Vertical occupational mobility and its measurement

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ABSTRACT

This paper sets describes a number of alternative approaches to devising a vertical occupational scale and compares the outcomes of different scales on calculations of occupational mobility. The paper describes the conceptual issues relevant to calculating occupational mobility and documents the measurement error embedded in the choice of measure, as applied to different data sets. The ranking schemes used include SOC (9) major codes ranked by mean occupational hourly earnings, Hope-Goldthorpe collapsed 36-point scores, a 15-category SOC ranking based on educational qualifications, and a 77 category ranking based on 2-digit SOC90 occupations, wage rates, educational qualifications, training and job tenure. These ranking schemes are applied to data from the 1958 NCDS cohort between the ages of 23 to 33 and 33 to 42, and to 1.25 year transitions in the Quarterly Labour Force Survey panel data. The calculations carried out show that variations in the extent of vertical occupational mobility, both upward and downward, had systematic elements. The extent of mobility was found to vary by the composition of the individuals' data particularly in terms of lifecourse stages and gender, the number of categories in the ranking scheme, attrition in the data and flows out of employment over the mobility period, and changes in labour market conditions over time. However, the sizes of these effects were very variable.

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1.Introduction

The extent of occupational mobility is of relevance to a wide range of social science topics. It is at the heart of how the labour market works as well as being important for understanding individual career development, occupational attainment, social (class) mobility, both inter- and intra-generational movements. Mobility is also crucial for understanding inequalities and social exclusion for social gender, ethnicity, age or income groups. Whether or not some groups make advantageous movements between jobs at the same rates as others, will affect their relative labour market or social class positions and status. This paper's primary interest is in mobility between jobs rather than between social class positions, although these concerns overlap since they both require accurate measures, and in fact the same scales have been used in research calculations of both of these broad types of mobility. Studies have taken a varied amount of effort when investigating vertical occupational mobility and devising mobility measures. We will describe such methods in this paper. We find that important questions arise: Can we compare the outputs from studies which use vastly different measuring instruments? Do studies reach similar conclusions if they use different measuring instruments?

In the existing literature there have been few considerations of the implications of choosing a particular measurement scale for the conclusions reached. This paper's contribution to the existing literature therefore is to compare the extent of vertical occupational mobility for gender groups over time and across the lifecourse using different methods for ranking occupations. Consequently, the paper will help to document the degree of measurement error embedded in the choice of measure as applied to different data sets.

The paper proceeds as follows. We first outline some of the methods used to devise occupational rankings which are then used to measure vertical occupational mobility (Section 2). This includes an examination of the implied hierarchies of some of the well-know occupational coding schemes to see whether they can justifiably be used as a shorthand route to a vertical occupational mobility scale. In Section 3, we consider the conceptual issues that need at least a practical resolution in order to progress the aim of measuring vertical occupational mobility. The data we use are described in Section 4. In Section 5, we examine the rankings produced by varying some of the parameters in the construction of the scales. The outcome measures of occupational mobility associated

with these variations are described and discussed in Section 6, and Section 7 presents our conclusions.

2. Methods of ranking occupations

Investigations of occupational mobility are primarily interested in whether individuals or groups have acquired better (or worse) jobs over time. A number of ways have been used to try to capture the ranking between jobs that this exercise requires. They use a range of objective and subjective elements, all having some limitations. Varying degrees of effort have been put into devising these measurement scales. At the minimum effort end of the spectrum, researchers have simply taken the implied hierarchy embedded in one of the standard occupational coding schemes as their scale of vertical occupational mobility, often aggregated to relatively few categories for pragmatic reasons, most commonly in order to generate adequate sample sizes in categories for analysis (Heitmueller, 2004; Evans, 1999; Smeaton, 2006). Probably the most effort has been expended in devising a suitable occupational scale, outside of government, in the case of the Oxford Social Mobility study which created the Hope-Goldthorpe scale (Goldthorpe and Hope, 1974) and its subsequent elaborations (Erikson and Goldthorpe, 1992).

Standard occupational coding schemes

Most of the standard occupational classification (SOC) schemes do have an implied hierarchy built into their classification. The 1990 SOC, for example, groups together occupations with reference to the nature of the work activities and:

*'the similarities of qualifications, training, skills and exp*erience associated with competent performance of the work activities involved' (OPCS, 1990).

When aggregated up to 9 SOC major code levels (see Table 1), there is an approximate implicit hierarchy and ranking with the corporate managers being at the top and 'other elementary occupations' or unskilled being at the bottom. Using the SOC major level provides a rough and easy ranking, but if one starts to look into the detail below the surface of the major codes, it starts to look less satisfactory. For example, in the top category there are small shop owners along side corporate (global) managers. This top code 1 group 'managers' is placed higher than professionals, which includes lawyers and medics who have spent years in training. Using a finer level (2 or 3 digit) SOC coding

level does not eliminate this problem. The SOC 2000 classification (Beerton et al, 2001) rectified some of the grouping problems as well as incorporating new occupations.[1] However, aggregation across a wide range of occupations remains a problem in using SOC groups alone for the vertical ranking. One option then is to add another criterion to the existing SOC codes, and see if it is possible to juggle them around into a more intuitively satisfactory ranked order. The most common alternative criterion is to use occupational pay rates to rank occupation categories. Mean educational entry requirements of each occupation have also been used as well as combination of these criteria. Approaches which use a combination of criteria are discussed further below. However, some researchers merely add their own ideas without any justification (Smeaton, 2006).

Other occupational classification systems have been devised specifically to provide a hierarchy of social prestige, more akin to a social class scale. The development of the social prestige ranking of occupations in the Cambridge Scale (Stewart et al, 1980) used the occupational classifications of friends of individuals as well as their own occupation to help classify a set of socially stratified occupations. The Hope-Goldthorpe (H-G) scale is another social prestige classification system (Goldthorpe and Hope, 1978), measuring occupational prestige and containing 124 categories arranged in a sequential rank with numbers from the highest, 82.05 (self employed doctors, lawyers and accountants) to the lowest, 17.52, (street vendors and jobbing gardeners).[2] There is a well-established collapsed version of the H-G scale into 36 sub groups. However, some of the H-G scores given to these 36 groups are the same; which means that the effect number of categories is 24 for this collapsed version. Evans (1999) and Jacobs (1999) both used the Hope-Goldthorpe scale to create a time series of proportions of men's occupational upgrading and downgrading; in Evans's case, he used the 36-point version of the scale but collapsed to 6 broad categories and his data were from 1986 to 1992, the main aim being to investigate the relationship of individuals' occupational statuses to fluctuations in the business cycle and focusing on those who changed job year on year; Jacobs analysed

[1] SOC 2000 main changes compared with SOC 1990 included: a tighter definition of managerial occupations; moving many job titles between major groups to reflect the repositioning of certain jobs; adding new occupations in the fields of computing, environment and conservation; recognition of the development of customer service occupations through remote service provision in call centres; and changes linked to the upgrading of skills and the deskilling of manufacturing processes. (Beerten, 2001, p.358).

[2] The expressed intentions of the H-G scale was 'to construct a scale, which we would interpret as a measure of "general desirability" of occupations, on which occupations of all economically active men could be projected with some small, uniform, and estimable degree of error (Hope and Goldthorpe, 1974, p.22)

gender differences in occupational attainment using the retrospective histories in the 1986 SCELI data using the full range of the Hope-Goldthorpe scale.[3]

The National Statistics Socio-economic Classification (NS-SEC) was developed from the Erikson and Goldthorpe (1992) version of the H-G scale. The NS-SEC aims to differentiate positions within labour markets and production units in terms of their typical 'employment relations' that is, different labour market situations and work situations. Labour market situation equates to source of income, economic security and prospects of economic advancement. Work situation refers primarily to location in systems of authority and control at work, although degree of autonomy at work is a secondary aspect (Rose and O'Reilly, 1997, 1998). The NS-SEC's main envisaged use is at the high level of aggregation to study broad social class groupings.

Huge amounts of effort have been invested in developing all of the official government occupation coding schemes, the Hope-Goldthorpe occupational scale and the NS-SEC scale. The Hope-Goldthorpe and NS-SEC scales were both subjected to a very large validation exercise. However, the Hope-Goldthorpe scale was devised using men's occupations and has been criticised for this reason, where applications to women's occupations are concerned. The fact that it is so detailed in nature means that this is less of a problem than more aggregate scales that have combined occupations held predominantly by women into just a few categories. However, the problem of whose occupations a particular ranking scheme represents is not unique to the Hope-Goldthorpe scale but applies to others as well.

Hourly pay and occupation

One simple and clear way to judge a 'better job' is to examine the (mean) hourly wage rate of the occupation and say that an increase in hourly wage rate (after allowing for cost of living rises) is an improvement, and vice versa to define a worse job. There are several ways to do this calculation. One method uses the research data to create the mean hourly wage per occupation and ranks occupations according to its size (Joshi, 1984). Calculations of occupational mobility are then based on the proportion of individuals that move from one occupational rank to another. An alternative method uses an external data source to calculate the mean occupational wage which is then imported into the research data,. Individuals are allocated the mean hourly wage for the occupation they

[3] SCELI was the ESRC's Social Change and Economic Life Initiative, collecting data on 1000 individuals from each of 6 British towns which included their retrospective employment histories.

hold. It is then possible to assume all movements between occupations, say from *y* to *x* *($W_x > W_y$)*, can be represented as an average wage increase (or decrease) of $W_x - W_y$ (see Nickell, 1982; Stewart, 1983; Manning and Petrongola, 2006).

One problem associated with this method of ranking is that some jobs pay a premium for additional risk, or compensate for some other unpleasant elements eg. shift work or dangerous working conditions. These factors will be embedded in the initial hourly wage at time *t*. These factors will also potentially affect the conclusions about moves undertaken by time *t+1*. So for example, a move from a dangerous job (or full-time job) at time *t*, containing some premium element, to a non-dangerous job (or part-time job) at time *t+1* would be likely to be associated with a decrease in hourly pay. However, this would not signal, necessarily, a downward occupational move. Whether employees work part time is included here as a problem since a part-time wage penalty is a well documented phenomenon in the UK (Paci and Joshi, 1998; Manning and Petrongolo, 2004).

A further problem arises when calculating hourly wage rates in that there can be measurement error. The collection of earnings and hours data are often knowingly imprecise. It is quite common for government surveys to collect gross pay including overtime pay, but not necessarily have a clear data collection on how many hours of paid overtime was worked or the rate at which over time was paid. This is done in many surveys either because of insufficient time for collection, space in the questionnaire, or because respondents are not thought to be able to offer precise information about their pay with and without overtime payments. The lack of all these details means that the calculation of hourly wages regularly contains measurement error which will be highly likely to vary by occupation. Jobs involving either regular or occasional paid overtime will be subject to more of these errors than jobs without any paid overtime.

Another limitation of using pay to rank jobs is that it fails to take account of educational qualifications that are embedded in many jobs, as well as the additional prestige or 'better job' feel this gives some occupations, even where the pay does not always reflect this. Examples includes nurses, social workers or teachers since these jobs involve some altruistic pay off. Jobs with social hours and no overtime may be valued more highly than jobs involving nights or shift work. Hence individuals may exhibit attachments to certain occupations even when the pay is not as high as other jobs because they think of them

as better jobs (eg. women's attachment to some sorts of white collar clerical work compared with more manual jobs that pay more). Nickell's (1982) much cited paper on measuring occupational success starts our recognising the relevance to individuals of their occupation although then indicates an unequivocal preference for analysing only (average occupational) wage rates.[4]

In summary, pay is a vitally important element of utility acquired from jobs as well as their ranking, but pay on its own, although objective as a cardinal measure, is probably an insufficient criterion for ranking occupations in order to examine occupational mobility. Moreover, this method provides an insufficient approach when deciding whether the labour market is allocating qualifications and skills efficiently.

