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**Occupational Mobility and Career Paths
in the 'Hourglass' Labour Market**

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Craig Holmes and Gerbrand Tholen

SKOPE, University of Oxford

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Editor's Foreword

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Abstract

This paper looks at how patterns of occupational mobility in the UK have been affected by the change in the occupational structure away from middle-wage routine occupations and towards higher and lower wage non-routine occupations. The first analysis looks to identify the additional mobility created by this shift in the occupational structure – referred to here as displacement – separate from all the other factors which are associated with labour market transitions. Two UK birth cohort studies are used to compare the experiences of workers who entered the labour market in the mid-1970s and the late 1980s respectively. The main conclusion from this analysis is that the older cohort is less mobile in general, but did experience significant increases in occupation mobility associated with the decline in non-routine jobs, while the younger cohort was more mobile in general, but this mobility is largely unaffected by shifts in the occupational structure. This points to a fundamental change in the way recruitment takes place into the growing number of good non-routine jobs. For the older cohort, there were progression opportunities from lower positions, while the later cohort has not benefitted in this way. These conclusions are explained further by looking at a more representative panel dataset from the UK Labour Force Survey (LFS). The LFS records occupational transitions over the previous 12 months for a subset of survey respondents. For routine workers, patterns of mobility are observed that are consistent with those of the cohort analysis. Changes in the upward mobility paths for low-wage service workers are also explored as the number of good non-routine jobs increases. The findings show there is some mobility for these workers, but it is limited by age, qualification and the state of the economy, and is more common in certain industries or occupations where internal progression pathways exist.

1 Introduction

Holmes (2011) looked at how changes in the occupational structure have affected patterns of occupational mobility over the past three decades. Using data from the National Child Development Study (NCDS), a cohort survey spanning 50 years from 1958, it showed that as a group of what will later be defined as ‘routine’ jobs have gone into decline, workers’ movements within the labour market had been affected, increasing mobility both upwards and downwards in the occupational classification. Prior to this paper, little research had been done to separate out this displacement effect from the other reasons why people move between jobs (for example, due to career progression or to overcome job mismatch).

This earlier paper showed the relative size of these displacement effects compared to factors driving labour market transitions. Up to this point, however, it has not been possible to say whether the experience of this single cohort is typical or whether cohorts entering the labour market at different times have been affected in different ways. This present paper extends the earlier analysis by looking at the effect of changes in the occupational structure on mobility and career pathways in a more comparative setting.

To do this, three sources of data are considered. In section 3, data are used from two cohort studies – the NCDS and the British Cohort Study (BCS). The BCS is a follow-up study to the NCDS, comprising a cohort of individuals born 12 years after those in the 1958 group. Following the same methodology, differences in the effect of a decline in routine work on the mobility patterns for workers in those jobs across the two cohorts are examined. The BCS cohort entered the labour market in the late 1980s and early 1990s, some years after the decline in routine jobs began. By comparison, the NCDS cohort had largely entered the labour market by the time this decline had started. Having controlled for differences in academic achievement, vocational training and labour market experience, any residual difference between the two cohorts is then examined. The findings show that while the younger cohort is more mobile in general, their mobility is less related to the decline in routine jobs than in the earlier cohort. One explanation for this might be that recruitment patterns change between the two cohorts. In particular, occupational mobility helps support the change in the occupational structure in the earlier cohort – the growth in employment share of good non-routine job is facilitated by increasing occupational mobility from the

declining routine job portion of the labour market. The mobility of the later cohort, on the other hand, does not support changes in the occupational structure in the same way. The greater mobility of the later cohort in terms of the frequency of transitions suggests something more fundamental has happened to the progression paths and career volatility of these individuals.

