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The Qualifications/Jobs Mismatch in Scotland

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ABSTRACT

This paper examines the mismatch between the highest qualification an individual holds and the entry qualifications associated with the job he/she does. Two conditions are identified: being 'over qualified' (i.e. individuals having a qualification which is above that required for entry to the job being done) and being 'under qualified' (i.e. individuals doing a job, the entry qualifications for which are above the highest qualification held). The paper has three objectives: first, to estimate the extent of 'over qualification' and 'under qualification' prevalent in Scotland, and to compare these estimates with those for the United Kingdom; secondly, to identify the determinants of the conditions of being 'over qualified' and 'under qualified', again comparing the Scottish results with those for the United Kingdom; and thirdly, to determine whether the likelihood of being 'over qualified' or 'under qualified' for an individual resident in Scotland, differs from the likelihood of being the same for an equivalent individual resident elsewhere in the United Kingdom. The examination makes use of the 2006 Employee Skills Survey.

It was estimated that 40 percent of employees in Scotland were 'over qualified' and 12 percent were 'under qualified'. The corresponding percentages for the United Kingdom were 39 and 13, respectively. For the Scottish subpopulation of the full data set, the determinants of the condition of being 'over qualified' were not the converse of the determinants of being 'under qualified'. Explanations of both conditions were more likely to be associated with the set of variables reflecting personal characteristics than any other set of independent variables, for example sets of variables reflecting the characteristics of the workplace at which he/she was employed. There was evidence that males were less likely than females to experience the condition of being 'over qualified'; and that the condition of being 'under qualified' was negatively correlated with the presence of dependent children. When using the full, United Kingdom data set rather than the subpopulation for Scotland the determinants of both conditions changed. The characteristics of the workplace at which the individual was employed came to be of equal importance as personal characteristics. The likelihood of being 'over qualified' did vary across the constituent countries of the United Kingdom, notably an individual in Northern Ireland was 12 percent less likely to be overqualified than the corresponding individual in Scotland. The likelihood of being 'under qualified' did not differ.

The principal policy conclusion from the paper is that the Leitch-based policies advocating universal up-skilling must be challenged, and that more nuanced policies, associated with incorporating training and skills policies into more comprehensive economic development policies, as currently proposed in Scotland, must now be designed and implemented.

The Qualifications/Jobs Mismatch in Scotland [1]

1. CONTEXT AND MOTIVATION

The long run, relative underperformance of the Scottish economy is well documented (e.g. Alexander et al, 2005: Ashcroft, 2002: FutureSkills Scotland, 2005). Although the causes of this may be manifold, the policy focus has tended to attribute the principal explanation to shortcomings in productivity and competitiveness on the part of many establishments located in Scotland (Scottish Government, 2007a). Hence the advocacy of further investment in enterprise, innovation and skills. By means of which, the argument continues, productivity is enhanced and, in turn and in time, businesses become more competitive internationally.

Within this generic policy framework, current Scottish Government policy has focussed almost exclusively upon skills development, perhaps because the fiscal constraints under which it operates currently make targeting issues which relate to the enterprise and innovation options more problematic (Hallwood and MacDonald, 2009). As a consequence 'Skills for Scotland' (Scottish Government, 2007b) was published. The following quotation illustrates well the centrality of human capital investments to the Scottish Government's principal policy objective of increasing sustainable economic growth:

> "A skilled and educated workforce is essential to productivity and sustainable economic growth. Not only are more skilled workers potentially more productive in their own right, but the skill level of the workforce is likely to impact significantly on the effectiveness of capital investment and the ability of employers to adopt innovative work practices" (Scottish Government, 2007b, p. 6) [2]

[1] The 2006 Employee Skills Survey data set was down loaded from the ECRC Data Archive. The survey was co-funded by the ESRC, the Department of Education and Skills, the Department for Trade and Industry, the Learning and Skills Council, the Sector Skills Development Agency, Scottish Enterprise, Future Skills Wales, the East Midlands Development Agency, Highlands and Islands Enterprise and the Department for Employment and Learning (Northern Ireland). I am grateful to Andy Dickerson and Francis Green for discussions on the generic project to which this working paper relates. The usual disclaimer applies.

[2] In so doing, the Scottish Government is subscribing to a conventional wisdom which prevails also at the level of the United Kingdom, as reflected in the Leitch Report (2006).

An important feature of the labour market in Scotland, however, is the extent to which the supply of individuals with relatively high qualifications exceeds the number of jobs which have similarly high qualifications as entry requirements. Felstead (2007) estimates that there are 240,000 more people with level 4 or above qualifications than there are jobs having this level of qualification as an entry criterion. Whereas the education system in Scotland, in particular its further and higher education sectors, appears to have supplied the labour market with new entrants of a calibre compatible with the requirements of a 'knowledge economy' (H.M. Treasury, 2004: Warhurst, 2008), nonetheless the increase in demand for these individuals on the part of business enterprises and other organisations located in Scotland has proved to be inadequate to provide appropriate employment opportunities for all.

The aims of this working paper are to examine the magnitude of the number of those deemed 'over-qualified' (i.e. individuals having a qualification which is above that required for entry to the job being done) and 'under-qualified' (i.e. individuals doing a job, the entry qualifications for which are above the highest qualification held) in Scotland and to identify the determinants of both conditions.[3] It does so by applying the techniques of micro econometric analysis to the same data set used by Felstead (2007) viz. the 2006 Employee Skills Survey. Integral to the analysis is a comparison of the qualifications/jobs mismatch in Scotland with that prevailing in the United Kingdom.

There are four substantive sections to the paper. First the data set is described. Then the model to be estimated and the modelling strategy employed are outlined. The results of the estimations are then reported. The principal conclusions from these results and their policy implications are discussed in the final section.

[3] As such, the paper may be seen within the context of the debate about 'over education' (e.g. Battu et al, 2000).

2. THE DATA SET: THE 2006 EMPLOYEE SKILLS SURVEY

The data source used in the analysis is the 2006 Employee Skills Survey (2006ESS), a survey which has its origins in surveys associated initially with the innovative Social Change and Economic Life Initiative (SCELI) of 1986 (Gallie et al, 1998).

Subsequent to the SCELI surveys, other employee skills surveys have been undertaken, part designed to establish a degree of continuity with respect to certain questions about the nature of the qualifications and skills possessed by individuals and required to do their current jobs. One illustrative example relates to what is termed 'broad skills', interpreted as and measured by the following: the qualifications required for job entry; the length of time it takes to train to obtain these qualifications; and the length of the period required, post entry to the job, to learn to do the job well. As a consequence, using Employee Skills Surveys, it is now possible to map over time changing trends in the distribution of broad skills across the working population (Green and Zhu, forthcoming). Information is also collected about the context (e.g. the working environment) in which these skills are acquired, developed and applied (Felstead et al, 2007). Moreover, other related questions have come to be included in more recent surveys, for example seeking to elicit employee perspectives on factors such as job quality, job satisfaction and task discretion (e.g. Green, 2008).