Ranking by educational qualifications

One approach which goes beyond the sole reliance on pay is to include other elements in the ranking. Educational qualifications are the most obvious additional criteria, and this has been used by Connolly and Gregory (2006) to rank women's occupations (see Appendix Table A1 below for the list of their categories using SOC1990 codes). The occupational rankings derived from this approach have much to commend them, especially if the aim is to examine mobility for one gender group, as Connolly and Gregory do. However, when the aim is to compare male and female occupational mobility further issues arise as we describe in the following section (3).

Ranking by human capital and hourly pay

A more refined approach to ranking occupations which uses occupation codes plus pay and educational qualifications was used by Sicherman and Galor (1990). They calculated an occupational index derived from a wage equation of the type described below where the log of individual *i*'s hourly wage in their current occupation *j* is given by:

$$LnW_{it} = \beta\ X_{it} + \alpha\ Ed_i + \gamma\ EXPERIENCE_{it} + \delta\ TENURE_{it} + \mu\ TRAIN_{it} + \varepsilon_{it} \qquad (1)$$

[4] Nickell (1982) says: '…to know a man's occupation is to know a great deal about him. It provides information about his health, his use of language, his taste in food, clothes, cars, his general well-being and his position in society'. (p.42). Later he says: 'we feel that a scale with some pretentions to cardinality is preferable' (p.43) and of the measure used '..occupational success simply means working in an occupation with a relatively high level of hourly pay' (p.43). This means that an individual is credited with some benefit even if they do not receive this high pay themselves. One is tempted to wonder what benefit cardinality had brought to such an individual.

Where X_{it} is a vector of observed characteristics of individual *i* working in occupation *j* at time *t*; Ed_i is the level of educational qualifications of individual *i* and $EXPERIENCE_{it}$ their level of employment experience before the person entered their current occupation j at time *t*; $TENURE_{it}$ is the individual's length of time in their current job at time *t* and $TRAIN_{it}$ the amount of training the employee received in order to be fully qualified in their current occupation. The error term is ε_{it}.

An occupational ranking is derived by averaging over occupation for 3 of these independent variables; namely educational qualifications *Ed*, labour market experience prior to entry in the occupation, *EXPERIENCE,* and *TRAIN*, the amount of training needed to be able to perform the job. The mean values for occupation j of Ed_j, $EXPERIENCE_j$ and $TRAIN_j$ are then weighted using the coefficients estimated from equation (1) as follows:

For any of the k occupations, j, its occupational index OI_j, where j=1, …, k is as follows:

$$OI_j = \alpha \overline{Ed_j} + \gamma \overline{EXPERIENCE_j} + \mu \overline{TRAIN_j} \qquad (2)$$

This Index can provide an occupational ranking in descending order according to its value. Hence higher values of OI_j are ranked higher up. It is possible to add more independent variables into the estimation and therefore into the index. A version of this index was created for use in this paper using Quarterly Labour Force Survey data and variables that were as close as possible to the ones outlined in Sicherman and Galor (see Appendix Tables A6 and A7 for the details). We refer to this ranking in the rest of the paper as the 'S-G' index, for brevity.

As Sicherman and Galor pointed out, this index has the limitation that it under-ranks occupations that are obtained through unobserved investments, for example, taking initiative or dedication to the job. It over-ranks occupations containing low quality workers, relative to their observed characteristics.

Subjective rankings

Whereas the wage rate method of ranking jobs leaves out how people feel about their jobs, a fifth approach would be to use a subjective measure. This method places sole or very heavy reliance on subjective views, say whether the individual concerned viewed

their change in occupation as moving to a 'better' (or worse or the same) ranked job. This approach is accepted as a way of determining whether someone works part time in many surveys.[5] Alternatively, a sample of individuals could be asked to rank a set of occupations. However, this latter approach would almost certainly fail to produce a consensus and some compromises would have to occur through an aggregation process. Such approaches are not regularly used to produce occupational rankings, not least because the available data rarely if ever offer such views. While there are few actual cases of subjective rankings, there are certainly advocates, building on Bourdieu's (1985) analysis, of using subjective rankings for social class analyses to capture elements of cultural and symbolic class differences instead of focussing narrowly on economic occupation rankings (see Bottero, 2005). The development of the Cambridge Scale, offering a hierarchical measure of stratification by ordering occupations on the basis of social similarity and the extent of social interaction comes arguably uses subjective elements in its ranking scheme (Prandy, 1999). Also, the construction of the Hope-Goldthorpe scale did include a subjective element by incorporating popular opinion about occupations.

Rankings based on worker's behaviour

A final method, used previously by one of the authors, (Dex, 1987), is to derive an occupational ranking, in part, by investigating the actual mobility of individuals. The set of 12 occupational codes used were those specially devised for the 1980 Women and Employment Survey (WES) data collection.[6] The identification of the ranking rests on the assumption if that workers can move easily between certain jobs, backwards and forwards, their entry qualification levels must be fairly similar and their occupational ranking similar therefore.[7] This may sound more like an occupational ranking system built

[5] In practice, self classification of part time vary from hours classifications when compared individual for individual, but analyses based on these two alternative definitions of part time rarely vary in their main conclusions.

[6] The WES survey devised its own 12 category occupational codes which were linked to the standard Socio-Economic Group categories current in 1980, but some categories were divided in order to avoid women being concentrated in only a few occupation categories. The set of 12 codes was not entirely satisfactory although judged better than other codes of the time for analysing women's occupations. It had the benefit that it made more distinctions between jobs held by women that the official codes of the day, but it still grouped together some occupations which should have been separated; for example, auxiliary nurses with fully trained and qualified nurses; and specialised secretarial work and PAs with lower grade clerical work.

[7] Dex (1987) found that there was considerable mobility over the working lives of these women between semi-skilled domestic jobs, other semi-skilled job, shop assistant work, child care work and other unskilled work. Such movements were clearly visible in a matrix of all job movements ever undertaken (Dex, 1987, Table A2.2, p.135) from which it was concluded that these lower level jobs were highly substitutable. Women seemed to move between them backwards and forwards without any constraints, presumably

on a tautology, but it contains some additional features. Several tests were carried out of the ranking Dex (1987) produced by this method. The mean occupational wage rates confirmed the ordering of the ranking (Joshi, 1984). In addition, Dex (1987) found qualitative material from other published studies showing women had attachments to the occupations that corresponded with her empirical profiles. This method, while being rooted in individuals' behaviours, occupational attachments and their own occupational rankings, does not lend itself to comparisons of occupational mobility across groups, gender groups in particular. However, it does have the benefit that it used all occupations held by (or reported by) individuals and was not restricted merely to occupations held at only some cross-sectional points.

In summary, a range of earlier occupational ranking schemes have been developed and used. Many have some element of disadvantage. It seems vitally important therefore, to understand the implications of choosing one approach over another. Several earlier authors make reference to high correlations between their own and other ranking schemes, although rarely are calculations performed to see the extent of difference use of another scale would make to the mobility.[8] An initial attempt was made for this paper to compare the amounts of occupational mobility cited in published studies using different scales. This proved to be largely impossible since the scales were used for different purposes, and applied in different ways to varying sub populations (Table 1). The closest comparison is from Connolly and Gregory, as well as Hietmuller who calculated occupational mobility for the subset of full-time employed women who changed jobs in a year (relevant rows highlighted in bold in Table 1). Gregory and Connolly average such moves over a 10 year period compared with a one year transition only in Hietmuller's case, and the two rankings use different numbers of occupational categories. The study

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because there was little training or qualifications required. Dex (1987) called this a semi-skilled occupational profile. This contrasted with a clerical profile and a skilled (manual) or semi-skilled factory profile as well as the higher level occupation code profiles (professional, teacher and nurse), in that women seemed more attached to these jobs as a vocation, rather than a job. Movement between these better jobs was far less, and upward moves certainly very small. However, at key lifestage points, most notably child birth, systematic movement out of the higher jobs was evident in a downwards direction; for example teachers, nurses and those in intermediate non-manual jobs moved down, after childbirth, into clerical, semi-skilled or unskilled work. Multivariate analysis found these downward moves were more likely where women returned to a part-time job after childbirth or took longer time out of work. However, many women experiencing downward occupational moves later returned to their earlier (higher) occupation, further exhibiting their attachment to it as a career choice.

[8] Nickell (1982) and Stewart (1983) both refer to Phelps Brown's (reference?) finding that an occupational scale based on mean hourly earnings was highly correlated with the Hope-Goldthorpe ranking. Sicherman and Galor (1990) also claim a high correlation between their own and two other US prestige status scales that is, Duncan's socio-economic status index and the NORC occupational prestige index. Evans (1999) claims to have checked the impact of changing the ranking scheme but does not give any information about his findings.

with the larger number of (15) categories (Connolly and Gregory) finds that rates of both upward and downward mobility are higher than using 5 categories (Heitmuller) by 8.5 percentages points higher for upward mobility and 3.3 percentage points higher in the case of downward mobility. However, there are other differences between the approaches in addition to using different numbers of categories which might affect the calculation. These are among a range of conceptual and practical issues that have to be considered in choosing a measure of vertical occupational mobility as discussed in the next section (3).

3. Conceptual issues for measurement.

Measuring the extent of vertical occupational mobility generates a series of conceptual and practical issues for researchers. Many jobs have established pay scales which change over the lifecycle and job tenure of individuals who continue to hold them; this creates an issue for the `ranking by average pay' approach. It is arguable whether an incremental (annual) jump on an established pay scale, of the sort that is common in the public sector, represents a 'better job'. If there are normal expected paths over which the pay of certain occupations grows this poses another question: Should any measure of occupational mobility only recognise movements that are over and above (or under) the expected or average path for that particular occupation? If it were possible to calculate the average growth path for that occupation, then it probably would be a good idea to examine significantly over or under performance against this average. There would of course be a need to define what counts as over- or under- performance and this would be an ad hoc component. In practice it is difficult to chart the wage growth of occupations across the lifecourse for all occupations, especially if they are finely distinguished (eg. certainly at the 3 digit level and possibly also even at the 2 digit level). Also, given that occupation categories aggregate across a number of occupations, deviations from such occupational growth curves may be difficult to interpret. Clearly some jobs progress by changing their occupation codes, for example, the common cases where career movement into management offers higher remuneration than exercising a technical skill (eg. engineer); while others progress by staying in one occupational code (eg. teacher, lawyer).

Changes in pay over the lifecourse raise another problem for deriving a ranking. For example, it is well established that jobs that require little training can often offer new

school leavers a higher or at least equal rate of pay to the entry level pay of jobs requiring longer periods of full-time education, although the pay of the high qualification job soon rises at steeper rates to cut across the wage profile of the low qualification job (Mincer, 1974). A pay-based ranking based on young workers, therefore, would put some lower skilled jobs above higher skilled jobs. Similarly, using middle-aged workers' wages may well produce a different ranking from younger or older workers' wages. Age-earnings profiles are mostly parabolic in shape and start to decline at older ages, but at different rates, and varying by gender, (Elias and Gregory, 1994). This leads us to formulate the following hypothesis:

Hypothesis 1: Variation over the lifecourse. We expect that vertical occupational rankings based on earnings will also vary over the lifecourse. Whether this leads to differences in the calculations of the extent of occupational mobility is more difficult to predict.