In section 4, data are used from the UK Quarterly Labour Force Survey (LFS). As well as supplying detailed cross-sectional data on the state of the labour market at any point in time, it also includes information about changes in work outcomes over the previous 12 months. Hence, we are able to look at mobility patterns across the entire labour force between routine and non-routine jobs across three different periods of time – the early 1990s, the early 2000s and the late 2000s. By comparing patterns of occupational transition between these three time periods, the original analysis is complemented by looking for the effect of routine job displacement across a cross-section of the entire labour market (rather than just a single cohort). Further, the paper investigates whether the onset on the global financial crisis and subsequent recession in the UK has altered these mobility paths. In addition, data are used to explore transitions other than those from routine jobs. As will be discussed in section 2, some non-routine jobs are lower paid and tend to be lower-skilled, including many personal service and retail occupations. Before the decline of routine jobs, which tend to be medium skilled and better paid, lifecycle career progression may have involved transitions into more skilled routine jobs. However, as the low-paid jobs grow and middle wage jobs decline, such transitions become increasingly difficult. One possibility is that this creates a bottleneck where upward mobility becomes more infrequent for those trapped in the lowest wage jobs. Alternatively, workers may establish new career paths as the occupational structure changes. LFS data are used to examine what has happened to transitions from these lower paid non-routine jobs.

Section 5 concludes with the implications of this research for recent interest in social mobility, particularly that which has emphasised the importance of education, training and skills. Under a human capital viewpoint, the only thing that should matter is the combination of their education, skills and productive capabilities. Barriers to mobility from one occupation to another can be overcome by investing in new skills and training. This paper identifies non-human capital barriers, focusing particularly on the changing occupational structure.

2 Background

The occupational composition of many national labour markets has changed significantly over the past 30 years. The sort of jobs firms require and create depends on a number of factors, but one of the key ones is the current level of technology. As the general level of technology improves, firms are able to invest in more, better and cheaper capital, particularly computerised machinery. Some jobs may be complementary to the introduction of new technology, while others may be substitutable. For example, if engineers are more productive because they now work with an upgraded computer system or software design package, then the demand for engineers increases as firms seek to capitalise on their increased productivity (and profitability). In contrast, an automated production process may replace part, or all, of the workers on a production line. These different changes can appear within a single firm – the same automated production process that reduces employment of production line workers may require firms to employ more highly skilled production supervisors to monitor or programme it.

One viewpoint is that jobs which are most complementary to technological improvements are more highly skilled, while jobs which are substitutable with these advances are low skilled. This is commonly referred to as skill-biased technical change. Autor, Levy and Murnane (2003) present a refinement of the skill-based technical change (SBTC) view. They argued that technology used in the production of goods and services was related to particular tasks performed by workers, rather than the skill levels of those workers. Jobs which predominantly performed routine tasks were replaced by new technology whilst those which performed non-routine tasks were not. Non-routine work may be complementary with new technology, although this is not always the case. This process is referred to by the authors (and in this paper) as routinisation.

Others have stressed the importance of international outsourcing in labour demand for different skill groups (e.g. Feenstra and Hanson 1996, Arndt 1999, Kohler 2004). Echoing the debate around the effect of technological progress, economists agree that low-skilled work is more under threat than high skilled work (Feenstra and Hanson 1996, Egger and Egger 2003) and that routine work is more likely to be outsourced than non-routine work (e.g. Blinder 2009).

Whatever the explanation, non-routine work has grown in the past three decades. Goos and Manning (2007) argued that non-routine work fell into two categories – high wage, high skilled (or ‘lovely’) jobs, where the tasks performed could largely be classified as non-routine abstract or creative, or low wage, low skill (or ‘lousy’) jobs, where the tasks could be considered non-routine manual or service. Routine jobs tended to be middle wage, such as process operatives in manufacturing and some administrative jobs. This observation leads to the polarisation hypothesis, with increasing employment at high-paying and low-paying jobs and falling employment for middle-income jobs. This is sometimes referred to as the hourglass labour market.

Goos and Manning examined changes in employment shares between 1979 and 1999 in the UK for occupations, ranked by their initial median wage in 1979 as a measure of the each job’s quality. They find that there has been employment growth at both ends of the pay spectrum and declines in the middle. Similar U-shaped patterns of employment growth across the occupational-quality spectrum has been found in numerous other countries, including the US (Autor, Katz and Kearney 2006, Caranci and Jones 2011), Germany (Spitz-Oener 2006, Oesch and Rodríguez Menés 2011), Spain and Switzerland (Oesch and Rodríguez Menés 2011) and across Europe (Goos, Manning and Salomons 2009).

