNuts10(6)	-.346	.001	.707
RegNuts06(South East)	-.339	.001	.712	RegNuts08(7)	-.332	.001	.717	RegNuts10(7)	-.254	.006	.776
RegNuts06(South West)	-.445	.000	.641	RegNuts08(8)	-.466	.000	.627	RegNuts10(8)	-.358	.001	.699
RegNuts06(Wales)	-.445	.003	.641	RegNuts08(9)	.001	.994	1.001	RegNuts10(9)	.015	.900	1.015
RegNuts06(Scotland)	-.206	.065	.814	RegNuts08(10)	-.157	.154	.855	RegNuts10(10)	.024	.806	1.024
RegNuts06(Northern Ireland)	-.502	.002	.605	RegNuts08(11)	-.206	.151	.814	RegNuts10(11)	-.223	.096	.800
Educ2006		.000		Educ2008		.000		Educ2010		.000	
Educ2006 (NQF Level 5)	-1.635	.000	.195	Educ2008(1)	-1.651	.000	.192	Educ2010(1)	-1.858	.000	.156
Educ2006 (NQF Level 4)	-1.355	.000	.258	Educ2008(2)	-1.517	.000	.219	Educ2010(2)	-1.523	.000	.218
Educ2006 (NQF Level 3)	-1.069	.000	.343	Educ2008(3)	-1.220	.000	.295	Educ2010(3)	-1.070	.000	.343
Educ2006 (Trade Apprenticeships)	-.977	.000	.377	Educ2008(4)	-.893	.000	.409	Educ2010(4)	-1.071	.000	.343
Educ2006 (NQF Level 2)	-.830	.000	.436	Educ2008(5)	-.760	.000	.468	Educ2010(5)	-.826	.000	.438
Educ2006 (Below NQF Level 2)	-.512	.000	.599	Educ2008(6)	-.497	.000	.608	Educ2010(6)	-.553	.000	.575
Educ2006 (Other qualifications)	-.562	.000	.570	Educ2008(7)	-.770	.000	.463	Educ2010(7)	-.794	.000	.452
Constant	-2.150	.000	.116	Constant	-2.034	.000	.131	Constant	-.737	.000	.479

**Table 6a. Responsible for supervising \* Level of Education plus PGs 2006 \* AGE Binary 2006 Crosstabulation**

AGE Binary 2006				Level of Education plus PGs 2006								
				NQF	NQF	NQF	Trade	NQF	Below			
				Level	Level	Level	Apprenticeships	Level	NQF	Other	No	
				5	4	3		2	Level	Qualifications	Qualifications	
									2		Total	
26-40	Responsible for supervising	Yes	Count	846	2984	1319	323	1080	869	463	203	8087
			% within	10.5%	36.9%	16.3%						
			Responsible for supervising				4.0%	13.4%	10.7%	5.7%	2.5%	100.0%
	No	Count	709	2567	1616	448	2147	2138	1098		957	11680
			% within	6.1%	22.0%	13.8%						
			Responsible for supervising				3.8%	18.4%	18.3%	9.4%	8.2%	100.0%
	Total	Count	1555	5551	2935	771	3227	3007	1561		1160	19767
			% within	7.9%	28.1%	14.8%						
			Responsible for supervising				3.9%	16.3%	15.2%	7.9%	5.9%	100.0%
41-60	Responsible for supervising	Yes	Count	1150	3456	1488	737	1272	1021	688	618	10430
			% within	11.0%	33.1%	14.3%						
			Responsible for supervising				7.1%	12.2%	9.8%	6.6%	5.9%	100.0%
	No	Count	535	2163	1653	1061	2124	2422	1468		2659	14085
			% within	3.8%	15.4%	11.7%						
			Responsible for supervising				7.5%	15.1%	17.2%	10.4%	18.9%	100.0%
	Total	Count	1685	5619	3141	1798	3396	3443	2156		3277	24515
			% within	6.9%	22.9%	12.8%						
			Responsible for supervising				7.3%	13.9%	14.0%	8.8%	13.4%	100.0%