As before, the core sample for 2006ESS was based on a multi-stage design, with addresses being drawn from a random starting point within the 297 geographical boundaries (i.e. post codes) selected across the United Kingdom (UK). 4,800 productive interviews of individuals aged 20 – 65 in employment were undertaken during a seven month period in 2006. There were five areas where this core sample was boosted viz. East Midlands, Wales, the Scottish Enterprise Area, the Highlands and Islands (of Scotland) and Northern Ireland, with the boosts being obtained using the same sampling methodology. As a consequence, the total number of observations within the data set is 7,787. The sample may be seen as representative of those at work within the UK, for the age group specified. Of the 7,787, 958 were self described as 'self employed'. These were removed from the data set analysed because the status of self employment was considered inappropriate to the central employment

issue being examined in this paper. The number of observations was further reduced to 5,376 when those observations with missing values for one or more variables were removed from the data set.

For the purpose of this working paper, the data set is analysed throughout using Stata's 'survey' routines. The weighting variable 'newwt65uk' is used, i.e. the weight when dealing with the 20 – 65 years of age population for the full, UK sample.[4] The Scotland subset within the full data set is analysed using the subpopulation estimation routines (Stata, 2005).

In their comprehensive, economy-wide, demand and supply analysis of skills – both for the UK (Felstead et al, 2007) and Scotland (Felstead and Green, 2008a: 2008b) – Felstead and his colleagues incorporate into the employee skills survey data information from other sources, notably Labour Force Surveys and Vacancy Surveys for the appropriate quarter/month. By contrast, the estimations undertaken in this paper focus upon qualifications – as noted above, only one element within the three associated with broad skills – and the data come only from 2006ESS.

The focus is upon two sets of variables:

- 'holnvq0' – 'holnvq45' – the highest qualification possessed by the respondent, in levels, from possessing no qualifications ('holnvq0') through to possessing qualifications at levels 4 or 5 ('holnvq45'); [5]
- 'hiq0' – 'hiq45' – the highest entry qualification required for the job done by the respondent, in levels, from no qualifications are required for job entry ('hiq0') through to level 4/5 qualifications are required ('hiq45') [6]

[4] This is the variable name in the original data set. Other variables names which appear in inverted commas throughout the paper are those also used in the original data set.

[5] 'holnvq1' – 'holnvq45' are derived variables within 2006ESS, when specific academic, professional and vocational qualifications are categorised according to convention. Broadly, and following the qualification mapping detailed in Felstead and Green (2008), Table 3.1 (p. 31): level 4 or above equates with degrees and post graduate degrees and their professional and vocational equivalents; level 3 equates with sub degree academic qualifications and their professional and vocational equivalents, usually gained in further education, post 18 years of age; level 2 equates with 'higher school' academic qualifications obtained, usually, at the age of 18/19 and their professional and vocational equivalents; and level 1 equates with 'lower school' academic qualifications obtained, again usually, at the age of 16, the end of mandatory formal education in the UK.

When manipulated, these variables come to form the two dichotomous dummy dependent variables in the equations estimated viz.:

- *overquadv*: making use of 'holnvq0' – 'holnvq45' and 'hiq0' – 'hiq45', to identify individuals whose highest qualification in levels is above the entry requirement for the job being done;
- *underquadv*: again making use of 'holnvq0' – 'holnvq45' and 'hiq0' – 'hiq45', but this time to identify individuals whose highest qualification in levels is below the entry requirement for the job being done;

Table 1 presents descriptive information for Scotland on the nature and extent of the respective conditions of being 'over qualified' and being 'under qualified'. Table 2 presents the same information for the UK.

In both tables, the rows identify the distribution of jobs done by respondents by entry requirements, where these are measured in terms of five qualification levels, from 'no qualifications are required' through to 'level 4/5 qualifications are required'. For example, in Table 1, in Scotland (approximately) 31 percent are in jobs requiring no entry qualifications; 11 percent are in jobs requiring level 1 qualifications for entry; 10 percent are in jobs requiring level 2 qualifications for entry; 18 percent are in jobs requiring level 3 qualifications for entry; and 28 percent are in jobs requiring level 4 or 5 qualifications for entry. The columns identify the distribution of the highest qualification held by the respondents, where these are again measured in terms of the same five qualification levels. Again for example in Table 1, in Scotland (approximately) 13 percent have no qualifications; 6 percent have level 1

[6] The data set also contains two other, seemingly equivalent, derived variables viz. 'degr' (that the respondent holds a degree) and 'rdeg' (that the job done by the respondent has a degree as an entry qualification). However, in the construction of both, degree equivalent professional and vocational qualifications are treated as if they are 'less worthy' than degrees. For example, whereas 36 percent of those in work in Scotland are accorded with having qualifications at level 4 or 5, only 20 percent are accorded with graduate status. Whereas 28 percent of those at work in Scotland are in jobs an entry requirement for which is level 4/5 qualifications, only 16 percent are in jobs which stipulate that potential holders have graduate status. (Author's own calculations from the original data set.) One consequence of this construction is that it precludes using 'degr' and 'rdeg' in the same way as 'holvq0' through to 'holvq45' and 'hiq0' through to 'hiq45' are used in this paper, because of the probability of (very considerable) measurement error attributable to having respondents holding degree equivalent professional and vocational qualifications in the non graduate category and respondents in jobs requiring degree equivalent professional and vocational qualifications for entry in the 'no degree required' category.

qualifications as their highest qualification; 14 percent have level 2 qualifications as their highest qualification; 27 percent have level 3 qualifications as their highest qualifications and 36 percent have level 4 or 5 qualifications as their highest qualification.

Given the structure of these tables, therefore, cells along the (top left to bottom right) diagonal of each table indicate 'matches', i.e. where the entry requirement for the respondent's job match his/her highest qualification, where both are measured in levels. The aggregate of the proportions for these five cells for Scotland is 0.4857 (Table 1). The corresponding figure for the United Kingdom is 0.4763 (Table 2), a rate of matching marginally lower than that for Scotland. Noticeably, for both geographical territories, the highest level of the proportions matched relates to qualification levels 4/5.

Further within Tables 1 and 2, cells above the 'matched' diagonal cells represent outcomes which may be described as 'mis-matches' associated with the condition of being 'over qualified', i.e. where the qualification required for job entry, measured in levels, is below the highest qualification possessed, also measured in levels. The aggregate of the proportions for the 10 cells in question for Scotland is 0.4021 (Table 1). The corresponding figure for the UK is 0.3893 (Table 2). Conversely, again within Tables 1 and 2, cells below the 'matched' diagonal cells also represent outcomes which may be described as 'mis-matches'. However, in this instance they are associated with the condition of being 'under qualified', i.e. the qualification level required for job entry is above the highest qualification level possessed. The aggregate of the proportions for the 10 cells in question for Scotland is 0.1183 (Table 1). The corresponding figure for the UK is 0.1345 (Table 2).[7]

This examination of 'matching' and 'mis-matching' of job entry qualifications relative to highest qualification held would suggest, therefore, that the incidence of 'over-qualification' is not unique to Scotland.