The polarised labour market has implications for earnings, job quality and skill needs. A small number of authors have also explored the implications of routinisation for occupational mobility. One issue is what happens to workers in routine occupations. Cortes (2012, chapter 2) argues that a simple model of occupational selection (similar to that presented by Autor, Katz and Kearney 2006) would predict that as demand and wages for routine occupations falls, the productive ability of workers in these jobs is a key determinant of mobility patterns. Low ability routine workers, earning lower-than-average routine occupation wages, will transition towards low-skill non-routine jobs, while high ability routine workers will transition towards higher wage non-routine occupations. Middle ability routine workers are more likely to remain in these jobs as they benefit less from either transition. Using US panel data, Cortes finds evidence consistent with this model – the probability of downwards transitions is negative correlated with the ability of routine workers, while the probability of upward transitions is much higher for those of high ability. Autor and Dorn (2009) look at how the decline in routine jobs has changed job opportunities

in the US. To investigate this, they examine the prediction that local labour markets more heavily dominated by routine occupations in 1980 will have experienced larger shifts in employment share towards non-routine occupations over the subsequent decade. In their analysis, they confirm this prediction, and show that these effects were much larger for younger workers of all education levels. They explain that one reason routine occupations were 'getting older' was that workers were more likely to remain in routine occupations if they had more specific routine task-related skills. Younger workers, with less routine specific skills, are more mobile while new entrants would be less keen to enter these jobs. They also show that in areas most affected by routinisation, increases in employment of good, non-routine jobs was only observed for younger (16-29 years old) college educated workers. Employment of non-college educated middle-age workers and older workers in good non-routine jobs actually decreased in local labour markets which started with a high share of routine jobs. At the same time, these areas saw increased employment in lower-wage non-routine jobs for less educated young people and all middle-age and older workers. Overall, areas most affected by the decline in routine jobs experienced few good non-routine job opportunities and saw a large increase in lower-wage non-routine occupations.

Holmes (2011) looked at what has happened to routine workers and the importance of routinisation in the UK using longitudinal cohort data from the National Child Development study. The main difference between this paper and the Autor and Dorn study was that it estimated individual transition probabilities from routine occupations, rather than aggregate changes at the local labour market level. The effect of routinisation on individual transition probabilities was captured using the total decline in routine jobs during a succession of shorter periods of time over the period 1981-2004. The results were consistent with the Autor and Dorn analysis. Periods of time where more routine jobs were being lost were associated with increased mobility from routine occupation, towards both higher wage and lower wage non-routine occupations. This was mediated by the qualifications and working experience of workers, with more qualified displaced workers moving towards good, non-routine jobs with greater frequency, while individuals with more routine-specific experience were less likely to be displaced.

Section 3 contributes to this question of what happens to routine workers by comparing two cohorts together to see how younger and older workers have been

differently affected by the change in the occupational structure. In section 4 this analysis is complemented by looking at patterns of transitions from routine occupations made across the entire labour force. However, transitions from routine occupations are not the only aspect of mobility that might be influenced by the change in the occupational structure. Transitions from both high-wage and low-wage non-routine occupations may also be affected. Nunn *et al.* (2007) observe that the decline of middling jobs may impede individuals' ability to move from 'low quality' to 'high quality' work. Implicit in this is the idea of individual progress by small steps and that careers develop through skill being developed and one job allowing access to other, better jobs. Moreover, they note that 'as the period of increased absolute mobility driven by the changing occupational structure comes to an end, opportunities for mobility may be further constrained, relative to previous decades.'

The effect of changes in the occupational structure on job transitions has to be considered against a background of an overall increase in levels of occupational mobility. Tomkins and Twomey (2000) compare the frequency of occupational transitions in England between 1975 and 1995, finding that mobility increased during the period 1990-1995. Similarly, Kambourov and Manovskii (2008) show that occupational (and sectoral) mobility has increased in the US between 1969 and 1997. Using six broad occupational groups (professionals, managers, clerical and sales, craftsmen, operatives and labourers and service workers), they look at the average number of transitions between each of these groups across three shorter time periods. They find that the increase in mobility is common to all groups (with the exception of operatives). An important question is how much changes in the occupational structure have played a role.