There is another issue related to the nature of the data used when devising an occupational scale. If researchers use their own (research) data, they presumably must be sure they have data on occupations (and wage rates and educational information) from a representative sample of the workforce. If the researcher's own data were unrepresentative, this would tend to produce an unrepresentative ranking scheme, and bias the conclusions on the amount of vertical occupational mobility. Consequently, data from sub-samples of the population, which are restricted to certain groups eg. parents, or by age in the case of birth cohorts may be problematic for producing a vertical scale of occupations.

Table 1. Summary of selected calculations of occupational mobility

Authors	Data	Dates	Sample	Mobility period & N categories	% up occ	% no change	%down occ	Total% (N)
Nickell (1982)	National Training Survey (1975) plus retrospective history	1965-1975	Men 16-64,	1965-75, yearly. 396 KOS occupations. ranked using mean hourly occupational wage	DK.	DK	DK	(16,035)
Evans (1999)	LFS annual cross-section data – plus retrospective occupation one year earlier.	1986-1992	Men 20-60 changed job year on year	One year. 6 broad categories from Hope- Goldthorpe 36	NA*	27.5*	45.8*	100% - Includes job less (26.7%)
Connolly &Gregory, (2006)	New Earnings Survey panel	1991-2001	Women	1 year 15 occ categories ranked by ed quals	6.9	87.6	5.5	100% (602,521)
Connolly&Gregory (2006)	New Earnings Survey panel	1991-2001	Women New employer	1 year 15 occ categories	27.1	51.2	21.8	100% (93,094)
Connolly&Gregory (2006)	New Earnings Survey panel	1991-2001	Women Same employer	1 year 15 occ categories	3.2	94.3	2.6	100% (509,427)
Connolly &Gregory(2006)	**New Earnings Survey panel**	**1991-2001**	**FT Women New employer**	**1 year 15 occ categories**	**26.0**	**55.4**	**18.6**	**100% (46,492)**
Heitmuller, (2004)	BHPS England and Scotland	1999-2000	FT MEN 16-64 Job changers	1 year 5 occ categories	19.1	61.7	19.2	100% (635)
Heitmuller, (2004)	**BHPS England and Scotland**	**1999-2000**	**FT WOMEN 16-64 Job changers**	**1 year 5 occ categories**	**17.5**	**67.2**	**15.3**	**100% (464)**
Sicherman &Galor (1990)	USA- PSID	1976-1981	Male Head of household	1 year 25 categories	DK	DK	DK	
Johnes (2006)	BHPS 13 waves	1991-2003	Women	1 year Hope-Goldthorpe 36 (24)	NA	77.6 ***	16.1	100% (13063) (includes jobless 6.3%)
Johnes (2006)	BHPS 13 waves	1991-2003	Men	1 year Hope-Goldthorpe 36 (24)	NA	74.1 ***	17.5	100% (17701) (includes jobless 8.4%)
Johnes (2006)	BHPS 13 waves	1991-2003	Women over childbirth	1 year Hope-Goldthorpe 36 (24)	NA	60.3 ***	15.9	100% (922) (includes jobless 23.8%)
Smeaton (2006)	NCDS and BCS cohorts up to age 30	Up to 1988 NCDS, 2000BCS	Women over first childbirth by age 30	First ever return occupation. SOC major 9 cats –no rank criteria	NA	64 NCDS 78 BCS ***	36 NCDS 22 BCS	100% (1684) 100% (1702)

* figures given as controlled predicted rates for sample of men who change job within year only; 26.7% given as the equivalent figure of flow into 'jobless'; no rate of upward mobility offered. NA- not applicable. DK- not available in the publication. *** includes up-mobility per cent

Hypothesis 2: Variations in data lead to variations in ranking. We expect that different data sets will lead to different vertical occupational rankings. This is partly because data sets vary in composition of their age and lifecycle distributions which can cause variations in the mean occupational wage used for the ranking. They can also vary in terms of the economic conditions at the time the data were collected, although this particular issue is discussed as a separate point below.

However, there is a further problem if occupational rankings (by pay or educational attainment) have been changing over time. Occupational mobility, of course, has to be measured with a time lapse so this issue is inherent in all mobility measurement, but it is made even more difficult if the aim is to compare the mobility experiences of successive generations. Occupational codes change over time as new jobs come into being and some jobs disappear.[9] For this reason, official occupational coding schemes are regularly reviewed and revised causing problems for attempts to measure change. This is one of the standard problems of longitudinal intra or inter-cohort comparisons using classification schemes that change over time.[10] There is no complete solution to such problems. Fortunately the changes to occupational codes are often fairly small and it is usual to be able to convert new codes back into the old ones, for purposes of comparison. However, as well as the occupation codes changing, the relative pay attached to an occupation has been known to change over time. Widening of pay rates from the top to the bottom occupations occurred over the 1980s and early 1990s, but these probably did not alter the ranking of occupations. What is more likely is that occupations in decline, for example in mining and other skilled jobs manufacturing, have gone down in the hierarchy over the 1980s and 1990s using a pay-based ranking indicator.[11] The implication of such changes is that occupational rankings based on more recent occupations and earnings will look different from those based on occupations from two decades ago. Sicherman and Galor (1990) made a compromise

[9] Johnes's (2006, p.19) analysis used Hope-Goldthorpe scores on recent data and pointed out that there are some elements which are out of date in the H-G scoring, for example, accountancy and nursing have become occupations with graduate entry since the scale was originally devised. He concluded it was still a useful scale, partly because of its high correlations with other scales.

[10] Solga (2001) discusses this issue as a problem one of varying subjective and conceptual meanings that can be embedded in panel data respondents' answers to the same questions asked at different points in time.

[11] The changes made to the SOC 1990 classifications to make SOC 2000 state that this was one of the changes made.

by including occupational wage rates from both their origin and end times in devising their vertically ranked occupations.

Another variant of this problem arises from the variation in the number of occupations used. Occupational classification schemes contain different levels of aggregation across occupations. Within one classification scheme, for example SOC, there are a series of levels of aggregation possible. Comparisons across different classification schemes are likely to lead to comparisons based on different numbers of occupational codes. However, the amount of occupational mobility across a set of categories will depend upon the nature of the most common occupational movements. If the most common movements are those that are between the more aggregate occupational groupings, rather than within them, or between jobs defined by the same occupation (eg lawyer), use of varying degrees of aggregation of occupations may lead to relatively small amounts of change in occupational mobility.

Hypothesis 3: Variations in occupational coding schemes are expected to lead to variations in the extent of vertical occupational mobility. In particular, one might expect the extent of occupational mobility to be lower the higher the level of aggregation, or the fewer the occupational categories. However, this may be only a small difference if the higher level occupational groupings capture most of the occupational moves as within-category moves.

However, it is worth noting that a relationship between number of categories and extent of mobility, were it to be supported, does not imply that survey instruments should always use a scale with the maximum number of categories or scale points. The number of categories coded from survey data need to be sensitive to how accurate survey respondents can be about the information they provide, particularly if retrospective details about occupations are being collected. Since it is likely that respondents have better memories for salient and significant job changes rather than for minor changes, a broader set of categories may on occasions be most appropriate for matching the constructs which survey respondents themselves use.

Attrition in panel surveys provides another challenge, as recognised by Solga (2001). Occupational mobility across a period of time is only measurable where individuals stay employed across the time period, and give full information at the follow up data

collection point. These are two ways in which the sample size at the 'destination' time is likely to be less than at the origin time. This problem applies most to calculations of mobility which are derived from two cross-sections, rather than from a more continuously recorded (or recalled) employment history. Were calculations of occupational mobility from time *t* to *t+1* to be carried out, based on the denominator that included those who had left employment by time *t+1*, or by including those who did not respond at time *t+1*, the extent of mobility must necessarily be smaller, on these larger denominators. This issue does not lead to a hypothesis since the effects are certain although it is an empirical issue to determine by how much non-employment and non-response affect the calculations. However, where attrition is concerned, the matter of bias becomes an issue. Respondents who are lost from the panel sample at *t+1* may not have the same characteristics or mobility patterns as those who responded and where they differ, calculations of mobility will also be biased.

Hypothesis 4: The level of attrition (or flows into non-employment) over the mobility period, by affecting the information available about destination occupations and the sample size with valid data, will affect the extent of vertical occupational mobility.

Studies have also found that the extent of job mobility varies with the economic cycle and labour market conditions (Evans, 1999; Hughes and McCormick, 1990; Okun, 1973). Workers are thought to be more cautious in depressed labour markets, preferring to stay in their jobs. A buoyant labour market will generate more job movements. For this reason, the extent of occupational mobility might also vary according to the state of the labour market. Evans's (1999) analysis of cyclical effects found that the rate of upward occupational mobility was procyclical as expected, but contrary to expectation, the rate of downward occupational mobility was greater in boom times. Also highly educated or skilled employees were less likely than others to experience downward occupational mobility. In practice, the extent to which cyclical variation might affect the calculations of occupational mobility will depend on the choice of origin and destination points, but also on the length of the mobility period. Longer periods of mobility are less likely to be linkable to a particular type of labour market conditions than relatively short mobility periods. We can formulate another hypothesis from these effects:

Johnes's (2006) calculations of downward mobility for women and men (Table 1) show that including the outflow into non-employment into the denominator for the calculations almost equalised the percentages of 1-year downward occupational mobility between women, men and women with children across childbirth. However, this outcome will vary depending on the sizes of the outflows, which in turn will be related to the economic climate at the time. Johnes's calculations average over a 13-year period from 1991-2003 and potentially average over a range of results and conclusions therefore.

Hypothesis 5: The extent and comparability of measures of vertical occupational mobility are expected to vary depending on the economic climate over the period the mobility is measured. However, this effect will be mediated by the length of the mobility period; shorter mobility periods are more likely to see effects of labour market conditions on mobility calculations than longer periods where the effects are likely to be averaged out.

Finally, a problem arises in attempting to compare groups, for example gender or minority ethnic groups who are distributed differently through occupations, and who also may have different pay within occupations. This problem applies to any groups where there is evidence that their hourly wage may not represent an individual group member's productive potential, and that there may be discrimination, and possibly inefficient job matching taking place. The approach to ranking occupations by pay and or education may well produce different rankings for women's occupations than for men's, and when they are pooled (men plus women) compared to when either gender is examined separately. Since many women work part time, and part-time work is known to be disproportionately women's employment, low skilled and incur an hourly wage penalty (Joshi and Paci, 1998) this exacerbates the problem. The presence of part-time work in an occupation will depress the occupation's mean hourly wage, especially in occupations with a high proportion of part-time workers. The question then arises: Whose occupational ranking is to be used for the calculation of the extent of vertical occupational mobility? Does it matter anyway? Clearly there is no simple answer here, and currently, there is no empirical work that indicates the implication of the choice. In the next section we start to examine the implications of these issues empirically after first describing some of the available data. However, we can formulate some likely hypotheses:

Hypothesis 6: The extent of vertical upward occupational mobility is expected to be greater for women working full time compared with part time.

Hypothesis 7: The extent of downward occupational mobility is expected to be greater for women working in part-time than in full-time jobs.

Hypothesis 8: Against the background evidence of gender inequalities in wage rates and occupational segregation and part-time employment described above, the following hypothesis would not seem unrealistic. The extent of vertical downward (upward) occupational mobility is expected to be greater (lower) among women than men.

Hypothesis 9: We anticipate that using women's (men's) occupational rankings on men's (women's) occupations will give varying amounts of vertical occupational mobility. It is difficult to predict the direction of the variation.