[7] For both the Scottish subpopulation and the complete UK data set, the Pearson Chi-square statistics indicate a statistically significant association between job entry requirements and highest qualifications held, when both are measured in levels.

Tables 3 and 4 provide complementary descriptive information about the relative importance of qualifications to the job. Approximately two in three employees, both in Scotland and the UK, consider qualifications to be of some consequence in being able to do their current job competently. Proportionately more in the UK than in Scotland consider qualifications to be essential (Table 3.) Approximately one in five employees, again both in Scotland and the UK, maintain that educational and technical qualifications are the most important thing to be able to do the job well. However, in this same context, more than one in three deemed previous experience of doing similar work to be the most important (Table 4). Although the single focus of the paper is on the mis-matching of entry qualifications for the job done with the highest qualification possessed, the nature of these responses would suggest that educational and technical qualifications are not the only important requirements either for job entry or for being able to do the job competently.

Table 5 provides further information of relevance. Approximately 85 percent of employees agree with the statement that their job offers scope to make full use of their qualifications and skills. Irrespective of any potential mis-matching between job entry qualification requirements and the highest qualifications held, therefore, only a minority of respondents perceive themselves to be in jobs which do not offer scope to employ their qualifications and skills to the full.

3. THE MODEL AND THE ESTIMATION STRATEGY

The binomial logit model used to estimate the likelihoods of the two conditions identified and described in the previous section conforms with convention and is as follows:

$$\mathbf{y_i} = \mathbf{X_i}\boldsymbol{\beta} + \boldsymbol{\varepsilon_i}$$

where $\mathbf{y_i}$ is the response of individual 'i'; $\mathbf{X_i}$ $\boldsymbol{\beta}$ and $\boldsymbol{\varepsilon_i}$ are, respectively, a vector of independent variables, a set of coefficients to be estimated, and an error term (cf. Cameron and Trivedi, 2009: Long and Freese, 2006). The independent variables are of three distinct types, reflecting an individual's personal characteristics, such as age and gender, personal characteristics which relate to his/her work, such as employment status and tenure, and the workplace characteristics of the establishment at which he/she is employed, such as its size, whether unions are present, and its sector. In the binomial logit estimations, $\mathbf{y_i} = 1$, if an individual is recorded as being :

- 'over –qualified' (i.e. when his/her highest qualification is above the entry requirements for the job), when qualifications are measured in levels (and = 0 otherwise); and

- 'under-qualified' (i.e. when his/her highest qualification is below the entry requirements for the job), again when qualifications are measured in levels (and = 0 otherwise)

First the determinants of each of dependent variable are estimated for the Scottish subset of the surveyed population. Wald tests are undertaken to examine the joint significance of particular sets of independent variables. The estimations are then replicated making use of the full data set to identify the determinants of the same two dependent variables this time for the UK. To examine whether the likelihood of being 'over qualified' and 'under qualified' differs between an individual resident in Scotland and an equivalent individual resident elsewhere in the UK, a further set of dummy variables identifying the constituent nations of the UK is added to the final set of estimations using the full data set.

Full information about the dependent and independent variables used in the estimations is presented in Table 6. Information about how the independent variables are categorised for purposes of the Wald tests is also given in the footnotes to this table.[8]

4. THE ESTIMATION RESULTS

There are three aims to this empirical section of the paper: first to identify the determinants of the likelihood that an individual is 'over qualified'/'under qualified', as defined, for the subpopulation of Scotland; secondly, to examine whether the determinants of the likelihood of being 'over qualified'/ 'under qualified' associated with the Scottish subpopulation apply also to the data base as a whole i.e. for the UK; and, thirdly, to investigate whether there is a statistically significant difference in the likelihood of being 'over qualified' / 'under qualified' between an individual resident in Scotland and equivalent individuals resident in the other three constituent countries within the UK.

In this exploratory exercise, for both dependent variables and for both data sets, the signs of the coefficients of the independent variables, their relative magnitudes and their statistical significance are to be established. However, one expectation is that the sign of most if not necessarily all of the coefficients will differ between the estimations of the two dependent variables i.e. those coefficients positively signed in the estimations of *overquadv* will be negatively signed in the estimations of *underquadv;* and *vice versa*.

'Over qualified' and 'Under qualified' in Scotland

Tables 7 and 8 present the results for the estimations of the dependent variables *overquadv* and *underquadv*, respectively, and the outcomes of the Wald tests.

[8] The inclusion of variables depicting occupation in the model to be estimated may be problematical, given the potential relationship between an individual's occupation and the variables associated with his/her highest qualification held and the entry qualification required for the job being done. The occupational classifications of Associate Professional and Technical and Skilled Trades may be cited as illustrative examples of this.

In the estimation of the dependent variable *overquadv*, only two variables (*male* and *logyears*), both negatively signed and reflecting personal characteristics, are statistically significant.[9] The likelihood of being 'over qualified' is 10 percent less for males than for females and it decreases with time spent in the labour market. None of the work related characteristics is statistically significant. Similarly, none of the five workplace related personal characteristics is statistically significant; none of the workplace characteristics which appear in Table 7 is statistically significant and neither of the sector dummy variables is statistically significant. In terms of the Wald tests undertaken, joint significance is established only for the sets of variables reflecting personal characteristics and occupation.[10]

When the converse condition of being 'under qualified' is estimated (i.e. dependent variable *underquadv*), again only two variables are statistically significant, and again both reflect personal characteristics viz. the positively signed *logyears* and the negatively signed *children*. The positive sign on *logyears* is perhaps compatible with expectations, because it is negatively signed in the *overquadv* estimation. However, these results for *logyears* appear to offer contradictory perspectives of the role of time spent in the labour market, where time may be seen to facilitate the operation of a matching process (Andrews et al, 2001).[11] On the one hand time spent in the labour market is *less likely* to generate a condition of being 'over qualified': and on the other hand, the very same process is *more likely* to generate a condition of being 'under qualified'. The negative sign on the *children* coefficient is also compatible with expectations, because it is positively signed in the *overquadv* estimation. That said, intuitively, one would expect that the presence of dependent children might constrain the manner in which individuals participate in the labour market, manifest, perhaps, in being in a job the entry qualifications to which are lower, not higher, than the highest qualification held. In terms of the Wald tests undertaken in the estimation of

[9] Statistically significant, that is, at $P < 0.05$, and this criterion is used hereafter.
[10] There is no consistent pattern to the results for individual occupations across this estimation and the others undertaken, for example in terms of the signs of their coefficients relative to the reference category or their statistical significance.
[11] Matching, conventionally, is seen in the context of worker and job. Equally, however, a worker may match with a workplace (because of characteristics such as its location) and/or enterprise (because of its reputation within the local labour market, for example in terms of employment security and/or earnings to be obtained).

underquadv, joint significance is established twice, once again for the sets of variables reflecting personal characteristics and occupation.