Tomkins and Twomey (2000) model transitions between 22 occupational groups at the aggregate level number of transitions made.¹ Mobility was more commonplace for destination occupations that were growing faster, as would be expected. However, there was no evidence of the anticipated negative relationship between slower growing (or declining) origin occupations and higher mobility. In the

¹ They use a Poisson distribution based model, which predicts the conditional probability of observing a given number of transitions in a particular period. The probability is conditional on factors relevant to either the origin or destination occupation (such as employment share growth or the mean wage), relative factors (such as the skill difference between the two occupational groups) and other factors (such as the proportion of moves within the public sector and geographic information). In this paper, we use a logit model, which predicts the probability that a single individual makes a particular type of transition.

period 1985-1990, workers in faster growing origin occupations were more likely to make an occupational transition, not less likely. If this result is correct, then there is a challenge to explain it. One possibility is that careers develop when individuals develop capabilities through working experience that allows for progression to better jobs. Such career paths connect one job to a small number of better jobs, as there needs to be an overlap in skills (Sicherman and Galor 1990). We might imagine that non-routine occupations are connected to each other in this way (for example, retail assistants and managerial positions within the company), but that routine occupations are not. Therefore, one explanation for the above results might be that a growth in demand for good non-routine jobs increases the mobility of lower level non-routine workers allowing progression upwards. Meanwhile, vacancies in lower level or entry non-routine jobs are filled more by new labour market entrants than displaced routine workers.

Some evidence for this is suggested by Kambourov and Manovskii (2008). Using their six occupational group analysis of transitions, their transition matrix (Table 5, pg. 73) reveals mobility from labourers and service workers towards routine occupations (defined as operatives here) declined between 1975 and 1995, while mobility towards better non-routine jobs increased, suggesting individuals were increasingly making new sorts of progression steps.

Finally, Rhein and Trübswetter (2012) argue that the link between changing occupational structure and increases in mobility is not simple and may depend on characteristics of a particular labour market. They compare occupational mobility trends and changes in the occupational structure between Britain and Germany. They find that while the number of occupational transitions is three times higher in the UK than in Germany, occupational structure changes were more pronounced in Germany. In terms of net transitions, the relationship between inflows and employment share change was stronger in Germany, suggesting that increases in employment shares of occupations in the UK relied more heavily on transitions into employment from non-employment and new labour market entrants, while decreases in employment shares lead to transitions into unemployment. The authors conclude that, unlike what is commonly assumed, occupational mobility may not always support structural changes in occupational employment shares.

3 Occupational Mobility: A Cross-Cohort Comparison

This section explores job transitions from routine occupations made by individuals in two cohorts over the past three decades. In particular, distinction is made between transitions which could be thought of as career progression, or those resulting from mismatch, and transitions which result from a decline in the number of routine jobs available (displacement). The main aim here is to discover how a change in the number of routine occupations has affected the occupational outcomes of existing routine workers, and to compare whether displacement has affected both cohorts in an identical fashion, or if the two cohorts have been affected in different ways by the decline in routine jobs. These results are related to wider issues about the change in occupational mobility over the past three decades.

3.1 Methodology

The starting point is the observation that, if the occupational structure remained constant, we could look at transitions over time to learn about career paths. When the occupational structure is disturbed, for example, when some individuals are displaced from declining routine jobs and non-routine jobs are expanding, then simply looking at the occupational mobility over time may capture both those moving due to career motivations and those displaced by routinisation. Ideally, we would compare two cohort studies, looking at the probability of moving between different occupational categories for a workforce unaffected by routinisation and one that entered the labour market just as routine occupations began to decline. However, an appropriate early cohort does not exist in the UK data.

The approach in this paper follows our earlier work (see Holmes 2011). Occupation of work data in the two cohort studies are reclassified into one of six occupational categories. There are three broad occupational groups, as discussed in the introduction – routine occupations, and high-skill and low-skill non-routine occupations. Within high-skill non-routine occupations, jobs are split into three categories – professional, managerial and intermediate. Growth in non-routine occupations does not happen proportionally across these three categories and on that basis it makes sense to distinguish between them. Moreover, entry requirements for these jobs differ significantly. Professional occupations usually require higher qualifications as entry requirements. Similarly, intermediate occupations tend to

require some specific skill or capability (although at a lower level than the professions). This distinguishes both from managerial occupations which, while some may have qualification barriers, tend to also require a combination of learned expertise, knowledge and soft or inter-personal skills. Low skill non-routine occupations are divided into service occupations and manual non-routine. Most of the expansion of low-wage work has occurred through the growth of services; however, there are a few manual jobs which have not declined in employment share. Two additional groups are also included – unemployed and inactive or non-employed – as possible destinations for displaced routine workers.

