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overeducation and reduced life
satisfaction**

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Heaven Knows I'm Miserable Now: Overeducation and Reduced Life Satisfaction.

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Heaven Knows I'm Miserable Now: Overeducation and Reduced Life Satisfaction.

This study is an investigation into relative overeducation and life satisfaction using British longitudinal data. The focus is on young people rather than the whole of the life cycle, an arguably more homogenous group. Such a focus means that the overeducation variable does not simply capture the increased participation in Higher Education of the young. The hypothesis is that there is a negative relationship between being overeducated and life satisfaction. Overeducation is measured using the realised matches approach, a statistical measurement comparing an individual's years of schooling with the average for one of two employment based reference groups. Using dynamic panel analysis, to account for the presence of serial correlation, such an association is found: the relatively overeducated seem to be relatively less happy.

Keywords: Life Satisfaction, Happiness, Overeducation, Dynamic Panel Analysis, BHPS.

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Heaven Knows I'm Miserable Now: Overeducation and Reduced Life Satisfaction.

1 Introduction

Within economics, an investigation into overeducation and life satisfaction has (to my knowledge) never been undertaken before. The broad hypothesis is that the relatively overeducated may experience less average life satisfaction (*ceteris paribus*). In this section, the theoretical discussion, suggests pathways through which there might be an association between overeducation and (un)happiness. One of these is through raised expectations being unmet; another is through the comparisons being made by individuals with others in the same position in terms of employment who have invested less in their education. There is an extensive overeducation literature, where measurement issues have been deemed to be important and these issues are also analysed in this section below. Following this, in the same section, there is a brief review of the overeducation and job satisfaction literature. There are some happiness and education studies which hint at an association between them via overeducation (though not explicitly) and these are also discussed. The literature review, theoretical foundations and hypothesis are all discussed in section 2. The specific methodological issues for the empirical investigation are discussed in section 3. The results and concluding remarks follow, in sections 4 and 5 respectively.

Before those more detailed sections, here a brief argument is made for a potential negative relationship between life satisfaction and overeducation, arising through unmet aspirations and comparisons with other individuals who are not overeducated. Relative or comparison effects have been repeatedly argued to be and demonstrated as important both within

economics and particularly ‘the economics of happiness’ literature. (For example, Veblen 1890, Dusenberry 1948, Frank 1985, and Clark et al. 2008, all provide either arguments or evidence or both for the importance of relative concerns.) The relatively overeducated are doing the same (or a similar) job as others but have invested more in education. This comparison is one potential pathway through which being relatively overeducated may depress life satisfaction. A relatively overeducated individual may make another comparison with a similar outcome: a comparison with the past (or their current situation and their expectations formed in the past). An individual may have invested in more education, only to find that his or her employment situation has not improved much (or at all). As the education has had little or no labour market impact, the individual may wonder whether it was worth it and be less satisfied because of this.

Little theoretical guidance comes from other disciplines. From psychology and sociology there are, currently, few studies that look at the relationship between overeducation and mental well-being. Notable examples are Kasl (1974) and Coburn (1975), which both found adverse effects on mental well-being amongst overeducated individuals via an achievement and aspiration mismatch, as suggested above. Interestingly, Coburn (1975) also found that if overeducation is self-perceived, rather than objectively measured, the adverse effects on mental well-being are more significant, a finding considered further in the subsequent literature review. Within psychology, there are contributions to the emerging literature that links non-cognitive skills with labour market outcomes, for example Blázquez Cuesta and Budría (2011). The relationship between personality and the specific labour market outcome of overeducation is analysed by Blázquez Cuesta and Budría although that study whilst interesting seems to have a fundamental flaw (discussed in the literature review), and other research is currently underway linking personality types and personality changes to happiness

(e.g. Boyce et al. 2012). A link between personality and happiness may provide more theoretical underpinnings for an investigation into the relationship between overeducation and happiness, though the work has not been done yet and is not undertaken here since the reason why overeducation may depress life satisfaction is not something that is directly investigated. This is something that is very difficult to undertake with most available data sets, including the British Household Panel Survey (BHPS). Instead the subsequent analysis attempts to empirically establish whether there is such an association. If found this would represent the first evidence for such a relationship within the economics literature (to my knowledge). There are challenging methodological issues involved, and these are discussed both within the literature review of section 2, and the subsequent methodological discussion of section 3.

2 Theoretical discussion and literature review

This section introduces the analysis regarding the relatively overeducated. Within economics, an investigation into overeducation and life satisfaction has (to my knowledge) never been undertaken before. The broad hypothesis is that the relatively overeducated may experience less average life satisfaction (*ceteris paribus*). In this section, the theoretical discussion, suggests pathways through which there might be an association between overeducation and (un)happiness. One of these is through raised expectations being unmet; another is through the comparisons being made by individuals with others in the same position in terms of employment who have invested less in their education. A critical review of the literature follows. There is an extensive overeducation literature, where measurement issues have been deemed to be important and these issues are also analysed in this section below. Following this, in the same section, there is a brief review of the overeducation and job satisfaction literature. There are some happiness and education studies which hint at an association

between them via overeducation (though not explicitly) and these are also discussed. The specific methodological issues for the empirical investigation here is that serial correlation is a feature of the data and careful consideration is needed to model this and ensure that the results are informative. The results and concluding remarks follow, in Sections 4 and 5 respectively.

Here a brief argument is made for a potential negative relationship between life satisfaction and overeducation, arising through unmet aspirations and comparisons with other individuals who are not overeducated. Relative or comparison effects have been repeatedly argued to be and demonstrated as important both within economics and particularly 'the economics of happiness' literature. (For example, Veblen 1890, Dusenberry 1948, Frank 1985, and Clark et al. 2008, all provide either arguments or evidence or both for the importance of relative concerns.) The relatively overeducated are doing the same (or a similar) job as others but have invested more in education. Such a comparison is one potential pathway through which being relatively overeducated may depress life satisfaction. A relatively overeducated individual may make another comparison with a similar outcome: a comparison with the past (or their current situation and their expectations formed in the past). An individual may have invested in more education, only to find that his or her employment situation has not improved much (or at all). As the education has had little or no labour market impact, the individual may wonder whether it was worth it and be less satisfied because of this. Though there are other potential reasons to pursue higher levels of education.