Several conclusions may be made from this examination of the conditions of being 'over qualified' and being 'under qualified' in Scotland. First, the determinants of the condition of being 'over qualified' are not the exact converse of the condition of being 'under qualified'. For example, contrast the determinants of the two estimations and note the number of times where the sign of the coefficients does not change, contrary to expectations (viz. 8 of the 16 which appear in Tables 7 and 8). Secondly, the principal determinants of both conditions are more likely to reflect personal characteristics (and occupational status) than either the work related personal characteristics of an individual or the manifold workplace characteristics of the establishment at which he/she works. For example, the employment status variables – *notperm* and *notfulltime* – are of no statistical consequence; nor are the union related variables – *member* and *unions* – perhaps a further reflection of the apparent irrelevance of the impact of union status or union coverage in Scotland (Dickerson, 2008); nor are the two sector dummy variables. This important distinction between the contrasting roles of distinct sets of independent variables is further evident in the results of the Wald tests, where joint significance is established only for the sets of variables reflecting personal characteristics and occupation. Finally, in the context of the relatively more consequential set of variables reflecting personal characteristics, where some individual variables are statistically significant, there is an element of ambiguity as to how the results with respect to *logyears* may be interpreted. However, there is evidence that the condition of being 'over qualified' is gender related, being less likely for males, and that the condition of being 'under qualified' is negatively correlated with the presence of dependent children.

'Over qualified' and 'Under qualified' in the United Kingdom

Tables 9 and 10 present the results for the dependent variables *overquadv* and *underquadv*, respectively, and the outcomes of the appropriate Wald tests.

Of the two statistically significant variables in the estimation of *overquadv* using the Scottish subpopulation, only *logyears* is similarly statistically significant in the corresponding estimation using the full, UK data set. However, in the latter

estimation, additionally: two further personal characteristics variables (*children* and *nojob*, both positively signed); one work related personal characteristic (the negatively signed *trained*); one workplace characteristic (the negatively signed *size*); and one sector dummy variable (the positively signed *volsec*) are statistically significant (Table 9). The individual determinants of the condition of being 'over qualified' making use of the UK data set, therefore, are very different from the same using the Scottish subpopulation. Moreover, the coefficients of eight of the 16 variables shown in Tables 7 and 9 change their sign with the change in the data sets. In terms of the Wald tests undertaken, joint significance is established on this occasion in four instances viz. the sets of variables associated with personal characteristics; occupation; sector; and industrial sector, results which offer further supporting evidence that the determinants of *overquadv* change when the data sets change.

In contrast to the estimation of *underquadv* which makes use of the Scottish subpopulation, in the estimation using the full UK data set *children* is no longer statistically significant, although *logyears* remains both negatively signed and statistically significant. In the latter estimation, *size* also is statistically significant (although the sign of the coefficient is now positive, in contrast to the Scottish result) (Table 10). In all, the signs of seven of the 16 variables change with the change in the data set examined. Further, with respect to the outcome of the Wald tests, in the estimation of the condition of being 'under qualified' using the full UK data set, joint significance is established on five occasions: for the sets of variables denoting personal characteristics; work related personal characteristics; occupation; workplace characteristics; and industrial sector. Again, therefore, there is further evidence that the determinants of the dependent variables change with the change in the data set.

This examination of the full, UK, data set does not change one of the principal conclusions made in the context of the Scottish subpopulation viz. the determinants of the condition of being 'over qualified' are not necessarily the converse of the determinants of the condition of being 'under qualified'. That said, in the estimations which make use of the full data set the signs of the majority of the coefficients (i.e. 11) shown in the tables do change, much in accordance with expectations. However, the determinants of both conditions change with the change in the data set, from that

for the Scottish subpopulation to that for the UK. This is manifest in three ways: first, the variables in both estimations which are statistically significant change, generally; second, the extent to which the signs of the coefficients change, eight in the context of the estimations of *overquadv* and seven in the context of the estimations of *underquadv*; and, thirdly, the outcomes of the Wald test are very different, in that personal characteristics and occupation are no longer the only sets of variables which are of consequence in the full UK wide data set.

One possible interpretation of these contrasting outcomes is that the determinants of the two conditions in question do indeed differ between Scotland and the United Kingdom. Another is that outcomes of the estimations undertaken are a consequence of the manner in which the survey is designed and subsequently analysed in this paper. Constructed via individuals in employment, it is only with the addition of more observations that the true salience of the characteristics of the workplace at which an individual is employed come to be fully recognised, not only as important determinants of the two conditions in their own right but also in the manner in which they affect the sign and magnitude of other coefficients in the estimated equations, more especially those reflecting an individual's personal characteristics.

'Over qualified' and 'Under qualified': inter country differences

To identify possible inter country differences in the determinants of the likelihoods of the two conditions, each equation is re-estimated with the addition of three further dummy variables denoting England, Wales and Northern Ireland. These results are presented in Tables 11 and 12.

The most notable single result relates to Northern Ireland in the estimation of *overquadv*: an individual located in Northern Ireland is 12 percent less likely to be 'over qualified' relative to a similar individual located in Scotland, the reference country category.[12] The outcome of the Wald test indicates the joint significance of the variables denoting country in this estimation. By contrast, in the estimation of the condition of being 'under qualified', none of the country coefficients is statistically

[12] This particular outcome may be explained, perhaps, in terms of the relatively high rate of out migration of highly qualified individuals from Northern Ireland, reducing the supply of the highly qualified individuals there relative to the demand for the same.

significant (although each is positively signed, with respect to the reference category). Further, joint significance of the variables in question is not established.

From the above, therefore, it is possible to conclude that whereas an inter country difference may be observed in the context of the condition of being 'over qualified', no such difference is to be found in the context of the condition of being 'under qualified'.

4. CONCLUSIONS AND POLICY IMPLICATIONS

This paper has investigated the qualifications/jobs mismatch in Scotland. It has done so by examining the extent and determinants of two related outcomes viz. being 'over qualified' (i.e. when an individual has a qualification which is above that required for entry to the job being done) and being 'under qualified' (i.e. when an individual is doing a job, the entry qualifications for which are above the highest qualification held). The analysis was undertaken using the 2006 Employee Skills Survey.