Transitions between these groups are examined across a number of periods of time, meaning that each individual in each cohort reports an origin and a destination occupational group in each period. There are data from two cohorts (described in section 3.3). For the earlier cohort data, five periods are used: 1981-1986 1986-1991, 1991-1995, 1995-1999 and 1999-2004. For the younger cohort, four periods are used: 1992-1996, 1996-2000, 2000-2004 and 2004-2008. These years were chosen based on when each cohort study collected waves of data, so individuals were mostly responding to questions about current employment, rather than recollections about earlier employment, and are likely to have given more accurate answers.

The dependent variables of the analysis is a dummy indicating whether the individual is in a given destination occupational group at the end of the period. Focusing just on those who originate in routine occupations, the factors affecting the probability transitions to destination occupational groups are estimated using a logit model, where the independent variables are qualifications, age, specific experience and two demographic variables (gender and ethnicity). A regression is estimated for the probability of moving from routine to each of the non-routine occupations.

To capture the effects of changes in the occupational structure, a measure of displacement is introduced within a given period. The decline in the total number of routine jobs across the whole labour market is used in estimations to capture the extra mobility from routine occupations caused by this. Table 3.1, below, summarises this measure for six periods.

Table 3.1: Measure of displacement, 1981-2008

	1	2	3	4	5	6
Drop in proportion of routine jobs	-5.83%	-5.64%	-3.52%	-1.60%	-5.68%	-2.22%
Rate of decline	-10.91%	-11.85%	-8.39%	-4.15%	-15.42%	-7.11%
DISPLACEMENT	0.1091	0.1185	0.0839	0.0415	0.1542	0.0711
NCDS age	23	28	33	37	41	-
BCS age	-	-	22	26	30	34

Source: LFS, own calculations. Note: Due to the timings of surveys, periods 3-5 are one year apart for each cohort.

The baseline model includes all of the variables. Following on from that, a number of additional specifications are introduced with interaction terms between the measure of displacement and the qualification variables (see Holmes 2011, for a discussion on the methodological issues related to interaction terms in logit models). These specifications are to test whether, following the change in the occupational structure, different individuals do better or worse.

3.2 Comparison of methodology with related work

Using large occupational groups is not unusual in research into occupational mobility (see Booth *et al.* 1999, Kambourov and Manovskii 2008) but it is obvious that occupational movements between large groups are naturally less likely to occur than between more narrowly defined occupational classifications (Dex and Lindley 2007). Therefore, our approach does not pick up all occupational mobility in the way that approaches which use many more occupational codes do (e.g. Moscarini and Thomsson 2008, Hauku 2011). However, given the size of the dataset, it would be impossible to extract anything meaningful from markedly narrower groups. In addition, broader occupational groups reduce distortions in the data that result from converting different occupational classifications to a common system over the long time period used in this study. Finally, it should also be remembered that the focus of this paper is on the move between two large occupational groups – routine and non-routine jobs. Some detail is sacrificed at the occupational level to establish the trends at the aggregate level in fundamental changes to workers' labour market position.

The second distinct feature of our approach is to use cohort data over a longer time span. While this approach is not novel (e.g. Budoki and Goldthorpe 2009), short time spans using cross sectional data are more commonplace. The long time period is

important as it is necessary to establish some variation in the rate of decline of routine jobs in order to establish what role it has played in shaping patterns of occupational mobility.

Finally, it has been well established within the literature that that macro-conditions matter in nature and frequency of labour market transition (e.g. Diprete 2002, Gangl 2004, Brzinsky-Fay 2007). Yet macro-economic labour market conditions, such as the changing structure of occupations, are usually not included in cohort studies on occupational mobility. Introducing a macro-level measure of the decline in routine jobs represents a new contribution to this literature.

3.3 Data

The analysis in this section uses data from the National Child Development Study (NCDS) and the British Cohort Study (BCS). The members of the NCDS study were all born in a single week in March 1958. Data have been collected on these members in a series of waves. The most useful waves for assessing labour market outcomes over a period where routinisation has taken place are between the fourth and seventh waves, taken in 1981, 1991, 1999-2000 and 2004-5 respectively. The fourth wave is the first one taken after the school leaving age (respondents were aged 23) and records early labour market experience. The seventh wave was completed in 2004-5 (respondents were aged 46-47), and has recent data on wages, employment and education. We construct a working life history over this time period using responses from all four waves, including periods of employment, unemployment, self-employment and non-participation for a number of reasons such as sickness or further education.