4. Available data

We used two data sets and some published material to explore these issues. One data set is the 1958 cohort, the National Child Development Study (NCDS), which contains detailed employment, occupational and education histories for its members up to age 42, at the time of writing this paper.[12] The NCDS is a nationally representative longitudinal survey of over 17,000 births in 1958 although there has been a substantial amount that left the survey which provides around 11,000 respondents in 1991 and 2000. Hawkes and Plewis's (2006) examination of attrition and non-response in the National Child Development Study found few significant predictors of non-random attrition. This supports the view that the data are still reasonably representative of this population.

The NCDS contains detailed employment, occupational and education histories for its members up to age 42. Information about the wages of the employed and their job tenure were only available as concurrent data about jobs held at the survey sweeps, ages 42, 33 and 23. For the age 42 contact/interview, NCDS data achieved 11,419

[12] NCDS members were also contacted at age 46 in 2004, but the data are not yet cleaned and available for use.

interviews, 5624 with cohort men and 5795 with the women. The cohort members who gave complete information about their weekly working hours and earnings are a sub sample of those who were interviewed at both sweeps of NCDS partly because these data were only available for those employed at the interview. Also, earnings data, not uncommonly, had a higher item non-response than most other questions in the interview and were available for a sample of 3558 full-time employees, 2606 men and 952 women. All wages have been adjusted to reflect inflation changes, all being deflated or inflated to year 2000 values.

Across the cohort sweeps, occupations were coded to different SOC codes; SOC80 at age 23, SOC90 at age 33 and SOC2000 at age 42. The calculations presented in this paper were carried out after all occupation codes in these 3 NCDS sweeps had been converted to SOC 90 codes for purposes of comparison. Occupations at age 33 were also originally coded to Hope-Goldthorpe (H-G) scores, but not at age 33 or 42. The authors devised a set of SPSS syntax to generate the collapsed 36 point H-G scores for age 42 occupations. The same syntax was also applied to age 33 occupations, so that bias was not introduced by having two different approaches used to generate the H-G scores.[13] The effective number of occupational categories is 24, through some groups having the same H-G score.

We also used the Quarterly Labour Force Survey (QLFS) to provide an external ranking for occupations using earnings and education. The Quarterly Labour Force Survey is conducted by the Office for National Statistics. Since 1992 the Quarterly LFS (QLFS) has had a pseudo-panel design where each sampled address is interviewed for five quarterly waves. Each quarter, face-to face interviews are achieved at about 59,000 addresses with about 138,000 respondents offering a high response rate (eg. 77% in 2002). The QLFS provides extensive information on employment, earnings, working hours as well as qualifications. The QLFS data were pooled from the 2001 to 2004 surveys, primarily to provide sufficient cases for the detailed analyses of earnings, and to take advantage of the detailed occupational categories.

[13] The syntax used the SOC 2 digit codes plus variables indicating self employment or employee status, supervisor, foreman or manager status, and numbers of employees at the workplace and is available from the CLS web site (www.cls.ioe.ac.uk).

5. Occupational rankings

Using pooled cross-sections of the Labour Force Survey (LFS) we examine the hourly wage rate rankings of SOC major occupational codes for all of the working population and employed men and women separately (Table 2). The rankings of each column are displayed in parentheses. The mean hourly wages are sometimes very close and so are given the same rank (eg when one or two pence apart). A display of standard deviations would show that more of these values are likely to be insignificantly different from each other than is implied in the precise ranks given. However, this does not detract from the main point, which is that there are small variations in rank comparing across many of the two-way comparisons displayed in Table 2. Ranks differ most by gender, when using employed men's and women's wage rates and comparing mean occupation hourly wage rates across SOC major occupation groups. They differ according to whether they are based on full-time jobs or all jobs. There are broad overlaps, with the top four occupations (managers, professionals, associate professionals and administrative-clerical) always being in the top four ranks; similarly there is tendency for the other elementary jobs to have the lowest rank, although with the exception of employed men where the inclusion of part-time men in sales clearly tips the ranking to give sales the lowest rank.

Table 2. Mean hourly wages, £ per hour, of main job of employed by SOC major codes.

1990 SOC occupations (N)	Men + women (Rank)	Men + women Full time (Rank)	Men (Rank)	Men Full time (Rank)	Women (Rank)	Women Full time (Rank)
Professionals (2)	10.24 (1)	10.30 (1)	10.52 (1)	10.61 (1)	9.89 (1)	9.80 (1)
Managers (1)	9.56 (2)	9.62 (2)	10.19 (2)	10.14 (2)	8.30 (2)	8.40 (2)
Associate professionals (3)	7.19 (3)	7.18 (3)	7.47 (3)	7.52 (3)	6.92 (3)	6.74 (3)
Administrative-clerical (4)	3.84 (4)	3.69 (4)	3.89 (4)	3.96 (4)	3.82 (4)	3.60 (4)
Skilled Trade (5)	3.16 (5)	3.24 (5)	3.26 (5)	3.29 (5)	2.20 (6)	2.26 (5)
Personal and protective services (6)	2.48 (7)	2.24 (7)	3.22 (5)	3.22 (6)	2.35 (5)	1.97 (7)
Sales (7)	1.82 (8)	2.07 (8)	1.64 (8)	2.07 (8)	1.89 (9)	2.08 (6)
Process & Plant & operatives (8)	2.62 (6)	2.68 (6)	2.74 (7)	2.80 (7)	2.06 (7)	1.95 (7)
Other Elementary (9)	1.75 (9)	1.70 (9)	1.58 (9)	1.76 (9)	1.93 (8)	1.56 (9)

Source: pooled samples of employed with earnings and hours data from annual Spring quarter samples LFS, 2001 to 2004, excluding self employed and those in full-time education.

We are able to draw on another ranking scheme using mean qualification level, displayed in Connolly and Gregory (C-G) (2006). They devised a vertical occupational ranking of 15 occupational categories based on the 1990 SOC codes, but grouped differently to the major codes by using mean qualifications held by full-time men and women employees in the occupation displayed in Appendix Table A1.[14] By excluding those working part time, the ranking system is avoiding the problem of women (or men) who work part time in occupations below their best occupation and their potential level of productivity. Clearly, this ranking by educational qualification varies from the one by pay. Teachers are allocated the top rank in a ranking based on educational qualifications. Corporate managers only appear at rank 5 in this ranking, other managers much lower down at rank 8, where these two occupations, grouped together, were mainly allocated second place after professionals in the ranking based on SOC major group's mean hourly wages (Table 2). It is not clear whether the C- G ranking would change if it were calculated using women's and men's educational qualifications separately.

Lifecourse and age differences in rankings

The age-earnings profiles of different occupations may lead us to expect that rankings of occupations based on wage rates may vary over the lifecourse. We were able to investigate this issue using cohort members from the 1958 NCDS cohort at ages 23, 33 and 42. The mean hourly wages for SOC 1990 major groups of cohort members who were employed at the 23, 33 or 42 year old interviews are outlined in Appendix Table A2, also broken down by gender. We display only full-time employees in order to keep the comparison manageable. As we expected, there are considerable variations by age in the rankings based on total full-time employees as well as by gender groupings. It should be noted that composition differences in the way the two gender specific mean wages are combined can lead to ranks, varying from when they are calculated using the total workforce compared with using each gender separately. These age bands are unlikely to capture crossovers in ranking associated with pay rates in the very early years of employment experience, but they will capture changes from the early to the

[14] The educational qualification scores were derived by giving an individual's highest qualification an integer score as follows: no qualifications=0; sub GCSE/O-level=1; GCSE/O-level=2; A-level or equivalent=3; nursing qualification=4; HND or equivalent=5; Teaching qualification=6; Degree level or above=7.

middle age years. However, it is worth noticing that the age 23 ranks have a quite a few occupations with joint ranks, and certainly the spread of wage rates across occupations is much narrower at 23 than appears in the older age groups.

Professional occupations hold the top rank by hourly earnings in the total workforce group and for both men and women at age 23. But even at this age, rankings below this vary between women and men. For women, associate professionals hold the second best wage rate rank at age 23 whereas for men it is skilled trades second and associated professional third place. For women, managerial occupations holds third place and for men this is ranked joint fifth with administrative occupations at age 23, and fourth place for men is held by personal service occupations. At the bottom end, the lowest (9^{th}) rank is held by elementary occupations for both men and women. But in the total workforce, this holds the 8^{th} rank with the lowest wage being in sales. Women in process and plant operative occupations hold the 5^{th} highest wage rates for women but only the joint 7^{th} for men, although fifth overall at age 23. It is also worth noting that skilled trades occupations for women are among the lowest in rank in the younger ages (23 and 33) whereas for men are much higher. However, by age 42, they are ranked much more equally between men and women.

By age 33, managers have risen to the top rank for men and stay there through to age 42. Professional occupations stay top of the rankings for women at age 33 and 42, and second place in the women's rankings at age 23, associate professionals continues in second place at age 33. However, by age 42, second place in the women's rankings has also been taken by managers, and associate professionals gone down to third place. By age 33, elementary occupations seem settled in bottom rank for women and men and process and plant operative settled at 8^{th} place. However, there are still variations in the middle occupation categories going on in these middle years of working life, as well as distinct variations by gender. In addition, the ranks gained from the total, all-ages, full-time Labour Force Survey workforce in Table 2 (column 2) are not precisely the same as those obtained in either the 33 or 42 year old's rankings in Appendix Table A2, even though the top and bottom rankings are consistent. It will undoubtedly cause some difference in the calculations of the extent of vertical occupational mobility, if these different rankings were used. However, there are a number of issues to consider here. The cohort members, as a birth cohort of those who

were born in the UK, survived to age 33 or 42 and stayed responding to the interviews, are not, at any given age, a nationally representative sample of this age group. This fact should be remembered, and will make some difference to the comparisons we wish to make. There is also the problem that these SOC major categories combine a wide range of occupations with a wide range of wages. With this limitation in mind we also carried out the ranking exercise on the C-G classification system, using mean hourly wages, to see whether the same lifecourse problems arose (see Appendix Table A3).

Again there are considerable variations by age in the rankings and by gender when mean wages are used to re-rank the C-G categories. Teachers are ranked highest only at age 23 for both men and women, with professionals starting to take over for women by age 33, continuing with as the highest rank to age 42. For men, corporate managers start to have top rank by age 33 continuing to age 42 with professionals in second place for 33 and 42 year old men. The wage rates in this more finely defined occupational scale do show a large number of occupations held by women in the lower ranks of this scale, with very similar rates of pay. It would not be surprising, therefore, to find that there is relatively easy movement between them, as described by Dex's *semi-skilled profile*. Even with this more disaggregated scale, there is considerable variation in the wage rate rankings of occupations by gender and age. This ranking system was not, of course, drawn up to reflect wage rate differences but instead use educational differences. However, one would hope that there would be some overlaps between an education based and a wage rate ranking scheme. But the overlaps are fairly small in practice. It is clear that the educational differences between occupations do not translate into a ranking of pay which is consistent over the lifecourse of each occupation.

The correlations between these ranking variables are displayed in Table 3. The correlations were calculated on NCDS employed men and women age 33 and again at age 42 who had a valid occupation code. The ranking schemes are all significantly and very highly correlated, as noted in other earlier studies. However, this may not preclude finding differences in the calculations of occupational mobility using different ranking schemes.

Table 3. Pearson correlations between different ranking schemes using NCDS age 33 and 42 SOC 2 digit occupations by gender.