According to the qualification levels measurement, in Scotland, 40 percent of the working population was deemed 'over qualified' and 12 percent deemed 'under qualified'. The corresponding percentages for the UK were 39 and 13, respectively. The potential 'problem' of 'over qualification', therefore, is not unique to Scotland. That said, qualifications were not perceived to be the only job entry requirement of consequence by individuals; and almost nine in ten respondents believed that their job offered scope to employ their qualifications and skills to the full.

Binomial logit models were used to estimate the determinants of the conditions of being 'over qualified' and being 'under qualified'. The nature of the sets of independent variables in the equations estimated reflected an individual's personal characteristics; his/her work related personal characteristics; occupation; the characteristics associated with the workplace at which he/she was employed; and the sector and industrial sector of the workplace. There were two conclusions of consequence viz. the determinants of the condition of being 'over qualified' were not

the converse of the determinants of being ‘under qualified’; and the principal determinants of both conditions were more likely to reflect sets of variables denoting an individual’s personal characteristics and occupation, rather than an individual’s workplace related characteristics or the characteristics of the workplace at which he/she was employed or its sector. That said, there was an element of ambiguity about how the more specific results relating to personal characteristics might be interpreted. The variable denoting labour market experience (*logyears*) was statistically significant in each estimation. However, whereas in the estimation of the condition of being ‘over qualified’ it was negatively signed in the estimation of the condition of being ‘under qualified’ it was positively signed. Although the variable denoting gender (*male*) was negatively signed in the context of the condition of being ‘over qualified’ and positively signed in the context of the condition of being ‘under qualified’, the variable was statistically significant only in the former estimation. Further, if counter-intuitively so, although the variable denoting the presence of dependent children (*children*) was negatively signed in the estimation of the condition of being ‘over qualified’ and positively signed in the estimation of the condition of being ‘under qualified’, it was statistically significant only in the latter.

The estimations of the two dependent variables using the full, UK data set produced some outcomes which were similar to those reported for the sub population of Scotland, notably that the determinants of one condition were not necessarily the converse of the determinants of the other. However, there was some evidence that the determinants of both conditions changed when the data sets changed. For example, in the context of the full data set for the UK, the issue of gender was no longer of consequence in the context of the condition of being ‘over qualified’, but other personal characteristics such as the presence of dependent children and a previous recent experience of unemployment were; and in the context of the condition of being ‘under qualified’ the presence of dependent children was no longer of consequence. Further, both the characteristics of the establishment at which an individual worked, notably its size and its sector came to be of some consequence in the estimations of both conditions . Finally, although the likelihood of the condition of being ‘over qualified’ did differ across the four countries of the UK, the likelihood of the condition of being ‘under qualified’ did not.

Almost nine out of ten respondents considered that the job they did offered scope to make full use of their qualifications and skills. Nonetheless that four out of ten workers in Scotland were deemed 'over qualified' must be considered to be a 'problem'. This 'problem' has both private and public dimensions. From a private perspective, individuals not in jobs appropriate to their qualifications may not be earning returns commensurate with their human capital investments (Rosen, 1977: Card, 1999). From a public perspective, the prevalence of so many potentially under employed individuals may part explain why recent increases in education and training expenditures in Scotland have not resulted in corresponding increases in labour productivity. Two quotations from Scottish government publications are especially noteworthy in this context:

> "… Scottish investment in education, for at least the last 30 years, has been higher than in the rest of the United Kingdom and this has resulted in a well qualified population….Scotland's skills profile has also been improving faster than that of the rest of the UK….Scotland has not, however, matched the UK economic growth rate despite its positive skills profile." (Scottish Government, 2007b, p. 6):
>
> (the) "strong performance on skills and qualifications does not feed through effectively enough to productivity" (Scottish Government, 2007a, p. 14).[13]

From the perspective of employers' recruitment and selection strategies, there are two possible explanations of why, *ceteris paribus*, the condition of being 'over qualified' may result and be so prevalent across workplaces. The first explanation is credentialism: the use of qualifications by employers to screen for potential productivity on the part of job seekers, irrespective of the relationship between these qualifications and the job to be done (Arrow, 1973: Spence, 1973). The second is that when the number of job seekers exceed the number of vacancies, a feature of local labour markets throughout many parts of Scotland over a long period of time, employers have the scope to increase their hiring standards, in so doing selecting individuals with relatively high qualifications in preference to those relatively less

[13] That said, the correlation if not the causation, between human capital investment and labour productivity is contentious (Keep et al, 2006).

well qualified, again irrespective of the qualification level required to do the job in question competently (MacKay et al, 1971).

One possible, and frequently cited, policy response to address the extent of 'over qualification' in Scotland is to increase the demand for those with qualifications. Encouraging indigenous firms to change radically their product market strategies and to move up their value chain is one such strategy (Ashton, 2007: Sung et al, 2009). How such a policy may be operationalised is problematical, however, as are its potential detrimental consequences, not the least of which is the possible displacement of low skilled workers into a labour market in which the supply of individuals with no/low skills already well exceeds the demand for the same.[14] Encouraging appropriate multinational enterprises to establish themselves in Scotland is another, although the consequences of external control for employment security will always remain a contentious issue in this context (Dicken, 1976: Firn, 1975: McDermott, 1979).[15] Encouraging and facilitating the mobility of those considered to be in jobs which are less than commensurate with the qualifications they hold would be a possible, complementary supply based policy. That said, the search for outside job offers by individuals is contingent upon appropriate job opportunities becoming available, something which is unlikely given the current – and the foreseeable future - conditions of demand constrained product and labour markets.

What the extent of 'over qualification' does question, however, both in Scotland and the UK, is the continued relevance of a policy of 'universal up-skilling' associated with the Leitch Review (Leitch Review of Skills, 2006). Although education and training may be important factors in the search for productivity growth and competitiveness (as well as other commendable policy objectives, such as social inclusion), they are not the primary – or, indeed, sole - factors. An important feature of recent skills policy in Scotland is an explicit acknowledgement of this, manifest in an emerging policy agenda which envisages skills policy as an integral part of a more comprehensive policy of economic development (Scottish Government, 2007a: Payne, 2009).

[14] See Payne (2009) for a discussion of some possible sources of inspiration for the design and implementation of appropriate economic development policies.
[15] Especially so given the more recent experiences with Diageo.

Advocates of devolution once maintained that one possible outcome would be the scope it offered for policy differentiation across the constituent parts of the United Kingdom. It may well be that we are about to witness yet another manifestation of this, this time in the context of economic and skills development.