The members of the BCS study were all born in a single week in April 1970. Since then, data have been collected in 1975, 1980, 1986, 1996, 1999/2000 and 2004/2005 and 2008/2009. For the purposes of our analysis, the last four waves were selected, given the working age of the respondents (respectively 26, 30, 34 and 38). As with the NCDS analysis, labour market history is examined going back to 1992, covering changes in participation and occupation, as well as educational changes over time. Not all waves present the same questions to respondents and some waves collect data from a relatively small subsample.

As with all longitudinal studies, there are missing data. The sample size for the NCDS cohort is around 12,000 for the fourth wave, and around 10,000 for the seventh

wave. The BCS cohort started out with 16,571 respondents in 1970. The number of respondents drops to 8654 (55.2 per cent) in 1996, increases to 10,833 in 2000 and then drops to 9316 in 2004 and 8874 in 2008.

Occupations

Occupations of employment are measured using the most detailed available occupational coding. One problem with doing this over a long period of time is that the system of coding occupations has changed three times since 1980. For the NCDS data, the 1981 wave uses the KOS (Key Occupations for Statistical Purposes) system of job title classification, which categorises occupations within the 18 CODOT (Classification of Occupation and Directory of Occupational Titles) major groups, while the 1991 and 1999 surveys use SOC90 and the 2004 wave uses the SOC2000 classification. The SOC2000 coding system of occupations has a four level classification system, from major group (first digit) to unit group (fourth digit). To make data comparable, a conversion system was derived between KOS and SOC2000 codes, using the descriptions of occupations provided for each group. The conversion is not always perfect (see Holmes 2010, for a discussion). In some cases a category in SOC2000 could apply to several categories under KOS (and vice versa) and subjective judgements have been made. In some cases, observations have been dropped because it was not possible to place one KOS code into a single SOC2000 code. Total exclusions on this basis account for 5.18 per cent at the minor group (three-digit) level for the 1981 survey.

A similar conversion was created between SOC90 and SOC2000, which was also used for the BCS data. These two classification systems had much more overlap in terms of the descriptions of each category. A conversion was made from each SOC90 occupation to a 4-digit SOC2000 category, where descriptions were on a similar level of aggregation. These were then reduced into 3-digit categories which are used in the analysis.

Each 3-digit category was assigned to one of the six occupational categories, as shown in Appendix 1. The allocation between different occupational categories was based on the wages, description and change in employment share (using UK Labour Force Survey data). Aside from a few obvious cases (such as those which are clearly professional from the descriptions), a routine occupation is defined as one which

experienced a significant decline in employment share over the period 1981-2008. The wages and descriptions are used as a common sense check – all these occupations have middle range wages and their descriptions suggest the work involves administrative or manual processes which could be replaced by computer technology. Two additional categories are included: unemployed and economically inactive.

Educational attainment

Across the multiple waves of the NCDS and BCS data used in this paper, there are numerous systems for recording educational achievement, including detailed data on a wide range of vocational courses which have declined in importance in recent years. As a way to bring all of this data together, the highest NVQ equivalent level across time is recorded. Each individual has two educational variables – a highest NVQ level in academic courses and a highest NVQ level in vocational courses, with both ranging from 0-5. Due to measurement error, the data sometimes implies that individuals are less qualified at a future date than they reported being at some date in the past. We correct the data to ensure that each period, NVQ levels are at least as high as they were in the past.

Experience

Age of the individual cohort members is included in the analysis, which captures labour market experience and is also correlated with numerous non-work factors that affected mobility (such as marriage, family and caring responsibilities). In addition, a measure of the experience in routine occupations is included, which captures the feature that the development of specific skills in a certain occupation reduces mobility (Autor and Dorn 2009). Specific experience is measured by the number of years spent working in routine occupations prior to the current period of transition.

Descriptive statistics

Table 3.2 shows the employment share of employed workers in different cohorts at selected times for both NCDS and BCS as well as representative data for the whole workforce derived from the Labour Force Survey and Quarterly Labour Force Survey (from 1992 onwards).