Little theoretical guidance comes from other disciplines. From psychology and sociology there are, currently, few studies that look at the relationship between overeducation and mental well-being. Notable examples are Kasl (1974) and Coburn (1975), which both found

adverse effects on mental well-being amongst overeducated individuals via an achievement and aspiration mismatch, as suggested above. Interestingly, Coburn (1975) also found that if overeducation is self-perceived, rather than objectively measured, the adverse effects on mental well-being are more significant, a finding considered further in the subsequent literature review. Within psychology, there are contributions to the emerging literature that links non-cognitive skills with labour market outcomes, for example Blazquez Cuesta and Budria (2011). The relationship between personality and the specific labour market outcome of overeducation is analysed by Blazquez Cuesta and Budria, although that study, whilst interesting, seems to have a fundamental flaw (discussed in the literature review), and other research is currently underway linking personality types and personality changes to happiness (e.g. Boyce et al., 2012). A link between personality and happiness may provide more theoretical underpinnings for an investigation into the relationship between overeducation and happiness, though the work has not been done yet and is not undertaken here since the reason why overeducation may depress life satisfaction is not something that is directly investigated. This is something that is very difficult to undertake with most available data sets, including the British Household Panel Survey (BHPS). Instead the subsequent analysis attempts to empirically establish whether there is such an association. If found this would represent the first evidence for such a relationship within the economics literature (to my knowledge). There are challenging methodological issues involved, and these are discussed both within the literature review just below, and the subsequent methodological Section, 3.

This critical review cannot discuss previous economic studies of the relationship between overeducation and life satisfaction because none exist. Although there are, within the happiness and education literature, some studies that hint at an association via overeducation. Some of these studies are briefly mentioned here, complementing the overeducation discussion. Also there is an extensive overeducation literature (often linked to job

satisfaction), which is critically reviewed. The literature defines overeducation as “having more education than is required for one’s job” (Rubb, 2003) and various explanations for being overeducated include individuals overcompensating for their lack of other ability or experience, or as part of a career plan (Sicherman 1991; Groot 1993). Similarly, overeducation could also result from having no career plan. There is some evidence to suggest that how overeducation is measured has significant consequences for its incidence and any subsequent empirical results. These studies are critically reviewed here, with their implications for the analysis of this study explained.

The increase of participation in HE in the UK raises the possibility of an increase in the incidence of overeducation. Belfield (2000) makes a similar comment about countries other than the UK, demonstrating that such concerns are shared elsewhere:

With rapid recent expansion of participation in higher education in most Western economies, there are concerns that some graduates may find a degree to be a poor investment (although these concerns do appear to be perennial, Lange 1998). Some new graduates may find work for which they are over-educated or at which they are underutilised (Belfield 2000, p.35).

Groot et al. (2000) in a meta-analysis of both the incidence of, and the economic returns to, overeducation, offer OECD statistics to support their claim that “one of the most remarkable social developments of past decades in all western countries has been the increase in the educational level of the population” (p.149). If this increase in the supply of higher educated labour is not matched with the demand for highly-educated labour, widespread overeducation is a possibility. The meta-analysis of Groot et al. (2000) discusses several different ways of measuring overeducation. Some are subjective, where an individual is asked about the skills/education required to do the job; and some are objective where job requirements are investigated, or a comparison is made between an individual’s education and that of a reference group (often based on a broad occupational category). A later useful summary is

provided by Verhaest and Omey (2006), where two subjective and two objective methods are discussed. The two subjective methods are direct self- assessment and indirect self- assessment: the former is, in short, simply asking an individual if he/she is overeducated for the job he/she is doing; the latter is to ask an individual about the appropriate education level for their job and then make a comparison with the individual's actual education. The objective methods are job analysis and realised matches: job analysis bases the education level required on an occupational classification made by job analysts; realised matches involves comparing the individual's level of education with the average or modal level of education of workers in each occupation.

Each of these methods has limitations. These limitations are discussed in Groot et al.'s (2000) meta-analysis, the meta analysis of Rubb (2003) as well as Verhaest and Omey (2006). In short, the very subjectivity of the responses regarding an individual's opinion about his or her own job (what skills are necessary? what education does the job require?) is problematic for quantitative analysis: individuals may be influenced by adapted expectations, formal requirements for new hires (which may overestimate qualifications necessary given the increasing supply of qualified labour), and the education that they themselves have (among other possible influences). Conversely, the job analysis objective method classification cannot take into account the likely heterogeneity of jobs within occupations. A similar criticism can be levelled at the realised matches approach (the approach that is used later in this study, and thus critiqued further below). The choice made regarding the measurement of overeducation is likely to be important. Meta analyses (Groot and Massen van den Brink 2000; Rubb 2003; Kucel 2011) find significant differences in the both the incidence of overeducation, and, where also investigated, the results of subsequent analysis (e.g. returns to education, job satisfaction). The Kucel study widens the focus to sociology, psychology and

demography and supports the finding of differences of overeducation incidence by measurement method in earlier work. This is based on studies from six different countries, including the UK. A counter claim is that these substantial differences could result from sample heterogeneity and not from the choice of measurement itself. As Verhaest and Omey (2006) assert “no uniform way of measuring overeducation exists. The main reason for this lack of uniform measurement is the dependency of empirical researchers on the availability of relevant data to measure overeducation” (p.419). They themselves make use of Belgian SONAR data which provides information about the four methods of measuring overeducation mentioned above. The differences in the incidence of overeducation are striking: approximately half of individuals are overeducated based on the job analysis method, the subjective methods suggest that between approximately 32% and 43% of individuals are overeducated, and the realised matches method results in the lowest incidence of overeducation in the sample, at nearly 14%. Also the “correlations [of the different measures] are fairly low for indicators that have to measure the same variable” (Verhaest and Omey 2006, p.425-426). Certainly, measurement is likely to matter for the happiness association investigated here, where the ‘realised matches’ method used gives low estimates (when compared to other measures) of the incidence of overeducation,

Due to pragmatic concerns of data availability, the analysis presented in the later Sections of this study will use the objective method (realised matches) as used by Groot (1996).