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Table 1. The Qualification for Entry to the Job Currently Held, by the Highest Qualification Possessed, in levels: Scotland

		Highest Qualification Held, in Levels					
		No qualifications	***Level 1***	***Level 2***	***Level 3***	***Level 4/5***	***Total***
Qualification Required For Entry To The Job	***No Qualifications***	101.8 .0967 .3038 .7086 170	34.79 .0331 .1039 .4775 54	64.02 .0609 .1912 .4109 110	83.3 .0792 .2487 .2861 132	51.06 .0485 .1525 .1314 80	334.9 .3184 1 .3184 546
	Level 1	25.63 .0244 .217 .1785 38	18.81 .0179 .1592 .2581 33	27.14 .0258 .2298 .1742 35	31.96 .0304 .2706 .1097 52	14.57 .0138 .1234 .0375 26	118.1 .1123 1 .1123 184
	Level 2	8.663 .0082 .0771 .0603 17	8.554 .0081 .0762 .1174 12	34.9 .0332 .3107 .224 56	41.39 .0393 .3685 .1421 64	18.82 .0179 .1675 .0484 28	112.3 .1068 1 .1068 177
	Level 3	5.158 .0049 .0272 .0359 8	5.432 .0052 .0286 .0745 9	22.21 .0211 .1171 .1425 34	101 .096 .5323 .3468 158	55.93 .0532 .2948 .144 81	189.7 .1803 1 .1803 290
	Level 4/5	2.395 .0023 .0081 .0167 5	5.285 .005 .0178 .0725 11	7.544 .0072 .0254 .0484 15	33.58 .0319 .1131 .1153 59	248.1 .2359 .8356 .6387 412	296.9 .2823 1 .2863 502
	Total	143.6 .1365 .1365 1 238	72.87 .0693 .0693 1 119	155.8 .1481 .1481 1 250	291.2 .2768 .2768 1 465	388.5 .3693 .3693 1 627	1052 1 1 1 1699

Key to Table: Weighted counts
Cell proportions
Row proportions
Column proportions
Number of observations

Pearson Statistic:
Uncorrected chi2 (16) = 3538.3832
Design-based F(12.52, 83768.12) = 30.5818 P = 0.0000

Table 2. The Qualification for Entry to the Job Currently Held, by the Highest Qualification Possessed, in levels : United Kingdom

		Highest Qualification Held, in Levels					
		No qualifications	***Level 1***	***Level 2***	***Level 3***	***Level 4/5***	***Total***
Qualification Required For Entry To The Job	***No Qualifications***	859.5 .0738 .2655 .7084 573	554.8 .0468 .1683 .4623 275	780 .0669 .2409 .3445 469	634.6 .0545 .196 .2346 361	418.2 .0359 .1292 .0975 228	3237 .2778 1 .2778 1906
	Level 1	192.8 .0166 .1457 .1589 121	293.6 .0252 .2218 .2491 160	318.1 .0273 .2403 .1405 169	303.6 .0261 .2294 .1122 164	215.6 .0185 .1628 .0502 100	1324 .1136 1 .1136 714
	Level 2	86.78 .0074 .0478 .0715 56	167 .0143 .0919 .1417 88	753.4 .0647 .4148 .3328 421	489.6 .042 .2696 .181 279	319.4 .0274 .1758 .0744 178	1816 .1559 1 .1559 1022
	Level 3	54.67 .0047 .0315 .0451 39	100.3 .0086 .0577 .0852 47	255.2 .0219 .1468 .1127 147	815.9 .07 .4694 .3016 503	511.9 .0439 .2946 .1193 301	1738 .1492 1 .1492 1037
	Level 4/5	19.45 .0017 .0055 .016 16	72.72 .0062 .0206 .0617 46	157.4 .0135 .0445 .0695 84	461 .0396 .1303 .1705 229	2826 .2426 .7991 .6586 1639	3537 .3036 1 .3036 2014
	Total	1213 .1041 .1041 1 805	1178 .1011 .1011 1 616	2264 .1943 .1943 1 1290	2705 .2321 .2321 1 1536	4292 .3683 .3683 1 2446	1.2e+04 1 1 1 6693

Key to Table: Weighted counts
Cell proportions
Row proportions
Column proportions
Number of observations

Pearson Statistic:
Uncorrected chi2 (16) = 3497.5209
Design-based F(13.59, 90963.68) = 109.0720 P = 0.0000

Table 3. The Importance of Qualifications to do the Job Competently: Proportions

Response	Scotland	United Kingdom
Totally Unnecessary	0.1232	0.0982
Not Really Necessary	0.1449	0.1756
Fairly Necessary	0.3631	0.3395
Essential	0.3687	0.3867
Total number of valid responses	1,153	4,790

Table 4. The Most Important Thing that an Individual would need to do the Job: Proportions

Response	Scotland	United Kingdom
Right Age	0.0111	0.0225
Educational or technical qualifications	0.2140	0.2241
Previous experience of similar work	0.3847	0.3690
Previous employment within the organisation	0.0305	0.0230
Natural ability or fitness for the work being done	0.1821	0.1800
Motivation	0.1764	0.176
None of these	0.0012	0.0054
Total number of valid responses	1,248	5,162

Table 5. That the Job Offers Scope to Make Full Use of Knowledge and Skills Possessed: Proportions

Response	Scotland	United Kingdom
Disagree	0.1467	0.1687
Agree	0.8533	0.8313
Total number of valid responses	1,742	6,825

Table 6. Variable Names, Descriptors, Means (and Standard Errors) and Proportions

Variable Name	Variable Descriptor	Mean (SE) or Proportion (Scotland)	Mean (SE) or Proportion (United Kingdom)
The Dependent Variables			
overquadv	'over qualified' i.e. possessing qualifications (in levels) which are above the entry requirements for the job	.400	.385
underquadv	'under qualified' i.e. possessing qualifications (in levels) which are below the entry requirements for the job	.118	.135
The Independent Variables (I): Personal Characteristics			
Male	Male (=1)	.474	.487
Logage	Log of the age of the individual	3.683 (.012)	3.692 (.005)
Logyears	Log of the number of years in paid work since leaving school	2.811 (.029)	2.779 (.016)
Married	Married or living together as a couple (=1)	.705	.717
Children	With financially dependent child/children under the age of 16 (=1)	.359	.383
Nojob	Having had at least one spell of unemployment within the last 5 years (=1)	.110	.129
The Independent Variables (II): Work Related Personal Characteristics			
Loghours	The log of the number of hours usually worked each week	3.536 (.013)	3.537 (.007)
Notperm	Not in a permanent job (=1)	.034	.048
notfulltime	Working part time (=1)	.221	.216
Trained	Having received training for the current job since leaving full time education (=1)	.589	.610
Member	A member of a trade union or staff association (=1)	.375	.338

Table 6. (cont.)

Variable Name	Variable Descriptor	Mean (SD) or Proportion (Scotland)	Mean (SD) or Proportion (United Kingdom)
The Independent Variables (III): Workplace Related Characteristics			
Unions	Unions/staff associations are represented at the workplace (=1)	.604	.565
Bigger	The workplace is part of a larger organisation (=1)	.524	.564
Size	25 or more are employed at the workplace (=1)	.649	.678
Pubsec	The workplace is in the public sector (=1)	.410	.345
Volsec	The workplace is a non profit organisation (=1)	.025	.035
The Independent Variables (IV): UK Countries			
England	England (=1)		.847
Wales	Wales (=1)		.041
Ni	Northern Ireland (=1)		.021

Footnotes to Table 6:

1. A Wald test is undertaken to establish the joint significance of the variables reflecting the personal characteristics of the individual.