**Table 6b. Responsible for supervising \* Level of Education plus PGs 2008 \* AGE Binary 2008 Crosstabulation**

AGE Binary 2008				Level of Education plus PGs 2008								
				NQF	NQF	NQF	Trade	NQF	Below			
				Level	Level	Level	Apprenticeships	Level	NQF	Other	No	
				5	4	3		2	Level	Qualifications	Qualifications	Total
21-40	Responsible for supervising	Yes	Count	1010	3171	1461	229	1122	730	533	210	8466
			% within	11.9%	37.5%	17.3%						
			Responsible for supervising				2.7%	13.3%	8.6%	6.3%	2.5%	100.0%
	No	Count	915	3515	2331	401	2583	2113	1436	1196	14490	
			% within	6.3%	24.3%	16.1%						
			Responsible for supervising				2.8%	17.8%	14.6%	9.9%	8.3%	100.0%
	Total	Count	1925	6686	3792	630	3705	2843	1969	1406	22956	
			% within	8.4%	29.1%	16.5%						
			Responsible for supervising				2.7%	16.1%	12.4%	8.6%	6.1%	100.0%
41-60	Responsible for supervising	Yes	Count	1192	3595	1469	562	1295	989	674	527	10303
			% within	11.6%	34.9%	14.3%						
			Responsible for supervising				5.5%	12.6%	9.6%	6.5%	5.1%	100.0%
	No	Count	593	2324	1708	834	2254	2529	1531	2275	14048	
			% within	4.2%	16.5%	12.2%						
			Responsible for supervising				5.9%	16.0%	18.0%	10.9%	16.2%	100.0%
	Total	Count	1785	5919	3177	1396	3549	3518	2205	2802	24351	
			% within	7.3%	24.3%	13.0%						
			Responsible for supervising				5.7%	14.6%	14.4%	9.1%	11.5%	100.0%

**Table 6c. Responsible for supervising \* Level of Education plus PG Degree 2010 \* Age Binary 2010 Crosstabulation**

Age Binary 2010				Level of Education plus PG Degree 2010								
				NQF	NQF	NQF	Trade	NQF	Below			
				Level	Level	Level	Apprenticeships	Level	NQF	Other	No	
				5	4	3		2	Level	Qualifications	Qualifications	
									2			
											Total	
26-40	Responsible for supervising	Yes	Count	912	2567	1004	149	762	447	359	116	6316
			% within	14.4%	40.6%	15.9%						
			Responsible for supervising				2.4%	12.1%	7.1%	5.7%	1.8%	100.0%
		No	Count	889	2716	1592	262	1716	1374	992	655	10196
			% within	8.7%	26.6%	15.6%						
			Responsible for supervising				2.6%	16.8%	13.5%	9.7%	6.4%	100.0%
	Total		Count	1801	5283	2596	411	2478	1821	1351	771	16512
			% within	10.9%	32.0%	15.7%						
			Responsible for supervising				2.5%	15.0%	11.0%	8.2%	4.7%	100.0%
41-60	Responsible for supervising	Yes	Count	1133	3435	1319	486	1195	935	551	364	9418
			% within	12.0%	36.5%	14.0%						
			Responsible for supervising				5.2%	12.7%	9.9%	5.9%	3.9%	100.0%
		No	Count	592	2471	1721	701	2328	2231	1367	1751	13162
			% within	4.5%	18.8%	13.1%						
			Responsible for supervising				5.3%	17.7%	17.0%	10.4%	13.3%	100.0%
	Total		Count	1725	5906	3040	1187	3523	3166	1918	2115	22580
			% within	7.6%	26.2%	13.5%						
			Responsible for supervising				5.3%	15.6%	14.0%	8.5%	9.4%	100.0%

## 2006 Block 0: Beginning Block. (Tables 7a,7b, 7c)

**Table 7a. Classification Table 2006<sup>d,e</sup>**

Observed		Predicted					
		Selected Cases <sup>a</sup>			Unselected Cases <sup>b,c</sup>		
		ILO Revised 2006		Percentage	ILO Revised 2006		Percentage
		Employed	Unemployed		Employed	Unemployed	
Step 0	ILO Revised 2006 Employed	44405	0	100.0	374	0	100.0
	Unemployed	1669	0	.0	37	0	.0
Overall Percentage		96.4			91.0		

a. Selected cases Whether full time student EQ 2

b. Unselected cases Whether full time student NE 2

c. Some of the unselected cases are not classified due to either missing values in the independent variables or categorical variables with values out of the range of the selected cases.

d. Constant is included in the model.

e. The cut value is .500

**Table 7b. Variables in the Equation**

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	-3.281	.025	17317.233	1	.000	.038

**Table 7c. Variables not in the Equation**

		Score	df	Sig.
Step 0	Variables	sex(1)	6.002	.014
		AGECAT06(1)	38.002	.000
		Ethnic06(1)	270.445	.000
		Fam206(1)	7.858	.005
		RegNuts06	87.833	.000
		RegNuts06(1)	4.729	.030
		RegNuts06(2)	.006	.937
		RegNuts06(3)	.627	.429
		RegNuts06(4)	2.013	.156
		RegNuts06(5)	.004	.947
		RegNuts06(6)	.459	.498
		RegNuts06(7)	5.232	.022
		RegNuts06(8)	9.568	.002
		RegNuts06(9)	3.552	.059
		RegNuts06(10)	.316	.574
		RegNuts06(11)	2.895	.089
		Educ2006	379.300	.000