Additional studies that have used this method are Verdugo and Verdugo (1989) and Kiker et al. (1997). Groot (1996) uses the first wave of the BHPS, a subsection of the data that is utilised in this thesis, to investigate the extent of overeducation in the UK. In short, a comparison is made between an individual’s education level and the average education level of individuals in the same occupation category. Individuals are then classed as overeducated

if their level of education is more than one standard deviation above the average. A more critical assessment of this approach appears in the methodology discussion below. Groot (1996), using the one standard deviation definition, finds overeducation within this wave of the BHPS (i.e. 1991) to be at 11% and undereducation to be 9%, with males being less well 'skills matched' than females.

Further evidence for overeducation for UK graduates comes from Dolton and Vignoles (1997) who find that 38% of graduates are overeducated for their first job, a figure that falls to 30% six years after graduation. Data from the 1995 Labour Force Survey puts graduate overeducation at between 27%-38% (Alpin et al. 1998) and a survey from 1996 puts the figure at 40% (Battu et al. 1999). This suggests that overeducation, for graduates, has, for some time, been a sizeable issue. Belfield (2000, p.38) asserts that "although there has been a large expansion in the numbers of graduates in the UK over the last ten years, there is no clear evidence that over-education has increased". This is not a universal judgement. Groot's meta-analysis of the same year makes contradictory claims regarding how the incidence of overeducation has changed over time, and Section 3 below provides evidence of increasing overeducation since 1991 with British (BHPS) data.

The main focus here is on the happiness of the relatively overeducated; however, the rates of return to education and overeducation, not especially considered here, are potentially important channels and income must be controlled for. A recent meta-analysis, Leuven and Oosterbeek (2011), suggests a rate of return for a year of required (or matched) schooling of about 9%, whereas the return to a year of overeducation is about 4.5%. Some studies, largely from within psychology, do not control for income and thus present an unconditional correlation for the impact of education (and overeducation) on non-monetary outcomes. An

example of this is Cassidy and Wright (2008), who look at graduate employment status and its association with psychological well-being (among other factors). They use different measures of health, including the GHQ-12 scores, popular as a proxy for happiness in the economic literature. They use a small sample, based on a questionnaire administered at two points in time, and results indicate that graduate underemployment is detrimental to psychological health. Here underemployment is defined by the individuals responding to the survey as being in a 'stop-gap' job, perhaps similar to a subjective assessment of overeducation. However, it should be noted, that this study does not take into account any impact of low(er) income (from unemployment and underemployment) on well-being, which may have a modifying effect on the unhappiness of both graduate employment statuses – unemployment and underemployment - studied here. Are underemployed individuals relatively unhappy because of a lower income or is it because of the nature of their employment? The Cassidy and Wright study cannot make this distinction. The study is also limited by its small sample size (less than 250 individuals), and its focus on individuals who were students at just one UK university.

Another interesting study is Blazquez Cuesta and Budria (2011), which investigates the impact of personality traits on transitions into and out of jobs for which individuals were overeducated. They employ the realised matches method of measuring overeducation based on occupation category and find, using the German Socio-Economic Panel between 2000 and 2008, an 86-89% state dependence to overeducation, which means that 86-89% of individuals in the sample overeducated in one year are overeducated in the subsequent year. Given that the average age of the respondents is 41.5, it is unlikely that years of schooling will be changing for many of these individuals: what they are really measuring is transitions into and out of occupational categories. The authors find the persistence rate of overeducation to be

“remarkably large... [and that] only two percent of those who were not overeducated in one particular year are overeducated in the following year” (Blazquez Cuesta and Budria 2011, p.11). This seems to have little to do with overeducation per se, and more to do with people changing jobs and entering different occupations.¹ It appears that not many people do change jobs. Given the increase in participation in higher education in Western Nations like Germany, it is likely that their overeducation dummy is capturing to a large extent younger people. Our study, with its focus on the twenties does not face this problem of overeducation capturing the cohort change of increasing qualifications amongst the young. Whether the dummy simply captures this effect in the Blazquez and Cuesta study is unclear because little information is given about the breakdown of the overeducated in this study. Also, little information is given regarding the occupational categories and this is a major omission since the study is really about the transitions into different occupations (however they are measured), rather than transitions into and out of overeducation. Whether the persistence figures are ‘remarkably large’ or not depends on a comparison with typical rates of individuals changing their occupation category. It is not a claim that can be made without this information.

Fleming and Kerr (2005) use Australian data to investigate the relationship between overeducation and job satisfaction. They find some evidence that being overeducated in the labour market can lead to reduced job satisfaction (and lower productivity), although the implications for ‘whole of life’ satisfaction remain untested (until this study). Belfield (2000), in a survey, argues similarly, stating that ‘matched’ (i.e. neither over nor undereducated)

¹ This raises the additional possibility of promotion being a pathway out of overeducation. Due to the construction of the relative overeducation variable it is unlikely to be captured in this study, nor with the data used in this study, but it is a potential source of bias in capturing the happiness impact of overeducation. This is returned to in the methodological discussion. The author thanks Geoff Pugh for the initial suggestion and valuable discussions.

workers report significantly higher levels of job satisfaction than unmatched workers. Studies and surveys such as Veenhoven (1996) and Khattab and Fenton (2009), find evidence that, in some cases, the highly educated are less satisfied with life than individuals who are considered to have a medium level of education. The authors speculated that this negative association may have been due to a lack of available jobs at that level of education, and that perhaps unhappiness is also due to the aspirations or expectations-increasing nature of education (which are relatively unmet by the overeducated). Thus, being overeducated may have negative consequences for well-being, after controlling for income (and other standard controls). This presents the first hypothesis of this paper:

H1: Being overeducated is correlated with a lower level of happiness (*ceteris paribus*)

Given results elsewhere (including Piper 2012b, where evidence was found for a gender divide with respect to the effects of education), this hypothesis will be investigated for each gender separately. The next section discusses the data used and the reasons for the particular econometric approach utilised.