2. Additional work related variables are: whether the individual has been promoted within the last 5 years; and tenure (via 6 dummy variables). A Wald test is undertaken to establish the joint significance of the variables reflecting an individual's work related characteristics.

3. Occupational dummies are included, via 8 SOC dummy variables. A Wald test is undertaken to establish the joint significance of variables depicting 'occupation'.

4. Industry dummies are included, via 9 SIC dummy variables. A Wald test is undertaken to establish the joint significance of variables depicting 'industrial sector'.

5. The omitted, reference sector category is the 'private' sector. A Wald test is undertaken to establish the joint significance of variables depicting 'sector'.

6. The omitted, reference UK Countries category is 'Scotland'. A Wald test is undertaken to establish the joint significance of the variables depicting 'country'.

Table 7. Logit Results : Dependent Variable *overquadv*: Scotland

Variable	Coefficient	Linearized Std Err	Marginal Effect	Std Err	P >|z|
Male	-.463	.235	-.108	.055	.050
Logage	.092	.293	.021	.068	.751
Logyears	-.545	.120	-.128	.028	.000
Married	.220	.176	.051	.040	.206
Children	-.034	.188	-.008	.044	.854
Nojob	-.056	.236	-.013	.054	.809
Loghours	-.456	.361	-.107	.084	.205
Notperm	-.678	.442	-.143	.082	.081
Notfulltime	.496	.370	.119	.091	.190
Trained	-.101	.199	-.023	.047	.614
Member	-.017	.222	-.004	.052	.938
Unions	.014	.227	.003	.053	.950
Bigger	.102	.159	.024	.037	.519
Size	-.347	.177	-.082	.042	.053
Pubsec	.189	.256	.044	.060	.461
Volsec	.294	.451	.071	.111	.523
Constant	2.420	1.697			
Wald test for the joint significance of the personal characteristics variables: F(6, 5370) = 3.99 : Prob > F = 0.0005					
Wald test for the joint significance of the work related personal characteristics variables (excluding occupation): F(12, 5364) = 1.67 : Prob > F = 0.0667					
Wald test for the joint significance of the occupation (i.e. SOC) dummy variables: F(8, 5368) = 4.40 : Prob > F = 0.0000					
Wald test for the joint significance of the workplace characteristics variables (excluding sector and industrial sector): F(3, 5373) = 1.39 : Prob > F = 0.2429					
Wald test for the joint significance of the sector dummy variables: F(2, 5374) = 0.38 : Prob > F = 0.6871					
Wald test for the joint significance of the industrial sector (i.e. SIC) dummy variables: F(8, 5368) = 1.89 : Prob > F = 0.0567					
Number of observations:					5376
Sub population number of observations:					1351
F (39, 5337) =					3.76
Prob > F =					0.0000

Footnote to Table 7:

For this table and all subsequent ones, marginal effects are calculated at the mean value of the variable in question in the estimated equation. The marginal effects for all dummy variables are calculated for a discrete change from ‘0’ to ‘1’.

Table 8. Logit Results : Dependent Variable *underquadv*: Scotland

Variable	Coefficient	Linearized Std Err	Marginal Effect	Std Err	P >|z|
Male	.029	.287	.001	.018	.919
Logage	.064	.378	.004	.024	.864
Logyears	.966	.266	.061	.014	.000
Married	.417	.286	.024	.016	.123
Children	-.604	.265	-.036	.016	.026
Nojob	.825	.350	.069	.036	.058
Loghours	.368	.478	.023	.030	.447
Notperm	-.262	.634	-.015	.032	.645
Notfulltime	-.423	.459	-.024	.023	.300
Trained	-.331	.261	-.021	.017	.210
Member	-.359	.286	-.021	.017	.200
Unions	-.115	.296	-.007	.019	.697
Bigger	.180	.225	.011	.014	.423
Size	-.102	.241	-.006	.015	.679
Pubsec	-.038	.333	-.002	.021	.907
Volsec	-.639	.705	-.031	.026	.236
Constant	-6.206	2.497			
Wald test for the joint significance of the personal characteristics variables: F(6, 5370) = 5.74 : 0.0000					
Wald test for the joint significance of the work related personal characteristics variables (excluding occupation): F(12, 5364) = 1.33 : 0.1930					
Wald test for the joint significance of the occupation (i.e. SOC) dummy variables: F(8, 5368) = 2.14 : Prob > F = 0.0293					
Wald test for the joint significance of the workplace characteristics variables (excluding sector and industrial sector): F(3, 5373) = 0.35 : Prob > F = 0.7898					
Wald test for the joint significance of the sector dummy variables: F(2, 5374) = 0.41 : Prob > F = 0.6619					
Wald test for the joint significance of the industrial sector (i.e. SIC) dummy variables: F(8, 5368) = 0.98 : Prob > F = 0.4486					
Number of observations:					5376
Sub population number of observations:					1351
F (39, 5337) =					2.68
Prob > F =					0.0000

Table 9. Logit Results : Dependent Variable *overquadv*: United Kingdom

Variable	Coefficient	Linearized Std Err	Marginal Effect	Std Err	P >|z|
Male	-.112	.103	-.026	.024	.278
Logage	-.213	.136	-.049	.031	.120
Logyears	-.232	.059	-.053	.013	.000
Married	-.169	.091	-.039	.021	.066
Children	.185	.085	.043	.019	.030
Nojob	.298	.135	.070	.032	.031
Loghours	-.052	.165	-.012	.038	.752
Notperm	.162	.202	.038	.048	.430
Notfulltime	-.018	.171	-.004	.039	.915
Trained	-.212	.087	-.049	.020	.016
Member	.044	.109	.010	.025	.686
Unions	.102	.110	.023	.025	.351
Bigger	.118	.084	.027	.019	.161
Size	-.194	.093	-.045	.021	.038
Pubsec	-.157	.135	-.036	.031	.245
Volsec	.472	.232	.114	.057	.048
Constant	1.734	.814			
Wald test for the joint significance of the personal characteristics variables: F(6, 5370) = 5.93 : Prob > F = 0.0000					
Wald test for the joint significance of the work related personal characteristics variables (excluding occupation): F(12, 5364) = 1.62 : Prob > F = 0.0782					
Wald test for the joint significance of the occupation (i.e. SOC) dummy variables: F(8, 5368) = 18.55 : Prob > F = 0.0000					
Wald test for the joint significance of the workplace characteristics variables (excluding sector and industrial sector): F(3, 5373) = 2.23 : Prob > F = 0.0826					
Wald test for the joint significance of the sector dummy variables: F(2, 5374) = 3.82 : Prob > F = 0.0220					
Wald test for the joint significance of the industrial sector (i.e. SIC) dummy variables: F(8, 5368) = 2.55 : Prob > F = 0.0091					
Number of observations:					5376
F (39, 5337) =					9.97
Prob > F =					0.0000