	NCDS Age 33				NCDS Age 42		
MEN +WOMEN	**Connolly-Gregory**	**Sicherman**	**SOC major**		**Connolly-Gregory**	**Sicherman**	**SOC major**
Hope-Goldthorpe	0.858	0.873	0.848		0.862	0.871	0.829
Connolly-Gregory		0.928	0.833			0.936	0.821
Sicherman-Galor			0.812				0.812
MEN							
Hope-Goldthorpe	0.859	0.870	0.853		0.860	0.866	0.825
Connolly-Gregory		0.910	0.830			0.919	0.818
Sicherman-Galor			0.802				0.805
WOMEN							
Hope-Goldthorpe	0.876	0.876	0.849		0.874	0.879	0.837
Connolly-Gregory		0.946	0.842			0.956	0.831
Sicherman-Galor			0.836				0.832

All correlations are significant at 99 per cent confidence level

6. The extent of occupational mobility

We now turn to calculations of the extent of occupational mobility using a number of the various ranking schemes we have documented in Sections 2 and 5 above. The summary totals of occupational mobility across all origin and destination occupations, and across the range of ranking schemes examined are displayed in Table 4 for men and in Table 5 for women (as well as in Appendix Table A4 for the men and women combined). We discuss the summary values themselves, but also, in order to assist with the presentation of a large number of descriptive statistics, we ran an OLS regression analysis on the summary measures of percents upward and downward mobility. [15] Of course these statistics are not independent of each other being run on the same data, and their number is purely a selective and non-random sample of occupational mobility calculations we decided to do. Tests of significance and model fit, therefore, are strictly not appropriate. Nonetheless, we think this helps to summarise the variation across the changes in parameters that we were the focus of this paper. The coefficient results are provided in the Appendix Table A5) and are mentioned under the relevant hypotheses, as well as summarised later in this section.

Occupational mobility outcomes

As **Hypothesis 1** suggested, we did find variations in the ranking of occupations using mean occupational hourly wages according to the point in the lifecourse (Tables 4 and 5). In addition, there are differences in occupational mobility across the lifecourse, but mainly in the extent of upward occupational mobility rather than in downward occupational mobility. For men approximately 36 per cent experienced upward occupational mobility based on 9 occupations from age 23 to 33 compared with approximately 24 per cent from age 33 to 42 (using men's rankings Table 4 rows M8 and M9); downward occupational mobility increased, but only from 18.5 to 19.9 per cent aged 23-33 and 33-42 respectively. There were hardly any differences in results by varying the ranking scheme in this comparison.

[15] It was not possible to enter all of the dimensions of interest since in some cases these wholly overlapped in the data. For example, lifecourse position (an all age sample) and mobility period (1.25 years) were wholly overlapping in the case of the LFS data; number of categories in the ranking scheme was also overlapping with the different schemes. In the case of this latter overlap, the models were run twice, once with type of ranking scheme entered as a set of dummies and without the number of categories entered, and once with the number of categories but without the type of ranking scheme dummies. Entering a dummy to capture LFS data, with its much smaller mobility period of 1.25 years and an all age sample had a very large negative coefficient reduction in the percentages of mobility.

Women's experiences of upward mobility displayed less variation by ranking in this comparison and the direction of change in upward mobility over the lifecourse differed from those found for men; 32 per cent of women experienced upward occupational mobility by age 33 and 28 per cent of 33 year olds had the same experience by age 42 when men's rankings were used (SOC major 9 categories Table 6 rows W8 and W9), a 4 percentage point gap. When women's rankings were applied the size of the percentages experiencing upward occupational mobility were 26.4 per cent of 23 year olds by 33 and 28 per cent of 33 year olds by 42, a 1.6 percentage point gap (Table 5 rows W11 and W12). The C- G ranking (based on 15 categories) for these two women's age groups is in the same direction as the women's SOC rankings; 29.2 per cent of women having upward mobility over ages 23-33 and 32.5 per cent of 33 year olds by age 42 (Table 5 rows W14 and W15), a 3.3 percentage point gap. The C-G ranking scheme was devised for use on women's occupations so this is at least consistent across the two women's-based rankings.

Female downward occupational mobility was more varied over the lifecourse compared to male percentages. The percentage of women experiencing downward occupational mobility was 21.9 per cent for the 23 to 33 year olds, and 22.2 per cent for the 33 to 42 year olds, hardly any difference, when men's SOC (9 categories) rankings were used (Table 5 rows W8 and W9). When women SOC rankings were used (Table 5 rows W11 and W12), the same downward occupational mobility figures were 27.5 for the 23 year olds by 33, and 22.2 per cent of the 33 year olds by 42 per cent, a 5.3 percentage gap. The C-G calculations of downward mobility for the same age groups were 33.8 per cent and 25.7 per cent (Table 5 rows W14 and W15), a widening of the gap over the lifecourse, a percentage point gap of 8.1, in the same direction as the SOC women's ranking.

The extent of occupational mobility has been found to vary over the lifecourse, therefore, but it also varies by gender and according to whose occupational ranking scheme is used to make the measurements. However, the differences are mostly relatively small when the same aggregate ranking scheme is used, but variations increased with the use of a more disaggregated ranking scheme.

The regression model coefficients also confirmed that upward mobility was higher across ages 23 to 33 than mobility across the whole history and upward mobility across ages 33 to 42 was lower than across the whole life history. This supports the idea that there is more mobility at younger ages. However, the inclusion of interaction terms showed that there were gender differences in upward mobility across the lifecourse, which when taken together with the lifecycle effects, suggested that men had higher upward mobility than women over ages 23-33, by 4.9 percentage points and women had higher upward mobility than men over ages 33 to 42, by 3.3 percentage points. Downward mobility varied less over the life cycle than upward mobility but the gaps between men and women were much greater at the young ages. Men had lower percentages of downward mobility than women over ages 23 to 33 by an average of 4.3 percentage points. Women had a slightly lower downward mobility than men over ages 33 to 42 by only 0.6 percentage points.

Hypothesis 2 suggested that occupational mobility would vary according to the data set, possibly due to compositional differences but also due to the time period and the economic climate over which the data were collected. Unfortunately, although we have different data sets, their mobility periods differ substantially (1.25 years for LFS and 9-10 years in the birth cohort data) such that they are hardly comparable. However, the effects of labour market conditions are discussed below using a single data set.

Hypothesis 3 formulated that we expected variations in occupational coding schemes to affect the extent of vertical occupational mobility, with lower rates of mobility expected from lower numbers of categories (higher levels of occupational aggregation). We have seen something of this already in considering hypothesis 1, but the ranking schemes compared above were different in more ways then their levels of aggregation. For this comparison we selected two rankings, the 9-code SOC major hourly wages ranking and S-G approach because both of these scales use SOC 2 digit codes but at different levels of aggregation. Our two data sets, LFS and NCDS, generally support this hypothesis. Comparing these for men on LFS data (Table 4 rows M19 and M20), upward occupational mobility varies from 4.9 per cent (9 SOC codes) to 6.1 per cent (77 codes) over this 1.25 year period and downward occupational mobility from 3.9 per cent (9 codes) to 5.0 per cent (77 codes).

Table 4. Extent of occupational mobility of men's samples based on varying vertical occupational ranking schemes

Row label	Occupational transition sample	Ranking	% up mobile	% no change	% down mobile	Total %	Sample size
M1	NCDS men age 33-42	M+W mean hrly wage LFS SOC major	24.5	56.3	19.2	100	4181
M2	NCDS men age 33-42	FT M mean hrly wage LFS SOC major	24.1	56.3	19.6	100	4181
M3	NCDS men age 33-42	FT -W mean hrly wage LFS SOC major	23.9	56.3	19.8	100	4181
M4	NCDS men age 33-42	All W mean hrly wage LFS SOC major	24.3	56.3	19.4	100	4181
M5	NCDS Men age 23-33	M+W mean hrly wage SOC Age 42 NCDS	35.7	45.9	18.4	100	3596
M6	NCDS Men age 33-42	M+W mean hrly wage SOC Age 42 NCDS	24.7	56.3	19.1	100	4181
M7	NCDS Men all employ history 16 to 42	M+W mean hrly wage SOC Age 42 NCDS	29.6	47.3	23.2	100	28380
M8	NCDS Men age 23-33	Men mean hrly wage SOC age 42 NCDS	35.6	45.9	18.5	100	3596
M9	NCDS Men age 33-42	Men mean hrly wage SOC age 42 NCDS	23.9	56.3	19.9	100	4181
M10	NCDS Men all history employ 16 to 42	Men mean hrly wage SOC age 42 NCDS	28.8	47.3	23.9	100	28380
M11	NCDS Men age 23-33	Women mean hrly wage SOC age 42 NCDS	33.6	45.9	20.5	100	3596
M12	NCDS Men age 33-42	Women mean hrly wage SOC age 42 NCDS	23.9	56.3	19.8	100	4181
M13	NCDS Men all history 16 to 42	Women mean hrly wage SOC age 42 NCDS	28.6	47.3	24.2	100	28380
M14	NCDS Men age 23-33	C-G based on W	33.2	46.3	20.4	100	3596
M15	NCDS Men age 33-42	C-G based on W	23.1	55.2	21.8	100	4181
M16	NCDS Men all employ history 16 to 42.	C-G based on W	27.7	48.1	24.2	100	28380
M17	NCDS Men age 33-42	H-G based on men	32.2	42.9	24.9	100	4175
M18	NCDS Men age 33-42	S-G	28.7	43.1	28.2	100	4181

M19	LFS 1997 Q1-Q5 Men all ages (18-65)	All M+W mean hourly wage LFS SOC major	4.9	91.1	3.9	100	19,826
M20	LFS 1997 Q1-Q5 Men all ages (18-65)	S-G	6.1	88.9	5.0	100	19,826
M21	LFS 2000 Q1–Q5 Men all ages (18-65)	All M+W mean hourly wage LFS SOC major	5.4	90.3	4.3	100	18,882
M22	LFS 2000 Q1–Q5 Men all ages (18-65)	S-G	6.7	87.6	5.7	100	18,882

Table 5. Extent of occupational mobility of women's samples based on varying vertical occupational ranking schemes

Row label	Occupational transition sample	Ranking	% up mobile	% no change	% down mobile	Total %	Sample size
W1	NCDS women age 33-42	M+W mean hrly wage LFS SOC major	27.9	49.8	22.3	100	3828
W2	NCDS women age 33-42	FT M mean hrly wage LFS SOC major	27.7	49.8	22.5	100	3828
W3	NCDS women age 33-42	FT -W mean hrly wage LFS SOC major	27.6	49.8	22.6	100	3828
W4	NCDS women age 33-42	All W mean hrly wage LFS SOC major	27.6	49.8	22.6	100	3828
W5	NCDS Women age 23-33	M+W mean hrly wage SOC age 42 NCDS	28.7	46.1	25.2	100	3727
W6	NCDS Women age 33-42	M+W mean hrly wage SOC Age 42 NCDS	28.1	49.8	22.1	100	3828
W7	NCDS Women all employ history 16 to 42	M+W mean hrly wage SOC Age 42 NCDS	28.2	47.5	24.3	100	30808
W8	NCDS Women age 23-33	Men mean hrly wage SOC age 42 NCDS	32.0	46.1	21.9	100	3727
W9	NCDS Women age 33-42	Men mean hrly wage SOC age 42 NCDS	28.1	49.8	22.2	100	3828
W10	NCDS Women all employ history 16 to 42	Men mean hrly wage SOC age 42 NCDS	28.0	47.5	24.6	100	30808
W11	NCDS Women age 23-33	Women mean hrly wage SOC age 42 NCDS	26.4	46.1	27.5	100	3727