3 Data discussion and methodology

The hypothesis of lower life satisfaction for the relatively overeducated is investigated via a modification of the happiness function. Here a dummy variable for the relatively overeducated is included. Establishing the incidence of overeducation, in the first instance, follows the method of Groot (1996), the realised matches method: a comparison is made between an individual's education level and the average education level of their job, as demonstrated by one of nine broad occupational classifications. In addition to this, a refinement is made where the broad occupational category is combined with a broad industry

indicator to create eighty-one smaller reference groups. A further dummy variable was created which measures relative overeducation by both occupation and gender combined: on the basis that males may compare themselves primarily with other males and females with other females. In practice, the results from this addition are qualitatively the same as those for the dummies mentioned above, and as such are not discussed further. In each case, an individual is classed as overeducated if their level of education is more than one standard deviation above the average years of education for their peers (those in the twenties age range) in the same occupational group (or occupation-industry group for the alternative measurement).² This ‘realised matches’ approach gives, as the literature review above explains, the lowest incidence of overeducation of the various measures, thus being a more demanding criterion for assessing overeducation. Here this measurement is chosen for pragmatic reasons of data availability and is not without its problems. As Sloane et al. (1999) note, overeducation as measured by Groot does not account for the heterogeneity of jobs in the Standard Occupational Classifications, and the quality of education is difficult to take into consideration. Also education and overeducation, when measured by years of schooling, does not take into account the different levels of attainment that individuals have. The inclusion of an industry classification mitigates this first criticism somewhat, but not wholly so: the remaining categories will still contain heterogeneity in terms of the jobs individuals do. Also Groot’s analysis considered all ages as the comparator group so his overeducation variable may well have been picking up cohort effects: younger individuals have, on average, more years of education. Restricting the sample to the twenties age range means that the analysis in this investigation is relatively free from this objection. Piper (2012b) established this changing pattern of education over time, with a significantly higher percentage of younger people having higher qualifications than older individuals. With current large data sets, like

² The actual amount of years is quite varied dependent upon the reference group.

the BHPS, it is impossible to consider the potentially varying quality of education. Indeed, the analysis of this investigation shares the same difficulties that prevail in empirically assessing issues regarding education. Also, it is important to note that the two measures of overeducation (occupation, and occupation combined with industry) here do not cover the same years due to data availability. The industry data is incomplete in the BHPS, and this affects waves 16 and 17, reducing the amount of observations we can use.

The following table demonstrates the incidence of overeducation, i.e. individuals in their twenties who have more than one standard deviation more of education (captured by years of schooling) than the mean for their reference group. This tweak for the second reference group uses the 9 broad occupational groups of Groot (1996) (as in column 1) and combines them with 9 broad industry categories, forming 81 different groups (column 2), reducing somewhat reduces the effects of job heterogeneity. The reference group for each individual is now much smaller, and this is reflected in the table below with lower percentages of individuals being classed as overeducated. This is because the size of the group, in some cases, is quite small and no individual is classed as overeducated when measured by the standard deviation criteria.

Table 1 Incidence of overeducation in the BHPS, selected waves

Wave	Occupation only (1) Percent overeducated	Occupation and industry (2) Percent overeducated
1 (1991)	9.9	6.5
8 (1998)	19.7	14.0
15 (2005)	20.5	14.5
Overall (waves 1-15)	18.0	13.9

(Source: own calculations based on BHPS data 1991-2008)

The pattern here of increasing incidence of overeducation over time is consistent with increasing participation in higher education of young people, and an outcome we would expect to see in a nationally representative dataset like the BHPS. Interesting to note, too, that overeducation (which could be seen as under employment) is more prevalent than unemployment, affecting between 1.5 and 3 times as many individuals in this sample, depending upon how it is measured. The broad gender pattern for both measures is presented below: females have a lower incidence of overeducation than do males in the BHPS for both measures of overeducation, and the gender gap is larger under the second measure of overeducation. A partial explanation for this is that the categories used to create the second category become quite small, and this leads to no one being overeducated in some occupation-industry categories. For some categories, this is often especially so for females.

Table 2 Incidence of overeducation by gender

	Occupation only (1) Percent overeducated	Occupation and industry (2) Percent overeducated
All	18.2	10.7
Males	19.5	12.9
Females	17.0	8.9

(Source: own calculations based on BHPS data 1991-2008)

The breakdown by gender follows the overall categories with respect to the increasing incidence of overeducation over the duration of the dataset. This is as expected given the rising participation in higher education in the UK.

The descriptive averages for life satisfaction for the overeducated do not indicate any significant difference from the life satisfaction for the whole of the population. Average self-reported life satisfaction of individuals, in their twenties, who are overeducated when measured by the first category (occupation only) is 5.22, and for the second category (occupation and industry) it is 5.16, whereas it is 5.21 for the lifecycle as a whole (recall that

the scale is 1 to 7, with 7 being completely satisfied with life). This latter figure includes, of course, the unemployed and their life satisfaction responses are, on average, 4.6 which brings the whole sample average down.

The happiness function used here is similar to those of the wider empirical happiness literature, but with the addition of a dummy variable for overeducation. Ultimately we decide to estimate using a dynamic specification, hence the presence of the lagged dependent variable in the equation below.

$$LS_{it} = \alpha_0 + \alpha_1 LS_{it-1} + \alpha_2 educ_{it} + \alpha_3 inc_{it} + \alpha_4 overed_{it} + X_i' \beta + v_i + \epsilon_{it} \quad (7.1)$$

This happiness function is typical but with the addition of overeducation, and χ_i is a 1 x k vector of covariates and β is a k x 1 vector of parameters. v_i are the panel-level effects (which may be correlated with the covariates), and ϵ_{it} are independent and identically distributed over the whole sample. If the coefficient on overeducation (*overed*), α_4 , is both negative and statistically significant, the estimate provides evidence for the hypothesis that being overeducated (relative to your peers) is associated with reduced life satisfaction (after income, education and other controls are taken into account).