Table 10. Logit Results : Dependent Variable *underquadv*: United Kingdom

Variable	Coefficient	Linearized Std Err	Marginal Effect	Std Err	P >|z|
Male	-.137	.134	-.013	.013	.310
Logage	.214	.195	.020	.018	.274
Logyears	.507	.139	.049	.012	.000
Married	-.127	.179	-.012	.018	.488
Children	-.200	.129	-.019	.012	.121
Nojob	-.296	.208	-.026	.017	.123
Loghours	.172	.218	.016	.021	.429
Notperm	-.186	.293	-.016	.024	.498
Notfulltime	.525	.293	.057	.036	.114
Trained	.092	.119	.008	.011	.437
Member	.017	.146	.001	.014	.906
Unions	-.103	.153	-.010	.015	.500
Bigger	.094	.114	.009	.010	.406
Size	.362	.134	.033	.011	.004
Pubsec	-.103	.188	-.009	.017	.577
Volsec	-.464	.330	-.037	.022	.093
Constant	-4.713	1.084			
Wald test for the joint significance of the personal characteristics variables: F(6, 5370) = 5.56 : Prob > F = 0.0000					
Wald test for the joint significance of the work related personal characteristics variables (excluding occupation): F(12, 5364) = 2.34 : Prob > F = 0.0054					
Wald test for the joint significance of the occupation (i.e. SOC) dummy variables: F(8, 5368) = 6.89 : Prob > F = 0.0000					
Wald test for the joint significance of the workplace characteristics variables (excluding sector and industrial sector): F(3, 5373) = 2.77 : Prob > F = 0.0403					
Wald test for the joint significance of the sector dummy variables: F(2, 5374) = 0.99 : Prob > F = 0.3729					
Wald test for the joint significance of the industrial sector (i.e. SIC) dummy variables: F(8, 5368) = 4.29 : Prob > F = 0.0000					
Number of observations:					5376
F (39, 5337) =					5.71
Prob > F =					0.0000

Table 11. Logit Results : Dependent Variable *overquadv*: United Kingdom, with country variables included

Variable	Coefficient	Linearized Std Err	Marginal Effect	Std Err	P >|z|
Male	-.112	.103	-.025	.023	.280
Logage	-.213	.136	-.049	.031	.118
Logyears	-.236	.059	-.054	.013	.000
Married	-.169	.091	-.039	.021	.066
Children	.187	.085	.043	.019	.028
Nojob	.295	.136	.070	.032	.033
Loghours	-.051	.164	-.011	.038	.753
Notperm	.167	.202	.039	.048	.417
Notfulltime	-.019	.171	-.004	.039	.910
Trained	-.213	.087	-.049	.020	.015
Member	.043	.109	.009	.025	.694
Unions	.100	.110	.023	.025	.361
Bigger	.124	.085	.028	.019	.144
Size	-.197	.093	-.046	.021	.036
Pubsec	-.162	.136	-.037	.031	.228
Volsec	.473	.233	.114	.058	.048
England	-.101	.104	-.023	.024	.333
Wales	.032	.181	.007	.042	.859
Northern Ireland	-.596	.182	-.124	.033	.000
Constant	1.845	.822			
Wald test for the joint significance of the personal characteristics variables: F(6, 5370) = 5.98 : Prob > F = 0.0000					
Wald test for the joint significance of the work related personal characteristics variables (excluding occupation): F(12, 5364) = 1.61 : Prob > F = 0.0808					
Wald test for the joint significance of the occupation (i.e. SOC) dummy variables: F(8, 5368) = 18.61 : Prob > F = 0.0000					
Wald test for the joint significance of the workplace characteristics variables (excluding sector and industrial sector): F(3, 5373) = 2.31 : Prob > F = 0.0743					
Wald test for the joint significance of the sector dummy variables: F(2, 5374) = 3.91 : Prob > F = 0.021					
Wald test for the joint significance of the industrial sector (i.e. SIC) dummy variables: F(8, 5368) = 2.53 : Prob > F = 0.0095					
Wald test for the joint significance of the country dummy variables: F(3, 5373) = 3.97 : Prob > F = 0.0077					
Number of observations:					5376
F (42, 5334) =					9.56
Prob > F =					0.0000

Table 12. Logit Results : Dependent Variable *underquadv*: United Kingdom, with country variables included

Variable	Coefficient	Linearized Std Err	Marginal Effect	Std Err	P >|z|
Male	-.138	.134	-.013	.013	.308
Logage	.215	.195	.020	.018	.273
Logyears	.504	.139	.048	.012	.000
Married	-.129	.179	-.012	.018	.482
Children	-.202	.129	-.019	.012	.116
Nojob	-.295	.209	-.026	.010	.124
Loghours	.172	.218	.016	.021	.430
Notperm	-.192	.294	-.017	.024	.483
Notfulltime	.517	.292	.056	.035	.117
Trained	.088	.119	.008	.011	.457
Member	.024	.147	.002	.014	.867
Unions	-.103	.158	-.010	.015	.505
Bigger	.089	.115	.008	.011	.436
Size	.354	.134	.032	.011	.005
Pubsec	-.088	.188	-.008	.017	.635
Volsec	-.464	.330	-.037	.022	.093
England	.237	.138	.021	.012	.073
Wales	.136	.235	.013	.025	.583
Northern Ireland	.039	.235	.003	.023	.870
Constant	-4.911	1.086			
Wald test for the joint significance of the personal characteristics variables: F(6, 5370) = 5.53 : Prob > F = 0.0000					
Wald test for the joint significance of the work related personal characteristics variables (excluding occupation): F(12, 5364) = 2.37 : Prob > F = 0.0049					
Wald test for the joint significance of the occupation (i.e. SOC) dummy variables: F(8, 5368) = 6.91 : Prob > F = 0.0000					
Wald test for the joint significance of the workplace characteristics variables (excluding sector and industrial sector): F(3, 5373) = 2.61 : Prob > F = 0.0499					
Wald test for the joint significance of the sector dummy variables: F(2, 5374) = 0.99 : Prob > F = 0.3732					
Wald test for the joint significance of the industrial sector (i.e. SIC) dummy variables: F(8, 5368) = 4.29 : Prob > F = 0.0000					
Wald test for the joint significance of the country dummy variables: F(3, 5373) = 1.16 : Prob > F = 0.3217					
Number of observations:					5376
F (42, 5334) =					5.32
Prob > F =					0.0000