W12	NCDS Women age 33-42	Women mean hrly wage SOC age 42 NCDS	28.0	49.8	22.2	100	3828
W13	NCDS Women all employ history 16 to 42	Women mean hrly wage SOC age 42 NCDS	28.0	47.5	24.5	100	30808
W14	NCDS Women age 23-33	C-G based on W	29.2	37.0	33.8	100	3727
W15	NCDS Women age 33-42	C-G based on W	32.5	41.9	25.7	100	3828
W16	NCDS Women all employ history 16 to 42.	C-G based on W	31.5	39.6	28.9	100	30808
W17	NCDS Women age 33-42	H-G based on M	33.2	42.9	23.9	100	3827
W18	NCDS Women age 33-42	S-G	35.2	35.1	29.6	100	3828
W19	LFS 1997 Q1-Q5 Women all ages (18-65)	All M+W mean hourly wage LFS SOC major	5.3	90.9	3.8	100	17,121
W20	LFS 1997 Q1-Q5 Women all ages (18-65)	S-G	7.0	87.9	5.1	100	17,121
W21	LFS 2000 Q1-Q5 Women all ages (18-60)	All M+W mean hourly wage LFS SOC major	5.5	90.0	4.5	100	16,762
W22	LFS 2000 Q1-Q5 Women all ages (18-60)	S-G	7.2	87.1	5.7	100	16,762

Using the NCDS data for men between the ages of 33 and 42, a nine year period upward mobility varied from 23.9 (9 codes Table 4 row M9) to 23.1 (15 codes row M15), to 32.2 per cent (24 codes, M17) to 28.7 (77 codes, M18). Downward mobility for these same groups varied as follows: 19.9 per cent (9 codes, M9), 21.8 per cent (15 codes, M15), 24.9 per cent (24 codes, M17) and 28.2 per cent (77 codes, M18).

Calculations for women were spread across a similar range to those of men. Using LFS data in 1997 (Table 5 rows W19 and W20) the 9-code SOC produced 5.3 per cent of women having upward occupational mobility in comparison with 7 per cent using the 77 code S-G scale, and 3.8 per cent experiencing downward mobility with the 9-code SOC major scale and 5.1 per cent with the 77-code S-G scale. Using NCDS data between 33 and 42 produced upward occupational mobility of 28 per cent (9 codes Table 5 row W12), 32.5 per cent (15 codes row W15), 33.2 per cent (24 codes, W17) and 35.2 per cent (77 codes, W18). The equivalent percentages of downward occupational mobility (ages 33 to 42) were 22.2 per cent (9 codes, W12), 25.7 per cent (15 codes, W15), 23.9 per cent (24 codes, W17) and 29.7 per cent (77 codes, W18).

On the whole both upward and downward occupational mobility increased in all cases for men and in most cases for women as the number of codes increased. The differences as well as the amounts of mobility were very much greater across the 9 year interval from age 33 to 42 using NCDS data than averaged over all ages for a period of just over one year in the LFS.

The results from the regression model (Table A5) showed that the extent of upward occupational mobility derived in these measures was higher when using either C-G, H-G or S-G scales in comparison with SOC. However, the H-G scale added most to the calculations of upward mobility, rather than the scale with the largest number of categories (S-G). In an alternative model incorporating the number of a scale's categories as an integer variable, the higher the number of ranked categories, ncats, was include instead of separate scale dummies, (Coefficient on ncats = 0.054). This coefficient suggests a 2.7% increase in upward occupational mobility for an increase of 50 in the number of occupational categories. However, it is unlikely to be a linear relationship. Similarly downward occupational mobility was also higher than the SOC scale when calculated by the C-G, H-G and S-G scales. In this case the increase to downward mobility was largest for the S-G scale and smallest for the H-G scale. The

alternative number of categories measure when used for the regression on downward occupational mobility (when the separate ranking scheme dummies were omitted) also had a positive coefficient, (ncats=0.063). This regression coefficient suggests a 3.2% increase in downward occupational mobility for an increase of 50 in the number of occupational categories, again unlikely to be a linear relationship.

Hypothesis 4 related to the problem of survey or information attrition. We have used the LFS panel data to chart, over the 1.25 year period, the flows out of employment as well as the loss of respondents at the final panel wave. Table 6 displays these flows for the two LFS data sets along side the percentages of occupational mobility, when no attention is paid to these outflows from the samples.

The flow out of employment ranged from 3 to 6 per cent comparing 1997 and 2001 flows and was slightly higher in the recession years of 1997 than in the more buoyant year of 2001 and higher for women than for men. Including this small flow out of the labour market into the calculations of percentages of mobility produces a small reduction on the percentages of occupational mobility, around 0.2 per cent for men and around 0.3 per cent for women. Even with greater fluctuations in labour market conditions, these effects are not likely to be large. However, very sizeable changes derive from attrition; approximately one in four of the LFS first quarter (Q1) sample were no longer in the wave 5 follow up from both 1997Q1 and 2001Q1. Were these non-respondents to be a biased sample of the original Q1 sample, this could change the calculation of occupational mobility to a large extent. This is not something to ignore since mobile people are always lost disproportionately from longitudinal surveys, and residential mobility is likely to be highly correlated with job change, and possibly with occupational change. In conclusion, attrition flows from survey samples are likely to affect calculations of occupational mobility, but varying flows out of employment over the period of around a year will have relatively negligible effects on the extent of occupational mobility among men or women.

Hypothesis 5 referred to potential variations in occupational mobility with economic climate changes although possibly mediated by the length of the mobility period. We are able to compare 1.25 year occupational transitions using the LFS data at two periods selected for their different labour market conditions; 1997 was a period of relatively high

unemployment (annual averages 8.8% rate for men and 6.2% for all) and 2001 a period of relatively low unemployment (4.4% rate for men and 3.3% for all). As labour market conditions improved, upward occupational mobility increased from 4.9 to 5.4 per cent for men and very slightly from 5.3 per cent to 5.5 per cent for women. Comparing the same dates, downward occupational mobility also increased from 3.9 to 4.3 per cent for men and 3.8 to 4.5 per cent for women. These are relatively small changes. However, the period is short, but this should help us to better identify the direction of change from changes in labour market conditions. The direction of change found in mobility is consistent with that reported by Evans (1999), upward occupational mobility having an expected procyclical relationship. But, as Evans (1999) also found, downward occupational mobility had an unexpected increase when conditions improved. The rate changes are relatively small for a doubling of (unemployment) although they represent a large number of people in the total population who would be affected.

Hypotheses 6 and 7 related to the differences between women who work full or part time, with full-time women employees expected to experience a greater percentage of upward occupational mobility and less downward occupational mobility than part-time employees. We carried out a comparison on full/part-time differences on both men and women, although there was little difference for men, not unexpectedly, since excluding students, relatively few men work part time. For women, however, the hypothesis was confirmed using the SOC major scale rankings. Compared with 26.4 per cent of all NCDS women who experienced upward mobility from age 23 to 33, 33.9 per cent of women employed full time experienced upward mobility over this age range. Similarly compared with 27.5 per cent of all women who experienced downward mobility from age 23 to 33, the lower percentage of 18.7 per cent of women employed full-time at both ages experienced downward occupational mobility. These contrasts were repeated in other occupational rankings and data. In the regression analysis (Table A5), after controlling for other differences, full-time women employees did not have higher upward mobility after controlling for other variables, but they did have lower downward occupational mobility, by approximately 6.4 per cent.

Table 6. Occupational and employment changes and attrition in two LFS panel waves

Data + Occupational ranking	% upward occ mobility	% no change	% downward occ mobility	% flow into non-employment	% loss of wave1 sample	Total %	N
LFS – Men SOC 9							
1997	4.9	91.1	3.9			100	19,826
1997	4.7	87.2	3.8	4.3		100	20,726
1997	3.6	65.9	2.9	3.3	24.4	100	27,406
2000	5.4	90.3	4.3			100	18,882
2000	5.2	86.6	4.2	4.1		100	19,683
2000	3.8	63.8	3.1	3.0	26.3	100	26,703
LFS – Women SOC 9							
1997	5.3	90.9	3.8			100	17,121
1997	5.0	85.5	3.6	5.9		100	18,198
1997	3.8	65.5	2.8	4.5	23.4	100	23,761
2000	5.5	90.0	4.5			100	16,762
2000	5.2	84.9	4.2	5.7		100	17,780
2000	3.9	63.8	3.2	4.3	24.9	100	23,670

Hypothesis 8 was related to comparing men and women's experiences of occupational mobility. The hypothesis that women would have higher rates of downward occupational mobility and lower rates of upward occupational mobility than men could not be confirmed. In calculations using the SOC code and C-G (2006) rankings women had higher rates of downward occupational mobility than men, controlling for age and type of ranking, at all lifestage positions. In the case of calculations based on the shorter period using LFS and SOC ranking, men and women had percentages of downward occupational mobility within 0.1 per cent of each other (Table 4 rows M19 -W19; M21-W21) . The calculation of mobility using S-G (1990) rankings were also very close by gender although with women having slightly higher rates of downward mobility than men (M18-W18; M20-W20;M22-W22). In the H-G calculations men had slightly higher rates of downward occupational mobility (24.9% M17) than women (23.9% W17) over the ages 33 to 42.

In the case of upward occupational mobility gender differences varied by position in the lifecourse but less by ranking scheme. Women tended to have higher rates of upward occupational mobility than men over the ages of 33 to 42 and lower rates than men over ages 23 to 33 using both SOC and C-G ranking schemes. In calculations not broken down by lifestage, men had lower rates of upward occupational mobility than women in all rankings. In the regression analysis (Table A5), the gender dummy had very small coefficients for upward and downward mobility.

This means that our hypothesis of men doing better than women in upward occupational mobility is not confirmed. The hypothesis that women were doing worse than men in downward occupational mobility received some support, but this depended on the ranking scheme. The regression results (Table A5) indicate much larger effects for gender by lifestage differences, as discussed under Hypothesis 1 finding that women had higher rates of downward mobility than men over the 23 to 33 year lifestage, even for this group of women who were employed at both ages.

We found some support for ***Hypothesis 9***, expecting that using women's (men's) occupational rankings on men's (women's) occupations will give varying amounts of vertical occupational mobility. However, the effects were relatively small for differences in rank based on SOC 9 category codes, and only slightly greater when using ranking

schemes that were devised for men (H-G) as opposed to being devised for women (C-G, 2006). For example, upward occupational mobility over the period 33 to 42 year's old varies from 23.9 per cent to 24.5 per cent of men (Table 4) and from 27.6 to 27.9 per cent in the case of women of the same age (Table 5). Downward occupational mobility for these same groups varied between 19.2 to 19.8 per cent for men and 22.3 to 22.6 per cent for women. However, the extent of mobility among 23 year olds by 33 exhibit greater differences, particularly in the women's sample. The regression analysis on upward and downward mobility (Table A5) found that a variable applying women's rankings to men indicated only a 1.5 per cent reduction to percentages of upward occupational mobility and a slightly higher 3.2 per cent reduction to calculations of downward occupational mobility, One can be relatively comforted, therefore, that the amounts of occupational mobility will not differ to a great extent if marginal changes are made to the rankings of occupations when a highly aggregate scale is applied to the same data set.