A footnote above suggested that a route out of overeducation could be to do with promotion. There are some occupations that are open to both graduates and non-graduates (policing, fire service, nursing and so on). While a graduate might initially be “overeducated” for the operational nature of the job, he or she might well have an advantage with respect to gaining rapid promotion. Such considerations could indicate a potential bias in estimating the happiness effect of overeducation. Graduates may, so to speak, invest by entering non-graduate occupations, trading off temporary “overeducation” for better prospects of rapid

promotion into jobs in which their education will be appropriately utilised , and in which they may have better pay and/or status than their similarly educated peers in “graduate” occupations. If such investment considerations are at all widespread then we have a group that while overeducated in the lower ranks, early on in a career, may nonetheless record high levels of happiness that reflect their feeling of having made a good investment (e.g. the graduate PC working with non-graduate PCs but with a good chance of fast tracking to Inspector). In this case, the larger this group the bigger the bias in estimates of the overeducation effect on happiness (i.e. in the aggregate, ceteris paribus, the overeducation effect will be underestimated).³

Given the data set used, it is not possible to control for such occupations – i.e. those open to both graduates and non-graduates; or, in general, to entrants with widely differing levels of education. Perhaps future studies, if they make use of very fine grained occupational data could implement such controls, and remove this potential source of bias. For this investigation, we note that the happiness effect of overeducation might be underestimated.

The discussion now turns to the appropriate model choice. For the overeducation regressions the null hypothesis of no first order serial correlation is strongly rejected ($p=0.0000$), hence a discussion has to be had regarding the best way to model these omitted dynamics. The remainder of the discussion in this section focuses on this. There are two main aspects that need to be considered with regards to the choice of model: is it statistically appropriate? Is the model informative regarding the investigation? The statistical aspect is returned to below. Regarding the second aspect, the relative overeducation dummies are arguably contemporary variables with contemporaneous relevance (being currently overeducated is likely to impact

³ This is particularly the case with the study here due to the restricted age range focus.

on current life satisfaction) and can perhaps be assessed via a dynamic panel model. A note of caution is that the independent dummy variables will reflect only new information. If these dummies are ‘quasi’ fixed, then perhaps some of the information that is interesting would be captured in the ‘black box’ of the lagged dependent variable. The following table, 3, shows the ‘within an individual’ variation, via the standard deviation measure, and demonstrates that individuals do move in and out of the overeducation categories. This indicates that there is enough variation in the dataset for useful analysis via fixed effects analysis or dynamic panel analysis. If the variation was negligible, then the modelling choice would be more limited. In the table the first measure of overeducation is based on occupation only; the second one is the advance which takes into consideration both occupation and industry combined. We are particularly interested in the standard deviation column, because these represent deviations from the individual’s average. The figures in these columns demonstrate considerable ‘within’ person change. People do move into and out of overeducation enough for there to be enough variation for analysis. This is also supported by a comparison of within and between variation for the overeducation variables (not shown): in both cases the ‘within’ variation is at least 80% of the ‘between’ variation.

Table 3 Variation of overeducation dummy variables, BHPS 1991-2008

Variable	Mean	Std. Dev.	Min	Max	Observations
overeducation (1)	0.182	0.228	-0.727	1.091	T-bar = 3.7
overeducation (2)	0.108	0.207	-0.801	1.017	T-bar = 3.7

Is dynamic panel modelling statistically appropriate? Some initial estimates were made to test this (output omitted, but discussed below in the results section) and the outcome is a qualified yes: in most variants the diagnostic tests, explored in detail in Piper (2012a), indicate that

dynamic panel analysis is statistically appropriate.⁴ Further support for dynamic panel analysis is offered by the model passing Bond's informal test: the coefficient on the lagged dependent variable obtained via the dynamic model lies between the OLS and the fixed effects estimates (which are biased upwards and biased downwards respectively) (Bond 2002). Thus, dynamic panel modelling is statistically appropriate here.

Last, dynamic panel analysis seems, *prima facie*, more appropriate here because relative overeducation is a contemporary status: an individual either is overeducated *now* or is not, and it is the impact on current life satisfaction that is of interest. Thus the independent dummy variable for overeducation is informative and so dynamic modelling is appropriate in terms of the likely information from the results. Thus the overeducation estimates will be modelled using the dynamic GMM procedures. A flow chart summarising the discussion regarding modelling omitted dynamics when the past history of the model has only a slight impact (as in BHPS happiness estimates) is presented in this study's conclusion.

4 Results

This subsection collects the results of the overeducation estimates. In the previous section it was argued that a dynamic panel model is the preferred model because (a) it can address the omitted dynamics present in the data and (b) relative overeducation is a contemporary state so its effects are likely to be captured by the independent variable rather than being wholly

⁴ Common factor restrictions need to be tested to see if the choice is a free one between modelling the dynamics in the observed part of the model or in the residual. See Piper 2012b for a detailed discussion of the common factor restriction tests. There the common factor restrictions held, and they do here too. This is perhaps unsurprising given the similarity of the happiness functions.

captured by the lagged dependent variable itself.⁵ The diagnostics regarding dynamic panel analysis, for these estimations, offer a free choice regarding instrumentation and lag length. The results presented here are from estimations that use ‘default instrumentation’, i.e. lags of t-2 and higher, but other instrumentation choices also support the results obtained here. Minimum instrumentation gives qualitatively the same results in all cases. The overall result is that relative overeducation for employed individuals in the twenties age range is associated with lower life satisfaction, after controlling for education itself, income, and other standard controls. However, this is a result that requires qualification. A first inspection suggests that this finding is for males only. The happiness of females does not appear to be associated with overeducation at all. Table 4 presents the results from overeducation when measured by occupation only. With the dynamic estimates, there are fewer observations than would be used by standard fixed effects analysis because the estimator requires consecutive lags of data.⁶ The columns represent all respondents, males only, and females only, respectively. In all cases, the standard errors are cluster robust to heteroscedasticity and arbitrary patterns of within-group correlation, and the estimation uses the twostep procedure.

⁵ Lagged independent variables were used, consistent with the non-rejection of the common factor restrictions; however, they were all insignificant and so were dropped from the final models.

⁶ The lack of the life satisfaction question in wave 11 of the BHPS is thus ‘doubly’ problematic for dynamic estimation.

Table 4 Life satisfaction and overeducation (measured by occupation), System GMM panel analysis, BHPS.