	Educ2006(1)	34.520	1	.000
	Educ2006(2)	85.674	1	.000
	Educ2006(3)	15.631	1	.000
	Educ2006(4)	5.691	1	.017
	Educ2006(5)	.783	1	.376
	Educ2006(6)	19.645	1	.000
	Educ2006(7)	47.528	1	.000
Overall Statistics		725.459	22	.000

### 2006 Block 1: Method = Enter. (Tables 7d, 7e, 7f, 7g)

**Table 7d. Omnibus Tests of Model Coefficients**

		Chi-square	df	Sig.
	Step	626.061	22	.000
Step 1	Block	626.061	22	.000
	Model	626.061	22	.000

**Table 7e. Model Summary**

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	13726.301 <sup>a</sup>	.013	.050

a. Estimation terminated at iteration number 7 because parameter estimates changed by less than .001.

**Table 7f. Hosmer and Lemeshow Test**

Step	Chi-square	df	Sig.
1	6.299	8	.614

**Table 7g. Classification Table<sup>d</sup>**

		Predicted					
		Selected Cases <sup>a</sup>			Unselected Cases <sup>b,c</sup>		
Observed		ILO Revised 2006		Percentage	ILO Revised 2006		Percentage
		Employed	Unemployed	Correct	Employed	Unemployed	Correct
Step 1	Employed	44405	0	100.0	374	0	100.0
	Unemployed	1669	0	.0	37	0	.0
Overall Percentage				96.4			91.0

a. Selected cases Whether full time student EQ 2

b. Unselected cases Whether full time student NE 2

c. Some of the unselected cases are not classified due to either missing values in the independent variables or categorical variables with values out of the range of the selected cases.

d. The cut value is .500

## 2008 Block 0: Beginning Block. (Tables 8a, 8b, 8c)

**Table 8a. Classification Table<sup>d,e</sup>**

Observed		Predicted					
		Selected Cases <sup>a</sup>			Unselected Cases <sup>b,c</sup>		
		ILO Revised 2008		Percentage	ILO Revised 2008		Percentage
		Employed	Unemployed		Employed	Unemployed	
Step 0	Employed	46651	0	100.0	642	0	100.0
	Unemployed	1911	0	.0	64	0	.0
Overall Percentage				96.1	90.9		

a. Selected cases Whether full time student EQ 2

b. Unselected cases Whether full time student NE 2

c. Some of the unselected cases are not classified due to either missing values in the independent variables or categorical variables with values out of the range of the selected cases.

d. Constant is included in the model.

e. The cut value is .500

**Table 8b. Variables in the Equation**

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	-3.195	.023	18740.674	1	.000	.041

**Table 8c. Variables not in the Equation**

		Score	df	Sig.
Step 0	Variables	sex(1)	3.232	.072
		AGECAT08(1)	88.079	.000
		Ethnic08(1)	241.836	.000
		Fam208(1)	.011	.917
		RegNuts08	84.270	.000
		RegNuts08(1)	5.207	.022
		RegNuts08(2)	7.826	.005
		RegNuts08(3)	.765	.382
		RegNuts08(4)	.007	.933
		RegNuts08(5)	6.675	.010
		RegNuts08(6)	1.482	.223
		RegNuts08(7)	15.905	.000
		RegNuts08(8)	22.074	.000
		RegNuts08(9)	.771	.380
		RegNuts08(10)	3.015	.083
		RegNuts08(11)	.242	.623

	Educ2008	487.225	7	.000
	Educ2008(1)	38.831	1	.000
	Educ2008(2)	132.965	1	.000
	Educ2008(3)	26.829	1	.000
	Educ2008(4)	1.455	1	.228
	Educ2008(5)	4.163	1	.041
	Educ2008(6)	43.692	1	.000
	Educ2008(7)	17.555	1	.000
Overall Statistics		868.154	22	.000

### Block 1: Method = Enter. Tables (8d, 8e, 8f, 8g)

**Table 8d. Omnibus Tests of Model Coefficients**

		Chi-square	df	Sig.
Step 1	Step	776.575	22	.000
	Block	776.575	22	.000
	Model	776.575	22	.000

**Table 8e. Model Summary**

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	15334.207 <sup>a</sup>	.016	.056

a. Estimation terminated at iteration number 7 because parameter estimates changed by less than .001.