Occupational mobility from different origin occupations

All of the comparisons so far have been of the summary amounts of vertical occupational mobility. We now present some comparisons of the amounts of mobility from particular origin occupations. Since our ranking schemes vary considerably in their origin occupations, the only level at which we can offer this comparison is by using the SOC major categories as the origin occupation categories. An individual's occupational mobility was calculated using the specific ranking scheme indicated, and then, for purposes of display, summed across all individuals in terms of the SOC major group of their origin occupation, in order to facilitate comparisons across ranking schemes. This is a very broad occupational grouping, but it does allow us to compare the extent of occupational mobility from different origin occupations. The results are presented in Table 7 for downward and Table 8 for upward occupational mobility.

After controlling for origin occupation in this way, there are much larger differences in amounts of both upward and downward occupational mobility according to the ranking scheme used in the gendered comparisons. Varying the ranking scheme can also lead to reversing conclusions about whether women have higher (or lower) rates of downward or upward occupational mobility than men starting out in the same broad origin occupation. So for example, women who at age 33 were either managers and

senior officials or in administrative-clerical occupations experienced greater percentages of downward occupational mobility than men from 33 to 42 according to the non-SOC based ranking but lower percentages according to the SOC based rankings. The exact opposite result is evident for men and women who started out in professional or associate professional jobs at age 33. Gender comparisons of upward occupational mobility were more stable than the gender comparisons of downward mobility, but still had some of the same type of reversal of fortunes in the case of professional and personal services origin occupations.[16]

Table 7. Percentages of downward occupational mobility for NCDS cohort age 33 to 42 by origin occupation code, gender and differences in ranking.

Origin SOC major code	SOC FT-M%	SOC FT-W%	All W %	S-G %	C-G%	H-G%
MEN - DOWNWARD						
Managers and Senior officials	37.4	37.4	37.4	40.2	27.1	40.2
Professionals	30.8	30.8	30.8	38.1	37.4	38.5
Associate professionals	18.3	18.3	18.3	36.9	40.8	28.5
Administrative and secretarial	24.3	24.3	24.3	19.0	25.2	13.7
Skilled trades	15.8	15.8	13.6	24.4	16.6	19.4
Personal services	7.6	13.0	13.8	16.8	14.4	7.6
Sales and customer service	10.4	6.8	10.4	20.1	27.7	18.1
Process, plant & machine operatives	3.3	8.9	1.9	20.1	0.4	20.0
Elementary occupations	na	na	na	6.0	1.4	6.5
WOMEN- DOWNWARD						
Managers and Senior officials	23.0	23.0	23.0	51.5	41.6	59.9
Professionals	52.5	52.5	52.5	24.7	23.3	22.3
Associate professionals	20.3	20.3	20.3	30.3	29.9	22.6
Administrative and secretarial	21.9	21.9	21.9	35.1	29.8	25.1
Skilled trades	37.8	37.8	21.8	27.6	40.8	30.9
Personal services	20.5	25.8	26.5	27.8	20.6	17.1
Sales and customer service	21.8	13.0	21.8	19.5	21.1	14.8
Process, plant & machine operatives	7.4	10.3	13.3	23.1	6.4	23.1
Elementary occupations	na	na	na	0.8	1.2	2.7

na – not applicable. FT- Full time M- men W-women

[16] These conclusions do not include the highest origin occupations in the case of upward mobility and the lowest origin occupations in the case of downward mobility where using the SOC rankings, movement from these origin occupations was possible in one direction only.

Table 8. Percentages of upward occupational mobility for NCDS cohort age 33 to 42 by origin occupation code, gender and differences in ranking.

Origin SOC major code	SOC FT-M%	SOC FT-W%	All W %	S-G %	C-G%	H-G %
MEN - UPWARD						
Managers and Senior officials	na	na	na	25.2	17.2	20.1
Professionals	5.7	5.7	5.7	2.8	1.6	3.9
Associate professionals	34.0	34.0	34.0	21.4	11.7	24.5
Administrative and secretarial	41.2	41.2	41.2	60.2	48.7	59.7
Skilled trades	18.6	18.6	18.6	20.5	17.8	33.6
Personal services	36.8	59.6	20.5	28.4	29.6	36.4
Sales and customer service	38.1	37.6	38.1	60.3	50.5	65.9
Process, plant & machine operatives	69.6	39.5	55.1	41.9	39.5	44.0
Elementary occupations	56.9	56.9	72.8	62.0	45.4	56.5
WOMEN - UPWARD						
Managers and Senior officials	na	na	na	23.0	21.4	14.7
Professionals	6.2	6.2	6.2	2.5	1.6	3.8
Associate professionals	16.1	16.1	16.1	11.8	9.1	10.9
Administrative and secretarial	20.8	20.8	20.8	39.8	33.2	31.6
Skilled trades	29.6	29.6	34.1	42.9	26.5	45.4
Personal services	35.4	44.9	40.8	39.8	40.9	43.4
Sales and customer service	50.6	42.9	50.6	54.8	52.6	58.5
Process, plant & machine operatives	63.3	62.2	58.0	60.9	62.2	56.4
Elementary occupations	71.4	71.4	70.7	72.5	73.7	72.2

7. Conclusions

This paper compares the use of different ranking scales for measuring vertical occupational mobility. Although all of the scales used were highly correlated differences in the extent of occupational mobility resulted from varying the scale used in the calculation. The results display the range of measurement error that researchers can expect when investigating this topic and calculating vertical occupational mobility. On the basis of earlier studies and economic and sociologically informed reasoning, a number of hypotheses about the measurement of occupational mobility were devised. The calculations carried out support the majority of these hypotheses and show that variations in the extent of vertical occupational mobility, both upward and downward, had systematic elements. The extent of mobility was found to vary by the composition of the individuals' data particularly in terms of lifecourse stages and gender, the number of categories in the ranking scheme and whether women's (or men's or all employed) occupations were used

as the basis of the ranking, attrition in the data and flows out of employment over the mobility period, and changes in labour market conditions over time. While variations in economic climate produced variations in the extent of occupational mobility, procyclical for upward mobility, like earlier studies, the effects of downward mobility increasing in the boom period was not entirely expected. Although most of these elements are not surprising, we were unable to find any discussion or consideration of most of these issues in published calculations of mobility, with the exception of the economic climate effects that have been the specific focus of earlier studies.

We found that the extent of measurement error that exists in the calculations of occupational mobility is variable in size but mostly reasonably small. Changes in the ranking scheme at a high level of aggregation generated only very small differences in the extent of mobility. Fairly large changes in the number of occupational categories appeared to be necessary to generate large changes in the extent of mobility. Factors which had much larger effects on the calculations were lifecourse positions of the individuals, as well as outflows from the data due to moving out of the labour market, or through high levels of attrition from the survey data over the mobility period. Consequently, pooling data over a period where labour market conditions varied significantly, in order to boost sample sizes, could hide some important variations and potentially change the conclusions, compared with having larger sample sizes available in the data to track along side the changes in economic conditions.

Seeking to measure gender differences in occupational mobility was the original inspiration to explore these measurement issues. From the calculations carried out in this paper, we conclude that the extent of female and male occupational mobility, while not very different in total, exhibited greater variation by lifestage although the sizes of these effects were at their highest, only 4.3 percentage points lower for men than women, in the case of downward mobility over the ages of 23 to 33. Men also had the highest upward occupational mobility over these ages, although this male advantage was reversed in favour of women from ages 33 to 42. Changing the ranking scheme produced small differences in some summary cases but not others. When broken down by origin occupation (33-42 year olds only), men tended to have greater upwards mobility than women in the top part of the occupational hierarchy but less upward mobility than women at the lower level occupations. There were many cases where the same was true for downward occupational mobility, men having greater (lesser) downward mobility than

women from the top (lower) occupations but these rates were far more variable by the ranking scheme used. What is perhaps surprising is that men have such high rates of downward mobility, on a par with those experienced by women, if a little less. The idea that only women' skills are wasted because of occupational downgrading is therefore refuted. Our calculations suggest that there should be (almost) equal concern about the under-utilisation of men's skills as well.

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Table A1. Connolly and Gregory's 15- occupation category ranking.

Rank	Occupation	SOC 1990 codes included	Mean qualification level	Standard deviation of qualification
1	Teachers	Unit groups 230-239	6.6	1.1
2	Other professionals	Unit groups 200-224, 240-293	5.7	2.0
3	Nurses	Unit groups 340-341	4.7	1.5
4	Other associate professionals	Unit groups 300-332, 342-399	4.5	2.2
5	Corporate managers	Unit groups 100-139, 150-155, 169-170, 176-177, 190-199	4.2	2.3
6	Higher skilled services	Unit groups 600-613, 700-719, 790-792	3.2	1.9
7	Higher level clerical work	Unit groups 400-411, 420-421, 490-491	3.0	2.0
8	Other managers	Unit groups 140-142, 160, 171-175, 178-179	2.8	1.9
9	Skilled trades	Unit groups 500-599	2.5	1.5
10	Lower level clerical work	Unit groups 412, 430, 440-463	2.4	1.7
11	Caring services	Unit groups 640-659	2.3	1.6
12	Other personal services	Unit groups 614-631, 660-699	2.1	1.7
13	Sales assistants	Unit groups 720-732	2.0	1.8
14	Other low skilled occupations	Unit groups 800-899, 900-957, 959-999	1.6	1.4
15	Cleaners	Units groups 958	1.1	1.4

Source: 2000 Labour Force Survey, Full time adult employed men and women derived in Connolly and Gregory (2006).

Table A2. Mean hourly wage of full-time employees by age and gender for SOC 1990 occupation codes

NINE CATEGORY GROUPINGS USING SOC 90	NCDS 4 - AGE 23						NCDS 5 - AGE 33						NCDS 6 - AGE 42					
	WOMEN FT		MEN FT		ALL FT		WOMEN FT		MEN FT		ALL FT		WOMEN FT		MEN FT		ALL FT	
	Rank	Mean FT hourly wage £	Rank	Mean FT hourly wage £	Rank All	Mean FT hourly wage £	Rank	Mean FT hourly wage £	Rank	Mean FT hourly wage £	Rank All	Mean FT hourly wage £	Rank	Mean FT hourly wage £	Rank	Mean FT hourly wage £	Rank All	Mean FT hourly wage £
1 Managers and Senior Officials	**3**	5.22	**5**	5.64	**4**	5.59	**3**	9.49	**1**	12.41	**2**	11.61	**2**	10.54	**1**	16.49	**1**	14.87
2 Professional Occupations	**1**	6.19	**1**	6.31	**1**	6.27	**1**	11.45	**2**	12.32	**1**	11.99	**1**	11.39	**2**	13.91	**2**	12.75
3 Associate Professional and Technical Occupations	**2**	5.33	**3**	6.18	**3**	5.64	**2**	9.58	**3**	11.99	**3**	10.93	**3**	10.03	**3**	13.05	**3**	11.63
4 Administrative and Secretarial Occupations	**4**	5.08	**5**	5.64	**6**	5.21	**4**	7.36	**6**	8.66	**7**	7.77	**4**	7.42	**7**	8.52	**8**	7.71
5 Skilled Trades Occupations	**7**	3.97	**2**	6.28	**2**	6.02	**7**	5.71	**7**	8.20	**6**	8.06	**5**	6.34	**6**	9.69	**5**	9.25
6 Personal Service Occupations	**5**	4.30	**4**	5.94	**7**	5.20	**6**	6.19	**5**	9.29	**5**	8.17	**6**	6.01	**5**	10.28	**6**	7.83
7 Sales and Customer Service Occupations	**8**	3.88	**7**	5.60	**9**	4.74	**5**	6.55	**4**	9.59	**4**	8.52	**7**	5.84	**4**	12.87	**4**	9.44
8 Process, Plant and Machine Operatives	**5**	4.30	**7**	5.60	**5**	5.25	**8**	5.46	**8**	7.44	**8**	7.13	**8**	5.82	**8**	8.43	**6**	7.83
9 Elementary Occupations	**9**	3.36	**9**	5.03	**8**	4.94	**9**	4.93	**9**	6.81	**9**	6.57	**9**	5.03	**9**	7.40	**9**	6.8