VARIABLES	All Life Satisfaction	Males only Life Satisfaction	Females only Life Satisfaction
Life satisfaction (t-1)	0.05** (0.023)	0.07** (0.028)	0.06* (0.032)
Years of Schooling	0.01 (0.009)	0.00 (0.012)	0.02* (0.014)
Income	-0.01 (0.067)	0.23*** (0.080)	-0.17* (0.095)
Overeducated	-0.11*** (0.037)	-0.10** (0.049)	-0.09* (0.056)
Married	0.38*** (0.074)	0.31*** (0.095)	0.30*** (0.108)
Separated	0.20 (0.396)	-0.83 (0.661)	0.49 (0.301)
Divorced	0.27 (0.243)	0.16 (0.330)	0.04 (0.227)
Widowed	-2.41*** (0.788)		-1.74*** (0.577)
Health: excellent	0.82*** (0.174)	0.33 (0.215)	1.24*** (0.196)
Health: good	0.36*** (0.141)	0.17 (0.201)	0.67*** (0.170)
Age 20-22	0.09 (0.053)	0.19*** (0.073)	-0.05 (0.072)
Age 23-24	0.06 (0.043)	0.07 (0.059)	0.02 (0.061)
Age 25-26	0.04 (0.033)	0.05 (0.047)	0.01 (0.047)
Wave dummies?	Yes	Yes	Yes
Region dummies?	Yes	Yes	Yes
Constant	4.33*** (0.186)	4.12*** (0.269)	4.18*** (0.258)
Observations	9,857	4,808	5,049
Number of individuals	3,872	1,868	2,004
Number of instruments	416	367	403

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

The table provides the first evidence of a negative relationship between overeducation and life satisfaction. Other things being equal, the relatively overeducated are less satisfied than those who are not considered overeducated. This finding is statistically significant at the 1% level for everyone, and at the 5% level for males separately. Restricting the sample to females does not result in such an association: the sign on the overeducation coefficient is negative but the p-value is approximately 0.09 and thus the estimated coefficient is not significant. For all the estimates in table 4, marriage, and excellent (and good) health are associated with higher life satisfaction; widowhood with lower. There are two slightly unusual results here: for males, health is insignificantly associated with life satisfaction and, for females, income has a negative coefficient. Perhaps the former result indicates that employed males in their twenties take their good or excellent health for granted. Though not significant at a 95% level, the negative coefficient on income for females is somewhat surprising and may indicate that a higher income reflects a more stressful job, a longer commuting time, and more time at work away from the family.

The coefficient on lagged life satisfaction, the lagged dependent variable, is highly statistically significant but very small. This is consistent with the results from Piper (2012a): past levels of life satisfaction have little to do with current life satisfaction. Happiness is very much a contemporary phenomenon. This small coefficient on the lagged dependent variable indicates that the long-run outcomes are not very different to the directly estimated coefficients of the model; long-run coefficients are calculated and included in the summary tables below.

The following table shows the long-run coefficient for relative overeducation. The long-run coefficient is calculated as in Wooldridge (2002). Given the low value of the lagged

dependent variable, it is no surprise that the long-run coefficients for overeducation are not too far from the short-run (or contemporaneous) coefficients estimated above.

Table 5 Long-run overeducation coefficients calculated from table 4

	All	Male	Female
Long-run overeducation coefficient	-0.116*** (p=0.003)	-0.110** (p=0.039)	-0.063 (p=0.228)

Regressions using the alternative measure of overeducation provide some support for individuals who are relatively overeducated reporting less satisfaction with life, other things being equal, and can be seen in table 6.⁷

⁷ The fewer waves that can be employed with this created reference group to measure overeducation (as explained above) explains the lower number of observations used for the estimations when compared to the number used in table 4.

Table 6 Life satisfaction and overeducation (measured by occupation and industry), System GMM panel analysis, BHPS

VARIABLES	All Life Satisfaction	Males only Life Satisfaction	Females only Life Satisfaction
Life satisfaction (t-1)	0.07*** (0.027)	0.05 (0.040)	0.11*** (0.041)
Years of Schooling	0.01 (0.009)	-0.00 (0.012)	0.01 (0.015)
Income	0.02 (0.084)	0.21** (0.101)	-0.05 (0.143)
Overeducated	-0.08* (0.042)	-0.11* (0.060)	-0.06 (0.063)
Married	0.40*** (0.090)	0.23* (0.123)	0.38*** (0.121)
Separated	0.12 (0.481)	-0.98 (0.700)	0.54 (0.413)
Divorced	0.40 (0.305)	0.43 (0.557)	0.11 (0.243)
Widowed	-2.20*** (0.739)		-1.86*** (0.644)
Health: excellent	0.58*** (0.220)	0.23 (0.229)	0.98*** (0.223)
Health: good	0.17 (0.181)	0.07 (0.183)	0.49** (0.191)
Age 20-22	0.13** (0.061)	0.20** (0.079)	0.03 (0.083)
Age 23-24	0.10** (0.049)	0.07 (0.064)	0.09 (0.070)
Age 25-26	0.09** (0.036)	0.08* (0.050)	0.05 (0.052)
Wave dummies?	Yes	Yes	Yes
Region dummies?	Yes	Yes	Yes
Constant	4.30*** (0.224)	4.33*** (0.336)	3.97*** (0.330)
Observations	7,744	3,832	2,912
Number of individuals	3,382	1,640	1,742
Number of instruments	301	270	292

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

The results in table 6, using the alternative measure of relative overeducation, offer some support the conclusions drawn from the occupation-only measure. The negative coefficient on overeducation is significant at a level just higher than 5%. Here, both genders in the sample together maintain the negative relationship of overeducation for life satisfaction. The

p-value for overeducation for everybody is 0.054, a result which falls to 0.053 when the long-run coefficient is calculated, as displayed in table 7. And for males, The p-value for overeducation is 0.059, a result which falls to 0.056 when the long-run coefficient is calculated. With this alternative measure relative overeducation is insignificant for life satisfaction for females, further supporting the analysis of the first measure of overeducation.

Table 7 Long-run overeducation coefficients calculated from table 6

	All	Male	Female
Long-run overeducation coefficient	-0.088* (p=0.053)	-0.118* (p=0.056)	-0.064 (p=0.359)

The results presented in these tables seem to present strong evidence that overeducation is associated with lower life satisfaction. The size of the negative coefficient, when measured by the combination of occupation and industry, is, for males, about half the size of the positive benefit associated with being married. For the first measure of overeducation, the negative overeducation effect is about a third of the size of the positive benefit associated with being married. This proportion is smaller for the negative result found for both genders together.