**Table 8f. Hosmer and Lemeshow Test**

Step	Chi-square	df	Sig.
1	27.299	8	.001

**Table 8g. Classification Table<sup>d</sup>**

Observed		Predicted					
		Selected Cases <sup>a</sup>			Unselected Cases <sup>b,c</sup>		
		ILO Revised 2008		Percentage	ILO Revised 2008		Percentage
		Employed	Unemployed	Correct	Employed	Unemployed	Correct
Step 1	Employed	46651	0	100.0	642	0	100.0
	Unemployed	1911	0	.0	64	0	.0
Overall Percentage		96.1			90.9		

a. Selected cases Whether full time student EQ 2

b. Unselected cases Whether full time student NE 2

c. Some of the unselected cases are not classified due to either missing values in the independent variables or categorical variables with values out of the range of the selected cases.



**Table 8g. Classification Table<sup>d</sup>**

Observed		Predicted					
		Selected Cases <sup>a</sup>			Unselected Cases <sup>b,c</sup>		
		ILO Revised 2008		Percentage	ILO Revised 2008		Percentage
		Employed	Unemployed		Employed	Unemployed	
Step 1	Employed	46651	0	100.0	642	0	100.0
	Unemployed	1911	0	.0	64	0	.0
Overall Percentage				96.1			90.9

a. Selected cases Whether full time student EQ 2

b. Unselected cases Whether full time student NE 2

c. Some of the unselected cases are not classified due to either missing values in the independent variables or categorical variables with values out of the range of the selected cases.

d. The cut value is .500

## 2010 Block 0: Beginning Block. (Tables 9a, 9b, 9c)

Classification Table<sup>d,e</sup>

Observed		Predicted					
		Selected Cases <sup>a</sup>			Unselected Cases <sup>b,c</sup>		
		ILO Revised 2010		Percentage	ILO Revised 2010		Percentage
		Employed	Unemployed		Employed	Unemployed	
Step 0	ILO Revised 2010 Employed	38466	0	100.0	383	0	100.0
	Unemployed	2400	0	.0	41	0	.0
Overall Percentage		94.1			90.3		

a. Selected cases Whether full time student EQ 2

b. Unselected cases Whether full time student NE 2

c. Some of the unselected cases are not classified due to either missing values in the independent variables or categorical variables with values out of the range of the selected cases.

d. Constant is included in the model.

e. The cut value is .500

Table 9b. Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	-2.774	.021	17387.409	1	.000	.062

Table 9c. Variables not in the Equation

Table 9C: Variables Not in the Equation					
		Score	df	Sig.	
Step 0	Variables	sex(1)	68.798	1	.000
		AGECAT10(1)	87.024	1	.000
		Ethnic10(1)	91.667	1	.000
		Fam210(1)	253.167	1	.000
		RegNuts10	81.259	11	.000
		RegNuts10(1)	6.280	1	.012
		RegNuts10(2)	.118	1	.731
		RegNuts10(3)	16.084	1	.000
		RegNuts10(4)	1.378	1	.240
		RegNuts10(5)	8.020	1	.005
		RegNuts10(6)	12.726	1	.000
		RegNuts10(7)	14.664	1	.000
		RegNuts10(8)	18.490	1	.000
		RegNuts10(9)	1.079	1	.299
		RegNuts10(10)	.642	1	.423
		RegNuts10(11)	.259	1	.611

	Educ2010	611.062	7	.000
	Educ2010(1)	82.758	1	.000
	Educ2010(2)	183.581	1	.000
	Educ2010(3)	2.661	1	.103
	Educ2010(4)	.942	1	.332
	Educ2010(5)	5.831	1	.016
	Educ2010(6)	62.167	1	.000
	Educ2010(7)	22.493	1	.000
Overall Statistics		1147.562	22	.000

### 2010 Block 1: Method = Enter. Tables (9d, 9e, 9f, 9g)

**Table 9d. Omnibus Tests of Model Coefficients**

		Chi-square	df	Sig.
Step 1	Step	1052.558	22	.000
	Block	1052.558	22	.000
	Model	1052.558	22	.000

**Table 9e. Model Summary**

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	17210.833 <sup>a</sup>	.025	.071

- a. Estimation terminated at iteration number 6 because parameter estimates changed by less than .001.

**Table 9f. Hosmer and Lemeshow Test**

Step	Chi-square	df	Sig.
1	7.468	8	.487

**Table 9g. Classification Table<sup>d</sup>**

Observed		Predicted					
		Selected Cases <sup>a</sup>			Unselected Cases <sup>b,c</sup>		
		ILO Revised 2010		Percentage	ILO Revised 2010		Percentage
		Employed	Unemployed		Employed	Unemployed	
Step 1	Employed	38466	0	100.0	383	0	100.0
	Unemployed	2400	0	.0	41	0	.0
Overall Percentage		94.1			90.3		

a. Selected cases Whether full time student EQ 2

b. Unselected cases Whether full time student NE 2

c. Some of the unselected cases are not classified due to either missing values in the independent variables or categorical variables with values out of the range of the selected cases.

d. The cut value is .500