Note: All hourly wage rates adjusted to 2000 prices

Appendix Table A3. Mean hourly wage of full-time NCDS employees by age and gender for Connolly and Gregory occupation codes

Connolly and Gregory categories and (RANKS)	NCDS 4 - AGE 23						NCDS 5 - AGE 33						NCDS 6 - AGE 42					
	WOMEN FT		MEN FT		ALL FT		WOMEN FT		MEN FT		ALL FT		WOMEN FT		MEN FT		ALL FT	
	Rank	Mean FT hourly wage £	Rank	Mean FT hourly wage £	Rank All	Mean FT hourly wage £	Rank	Mean FT hourly wage £	Rank	Mean FT hourly wage £	Rank All	Mean FT hourly wage £	Rank	Mean FT hourly wage £	Rank	Mean FT hourly wage £	Rank All	Mean FT hourly wage £
1. teachers	**1**	6.38	**1**	6.53	**1**	6.44	**2**	11.27	**4**	11.08	**4**	11.19	**3**	10.47	**5**	12.49	**5**	11.23
2. other professionals	**3**	5.98	**3**	6.29	**4**	6.22	**1**	11.76	**2**	12.79	**1**	12.55	**1**	13.22	**2**	14.77	**2**	14.25
3. nurses	**6**	5.25	**8**	5.50	**9**	5.23	**6**	9.16	**5**	10.88	**6**	9.45	**5**	9.77	**6**	10.69	**6**	9.82
4.other associate professionals	**4**	5.64	**3**	6.29	**5**	6.10	**4**	9.86	**3**	12.06	**3**	11.32	**4**	10.27	**3**	13.18	**3**	12.22
5. corporate managers/administrators	**2**	6.21	**6**	6.14	**3**	6.28	**3**	10.25	**1**	13.22	**2**	12.46	**2**	11.22	**1**	17.66	**1**	16.03
6. higher skill services	**4**	5.66	**1**	6.53	**2**	6.38	**5**	9.36	**6**	10.69	**5**	10.49	**7**	7.75	**3**	13.20	**4**	11.96
7.higher level clerical	**7**	5.15	**7**	5.91	**7**	5.31	**7**	7.42	**7**	9.73	**7**	8.21	**8**	7.54	**9**	8.88	**9**	7.89
8.other managers	**12**	3.91	**11**	4.69	**12**	4.46	**9**	7.09	**8**	8.56	**8**	8.06	**6**	8.30	**6**	10.71	**7**	9.70
9.skilled trades	**12**	3.91	**5**	6.23	**6**	5.89	**13**	5.47	**9**	8.15	**9**	7.95	**11**	6.15	**8**	9.59	**8**	9.07
10.lower level clerical	**8**	4.67	**11**	4.72	**11**	4.74	**8**	7.29	**10**	7.29	**10**	7.29	**9**	7.29	**10**	8.21	**11**	7.54
11.caring services	**10**	4.19	**14**	4.12	**13**	4.27	**11**	5.58	**13**	6.54	**14**	5.76	**12**	5.65	**13**	6.54	**14**	5.71
12.other personal services	**9**	4.33	**10**	5.21	**7**	5.30	**10**	5.85	**14**	6.33	**12**	6.20	**10**	6.27	**14**	6.40	**12**	6.23
13.sales assistant	**14**	3.71	**11**	4.70	**14**	4.04	**11**	5.57	**12**	6.93	**12**	6.18	**14**	5.38	**12**	7.47	**13**	5.95
14.other low skill jobs	**11**	4.06	**9**	5.40	**10**	5.12	**14**	5.30	**11**	7.26	**11**	6.97	**13**	5.55	**10**	8.19	**10**	7.61
15. cleaners	n/a	n/a	n/a	n/a	n/a	n/a	**15**	5.21	**15**	5.48	**15**	5.38	**15**	5.10	**15**	5.75	**15**	5.15

Note: All hourly wage rates adjusted to 2000 prices.

Table A4. Extent of vertical occupational mobility in all employed (Men + Women) NCDS samples.

Occupational transition sample	Ranking	% up mobile	% no change	% down mobile	Total %	Sample size
NCDS M+W age 23-33	M+W SOC Age 42 NCDS	32.1	46.0	21.9	100	7323
NCDS M+W age 33-42	M+W SOC Age 42 NCDS	26.3	53.2	20.5	100	8009
NCDS M+W over all history 16 to 42	M+W SOC age 42 NCDS	28.9	47.4	23.8	100	59193
NCDS M+W age 23-33	M SOC age 42 NCDS	33.8	46.0	20.2	100	7323
NCDS M+W age 33-42	M SOC age 42 NCDS	25.9	53.2	21.0	100	8009
NCDS M+W over all history 16 to 42	M SOC age 42 NCDS	28.4	47.4	24.2	100	59193
NCDS M+W age 23-33	W SOC age 42 NCDS	29.9	46.0	24.1	100	7323
NCDS M+W age 33-42	W SOC age 42 NCDS	25.9	53.2	21.0	100	8009
NCDS M+W over all history	W SOC age 42 NCDS	28.3	47.4	24.3	100	59193
NCDS M+W age 23-33	C-G based on W	31.2	41.6	27.2	100	7323
NCDS M+W age 33-42	C-G based on W	27.6	48.8	23.6	100	8009
NCDS M+W all history 16 to 42.	C-G based on W	29.7	43.7	26.7	100	59193
NCDS M+W age 33-42	HG scale based on M	32.6	42.9	24.4	100	8004
NCDS M+W age 33-42	S-G	31.8	39.3	28.9	100	8009
LFS 1997 Q1-Q5 M+W all ages (18-65)	All M+W mean hourly wage LFS SOC major	5.1	91.0	3.9	100	36,947
LFS 1997 Q1-Q5 M+W all ages (18-65)	S-G	6.5	88.4	5.1	100	36,947
LFS 2000 Q1-Q5 M+W all ages (18-65)	All M+W mean hourly wage LFS SOC major	5.4	90.2	4.4	100	35,644
LFS 2000 Q1-Q5 M+W all ages (18-65)	S-G	6.9	87.4	5.7	100	35,644

Table A5. Results of OLS regression on summaries of percentages of upward and occupational mobility.

	Upward mobility	**Downward mobility**
Independent Variables	Coefficient	Coefficient
Constant	28.813	28.145
Rank		
SOC based (ref)		
Connolly+Gregory	1.009	3.016
Hope-Goldthorpe	6.184	2.299
Sicherman-Galor	3.454	4.024
Data		
Men (ref)		
Women	-0.218	-0.621
Full time *women	-1.396	-6.369
Lifecourse		
All history/ages (ref)		
23-33	1.523	-7.858
33-42	-3.958	-5.733
Mobility Period/LFS all ages data		
1.25 years	-24.419	-25.097
Interactions		
Women's rank on men's data	-1.474	-3.183
age 23-33 *women		6.424
age 33-42*women	3.541	
age 23-33*men	4.674	
N	47	47

Table A6. Ranking of 2 digit SOC 90 codes using Sicherman-Galor approach (Equation 2)

SOC 90 2 digit labels	Index	Rank	soc 90 2 digit labels	Index	Rank
23 teaching professionals	9.619	1	66 hairdressers, beauticians etc	5.603	39
20 natural scientists	9.431	2	41 numerical clerks and cashiers	5.473	40
27 librarians etc professionals	9.203	3	42 filing and record clerks	5.414	41
15 protective service officers	9.172	4	49 clerical, secretarial occs nes	5.270	42
22 health professionals	8.921	5	56 printing and related trades	5.184	43
26 architects, town planners, surveyors	8.768	6	45 secretarial etc personnel	5.179	44
34 health associate professionals	8.613	7	43 clerks nes	5.170	45
24 legal professionals	8.607	8	63 travel attendants etc occupations	5.165	46
10 gen managers government, large orgs	8.359	9	50 construction trades	5.124	47
21 engineers and technologists	8.309	10	79 sales occupations nes	4.890	48
29 professional occupations nes	8.298	11	65 childcare and related occupations	4.828	49
25 business & financial professionals	8.055	12	89 plant & machine operatives nes	4.782	50
31 draughtspersons, surveyors etc	7.828	13	69 personal service occupations nes	4.720	51
11 prod managers - manufacturing etc	7.454	14	46 receptionist, telephonists etc	4.603	52
32 computer analysts, programmers	7.448	15	59 other craft related trades nes	4.597	53
33 ship, aircraft, officers, controllers	7.404	16	58 food preparation trades	4.577	54
30 scientific technicians	7.402	17	94 other communication occupations	4.551	55
39 prof, technical occupations nes	7.378	18	84 metal working operatives	4.504	56
12 specialist managers	7.299	19	83 metal making, treating operatives	4.493	57
35 legal associate professionals	7.239	20	82 chemicals paper etc operatives	4.450	58
19 managers, administrators nes	7.174	21	62 catering occupations	4.396	59
36 business, finance associate profs	7.062	22	64 health and related occupations	4.314	60
38 artistic, sports etc professionals	7.033	23	88 other transport, machine operatives	4.302	61
60 ncos etc, armed forces	6.932	24	44 stores, despatch clerks & keepers	4.140	62
13 financial & office managers etc	8.850	25	87 road transport operatives	4.058	63
52 electrical, electronic trades	6.648	26	72 sales, check-out assistants	4.057	64
37 welfare etc associate professionals	6.540	27	73 mobile salespersons & agents	4.055	65
16 managers farming, horticulture etc	6.530	28	86 other routine operatives	3.827	66
70 buyers, brokers agents etc	6.402	29	80 food, drink, tobacco operatives	3.813	67
51 metal machining, fitting etc trades	6.333	30	85 assemblers, lineworkers	3.755	68
40 administrative staff in government	6.140	31	93 other transport occupations	3.634	69
14 managers in transport and storing	5.933	32	55 textiles, garments etc trades	3.565	70
54 vehicle trades	5.848	33	91 other manufacturing etc occupations	3.547	71
61 security etc service occupations	5.837	34	67 domestic staff etc	3.461	72
71 sales representatives	5.819	35	81 textiles, tannery operatives	3.422	73
17 managers etc service industry	5.776	36	92 other construction occupations	3.356	74
57 woodworking trades	5.742	37	99 other occupations nes	3.324	75
53 metal forming, welding etc trades	5.689	38	90 other farming related occupations	3.157	76
			95 other sales, service occupations	2.906	77

Table A7. Independent variables and their OLS model coefficients from model of log hourly earnings estimated to create a S-G ranking scheme (see Equation 1)

Independent variable description	Equation 1 symbol	Coefficient result	Robust tandard errors
NVQ level of highest education as 1-7 scale (zero=no qualifications)	α	1.612**	0.013
Tenure in current job, in months	δ	0.013**	0.000
Whether had training in current job in last 13 weeks, Dummy variable	μ	0.550**	
Gender, female=1	B_1	-1.815**	0.036
Has dependent child	B_2	0.641**	0.037
Constant		4.064**	0.044
Sample size	140,080		
R squared	0.154		

Data: Pooled 4 first quarter LFS from years 1997 to 2000. ** significant at 99 confidence level.