In summary, with both measures of overeducation used here, and for the whole sample, relative overeducation is negative and statistically significant at, or close to, the 5% level with life satisfaction. Thus, the hypothesis of a negative relationship between these two variables is supported. Again, the long-run coefficients for overeducation are not too far from the short-

run (or contemporaneous) coefficients. As explained in Piper (2012a), this is a reflection of the finding that happiness is largely a contemporary phenomenon. The results from the regressions that restrict the sample to each gender separately offer some support for this conclusion too, though at around the 5% level rather than a 1% level.

An open question, given the increase in the participation of individuals regarding higher education is whether this finding is consistent over time. This was investigated by splitting the data set into two time periods, and this particular analysis of the data suggests that there is a cohort effect: the negative impact of being relatively overeducated has an impact only in the earlier sample, and not the later sample. The two tables below present results from 1997-2000 (tables 8 and 9), and 2002-2007 (tables 10 and 11 respectively). This splits the dataset in two; remember that the life satisfaction question was not asked in wave 11, 2011, so this has been used as the breakpoint in the samples. The differences in the results for overeducation are striking, and suggestions why this might be the case are provided after the tables.

Table 8 Life satisfaction and overeducation (measured by occupation), System GMM panel analysis, BHPS 1997-2000

VARIABLES	All Life Satisfaction	Males only Life Satisfaction	Females only Life Satisfaction
Life satisfaction (t-1)	0.06* (0.034)	0.05 (0.058)	0.08 (0.053)
Years of Schooling	0.01 (0.015)	0.01 (0.018)	0.03 (0.023)
Income	-0.18 (0.134)	0.05 (0.155)	-0.28 (0.199)
Overeducated	-0.16** (0.061)	-0.18** (0.081)	-0.13 (0.092)
Married	0.49*** (0.115)	0.35** (0.145)	0.47*** (0.172)
Separated	0.08 (0.718)	-0.63 (0.578)	0.81 (0.692)
Divorced	0.36 (0.360)	0.35 (0.634)	0.22 (0.282)
Widowed	-3.39 (9.472)		-1.05 (6.609)
Health: excellent	0.54** (0.251)	0.06 (0.313)	1.13*** (0.266)
Health: good	-0.00 (0.194)	-0.12 (0.266)	0.41* (0.228)
Age 20-22	0.15* (0.087)	0.18* (0.107)	0.11 (0.123)
Age 23-24	0.13* (0.069)	0.03 (0.090)	0.19* (0.101)
Age 25-26	0.11** (0.051)	0.07 (0.067)	0.14* (0.081)
Wave dummies?	Yes	Yes	Yes
Region dummies?	Yes	Yes	Yes
Constant	4.65*** (0.736)	4.68*** (0.452)	4.104*** (0.912)
Observations	4,312	2,195	2,117
Number of individuals	2,089	1,041	1,048
Number of instruments	178	162	172

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Restricting the sample to 1997-2000 indicates that the relatively overeducated are significantly less satisfied with life than those who are not overeducated. This is the case

when the sample is restricted to males (at the 5% significance level) but not when restricted to females, a result consistent with the finding across the whole date range (table 4). As expected and as shown in table 9, the long-run overeducation coefficients are again similar to the independent variable coefficients for overeducation in table 8.

Table 9 Long-run overeducation coefficients calculated from table 8

	All	Male	Female
Long-run overeducation coefficient	-0.166** (p=0.011)	-0.185** (p=0.027)	-0.137 (p=0.167)

Restricting the sample to the later time period 2002-2007, as tables 10 and 11 show, indicates no statistically significant relationship between overeducation and life satisfaction. This general result is maintained when the sample is restricted to females, and also to males. Being overeducated seems to matter less (if at all) for satisfaction with life in this later period.

Table 10 Life satisfaction and overeducation (measured by occupation), System GMM panel analysis, BHPS 2002-2007

VARIABLES	All Life Satisfaction	Males only Life Satisfaction	Females only Life Satisfaction
Life satisfaction (t-1)	0.04 (0.028)	0.07** (0.035)	0.04 (0.047)
Years of Schooling	0.02 (0.011)	0.00 (0.017)	0.03* (0.017)
Income	-0.01 (0.081)	0.27** (0.107)	-0.21* (0.110)
Overeducated	-0.07 (0.046)	-0.08 (0.067)	-0.06 (0.065)
Married	0.30*** (0.095)	0.23* (0.126)	0.25* (0.132)
Separated	0.27 (0.379)	-1.30 (1.301)	0.28 (0.374)
Divorced	0.14 (0.307)	-0.26 (0.780)	-0.06 (0.331)
Widowed	-2.18*** (0.566)		-1.90*** (0.523)
Health: excellent	1.04*** (0.210)	0.50** (0.252)	1.29*** (0.269)
Health: good	0.59*** (0.174)	0.44* (0.243)	0.78*** (0.231)
Age 20-22	0.01 (0.067)	0.17* (0.103)	-0.16* (0.088)
Age 23-24	-0.01 (0.055)	0.05 (0.084)	-0.10 (0.072)
Age 25-26	-0.04 (0.043)	0.01 (0.067)	-0.09 (0.059)
Wave dummies?	Yes	Yes	Yes
Region dummies?	Yes	Yes	Yes
Constant	4.15*** (0.222)	3.899*** (0.315)	4.28*** (0.326)
Observations	5,545	2,613	2,932
Number of individuals	2,342	1,096	1,246
Number of instruments	261	228	254

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Again, the equivalent long-run coefficients are very similar. As table 11 shows, being relatively overeducated is not significantly associated with life satisfaction between 2002 and 2007.

Table 11 Long-run overeducation coefficients calculated from table 10

	All	Male	Female
Long-run overeducation coefficient	-0.072 (p=0.136)	-0.088 (p=0.220)	-0.053 (p=0.664)

This broad finding is supported with regressions making use of the alternative measure of overeducation: the results for 1997-2000 (not shown) are very similar, with the negative relationship being significant at the 5% level for both males and the whole sample (i.e. both genders), and statistically insignificant for females. For the later years, 2002-2007, the results for all three groups are insignificant, although the p-value for the whole sample is 0.059.

These alternative results are slightly different from those presented above, but support the broad finding that the negative influence of overeducation on life satisfaction has faded over time. While we do not have a reason for this, we speculate that it is a function of increased participation in higher education, and changing expectations. Perhaps students appreciate that as more individuals undertake higher education, a degree is not enough to get a good job (Adnett and Slack, 2007). Perhaps this result reflects a changing norm regarding what is a graduate job too. Also, with more individuals attending university there is perhaps less of a cultural stigma to not being adequately rewarded in the labour market. More people, perhaps, know other people who have a degree but do not (as yet) have a graduate job. Thus the relatively overeducated are less unusual. This suggestion is similar to a finding in the

unemployment and unhappiness literature, where being unemployed in a region, with more unemployed people is less damaging to life satisfaction than being in a region with fewer unemployed individuals (Clark 2003). This speculation, if true, provides more support for life satisfaction having strong relative elements: which groups we compare ourselves with and how we compare to others both matter for subjective well-being.

Extensions to the above analysis were undertaken by interacting overeducation with income and overeducation with education. The education interaction did not result in any additional significant difference between the overeducated and the rest of the employed individuals (output omitted), whereas the income-overeducation interaction generated some interesting differences. Below, in table 12, a summary is presented of the interaction terms for the whole sample used above which includes both genders and the full date range. Column (a) is the results from the regressions discussed in Section 4, and column (b) is the same estimation but with the inclusion of the interaction term.⁸

Table 12 Effects of interacting income and overeducation, System GMM panel analysis, BHPS 1996-2007

	a	B
Income	-0.013 p=0.851	-0.003 p=0.970
Overeducation	-0.11 p=0.003	-0.288 p=0.012
Income.overeducation	-----	0.148 p =0.047

Overeducation preserves its negative impact on life satisfaction, and income is still insignificantly associated with life satisfaction. However the last row of the B column demonstrates that, for the overeducated income is positively associated with life satisfaction.

⁸ Tests for the joint significance of overeducation and the interaction term demonstrated that they are jointly significant when they are individually significant throughout the estimates of this further extensions section.

Income appears to mitigate somewhat the reduced life satisfaction of being overeducated: the interaction between income and overeducation results in a positive coefficient approximately half the size of the negative effect of being overeducated. This finding, based on just the first estimate above (the left column of table 4) is supported by many of the comparisons made with the other estimates. The next two tables present the results for both genders together in the earlier period (1997-2000) and the later period (2002-2007).

Table 13 Effects of interacting income and overeducation, System GMM panel analysis, BHPS 1997-2000, and 2002-2007

1997-2000	a	b
Income	-0.180 p=0.180	-0.234 p=0.135
Overeducation	-0.156 p=0.011	-0.550 p=0.007
Income.overeducation		0.333 p=0.022

2002-2007	a	B
Income	-0.007 p=0.932	0.030 p=0.750
Overeducation	-0.069 p=0.137	-0.175 p=0.199
Income.overeducation		0.089 p=0.281

The 1997-2000 results support the main results: positive income effects partly offset negative overeducation effects in the earlier period as well as in the whole sample period (table 12).

Like the main results, in table 3, there is no such effect in the later period. For males, the income-overeducation interaction term is not statistically significant in any of the three age ranges indicating no difference between the overeducated and the rest of the employed individuals in the sample with respect to the effect of income (output omitted). For females,

the results are interesting. The three tables are below, starting with the full date range sample before the earlier period (1997-2000) and the later period (2002-2007).

Table 14 Effects of interacting income and overeducation, System GMM panel analysis, Females only, BHPS 1996-2007, 1997-2000, and 2002-2007

	a	B
Income	-0.165 p=0.083	-0.189 p=0.037
Overeducation	-0.094 p=0.091	-0.470 p=0.000
Income.overeducation		0.333 0.000

1997-2000	a	B
Income	-0.280 p=0.159	0.281 p=0.143
Overeducation	-0.127 p=0.167	-0.484 p=0.038
Income.overeducation		0.361 p=0.041

2002-2007	a	B
Income	-0.210 p=0.056	-0.251 p=0.011
Overeducation	-0.057 p=0.376	-0.491 p=0.001
		0.343 p=0.000

For all three estimates, the inclusion of the income-overeducation interaction term results in a statistically significant (sometimes highly so) and negative effect of overeducation on well-being. Like the results presented above, income appears to attenuate this negative effect of overeducation. In the latter period, as well as the overall range, the effect of income for females is (*ceteris paribus*) negative when the interaction term is included. Like before, this may reflect more time away from the family (longer hours at work, more commuting time) as

well as a stressful job at higher levels of income. Future research could investigate these possibilities and explore potential happiness-income trade-offs, conditional on other mediated effects.

5 Conclusion

This investigation has presented the first evidence of a negative association between relative overeducation and life satisfaction, and this was found via an appropriate econometric method. Serial correlation is present in the data, and this needs to be thoughtfully modelled. The method chosen needs to be appropriate, both statistically and economically and it must also be able to give informative results. Careful thought was given before deciding to model the overeducation-happiness relationship via dynamic panel methods and the results demonstrate that there is a negative impact of overeducation in terms of happiness. This result is robust to both the method of measuring relative overeducation, and the choice of instrumentation of the lagged dependent variable within the preferred dynamic panel method. This result adds to other results within the happiness literature which suggest that happiness is, often, based on relative concerns. Further analysis, however, suggests that this phenomenon is one that has faded with time, being more prevalent in the past when, we speculate, there may have been a greater stigma associated with education not being rewarded in the labour market. That there are more people who are considered overeducated, perhaps means that being relatively overeducated no longer makes people unhappy. Maybe, with rising participation in HE, the perception has come to be that HE is a necessary but not a sufficient condition for a “graduate” job? If, in the past, HE was perceived as sufficient, then non-achievement of a graduate job may have been more likely to have been a source of unhappiness. Future research may analyse why and whether this is the case.

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