Table 3.2: Employment shares by occupational group, 1981-2004

	NCDS 1981	LFS 1981	BCS 1996	QLFS* 1996	NCDS 2004	BCS 2004	QLFS* 2004
Cohort	Age 23 years	Labour force	Age 26 years	Labour force	Age 46 years	Age 34 years	Labour force
Professional	10.1%	10.0%	13.6%	12.6%	17.2%	16.2%	14.4%
Managerial	12.1%	10.1%	15.9%	12.8%	18.1%	17.4%	14.8%
Intermediate	14.0%	5.8%	14.0%	12.7%	14.9%	16.3%	13.7%
Routine	45.7%	56.1%	37.9%	40.2%	28.4%	29.2%	30.8%
Manual	6.4%	5.1%	5.7%	5.0%	7.1%	6.4%	5.8%
Service	11.7%	12.89%	12.9%	16.7%	14.5%	14.5%	20.5%
Total employed	9844	84471	10678	61564	6592	7989	58495

Source: NCDS and BCS, LFS own calculations. *Q1

Table 3.2 shows that routine employment has fallen in both cohorts. For the older NCDS cohort, it has fallen from 45.7 per cent to 28.4 per cent during the time period of the data. The younger cohort was far less likely to be employed in routine jobs at a comparable age (37.9 per cent compared to 45.7 per cent). By 2004, the final year of data for both cohorts, employment in routine occupations has fallen below 30 per cent for younger and older workers. Older workers are slightly more likely to be working in the top end managerial and professional jobs – reflecting the fact that they are further along with their careers – but all non-routine categories have grown in employment share. Compared to the whole workforce (LFS) the occupational distribution of the two cohorts matches reasonable well. For both groups there are relatively more managerial, professional and intermediate workers and less routine and service workers than in the workforce as a whole, which might reflect the absence of migrant workers in the cohort studies.

Table 3.3 shows a selection of other statistics for each cohort, looking at 1991-2 and 2004. Both cohorts have an even proportion of male and female participants, and just under 4 per cent of the sample are from a non-white British ethnic group. This is lower than the British workforce as a whole, where 5.5 per cent and 7.6 per cent consisted of non-white individuals in 1994 and 2004 respectively. Again, this reflects the effect of post-1970 migration patterns. The younger cohort is more academically qualified, with a higher proportion staying in post-compulsory

schooling. However, far fewer of the younger cohort have Level 3 vocational qualifications.

Table 3.3: Cohort demographic and educational statistics

	NCDS 1991	BCS 1992	NCDS 2004	BCS 2004
Female	50.7%	51.0%	51.3%	51.0%
Non-white	3.9%	3.7%	3.9%	3.7%
Academic level 3 qualifications	8.4%	10.7%	7.3%	10.9%
Vocational level 3 qualifications	10.3%	2.7%	12.4%	5.7%
University graduates	13.5%	15.0%	18.1%	19.1%

Transition matrices

Tables 3.4 and 3.5 show the transition between different occupational groups for each of the two cohorts. These tables show that the younger cohort is more occupationally mobile than the older cohort, with fewer individuals remaining in an occupational group during any given period of transition. One explanation for this could be the data for the BCS cohort looks at a shorter period of time than the NCDS cohort, earlier in the life cycle.

Table 3.4: NCDS cohort mobility matrix, all periods

% Origin	Destination							
	Professional	Managerial	Intermediate	Routine	Manual	Service	Unemployed	Inactive
Professional	85.4	4.5	2.8	2.4	0.4	0.8	0.8	3.0
Managerial	2.9	81.8	3.1	5.2	0.9	2.1	0.9	3.1
Intermediate	3.8	4.8	76.9	4.8	0.5	2.6	1.0	5.7
Routine	2.1	4.3	2.8	76.0	1.4	4.1	2.0	7.3
Manual	0.8	2.3	1.1	5.6	85.6	0.9	2.0	1.7
Service	1.5	3.7	3.2	9.4	0.2	70.8	1.4	9.7
Unemployed	4.1	5.1	5.2	22.2	3.9	7.9	38.4	13.3
Inactive	4.8	2.8	5.1	11.1	0.5	9.6	1.2	64.9

Table 3.5: BCS cohort mobility matrix, all periods

% Origin	Destination							
	Professional	Managerial	Intermediate	Routine	Manual	Service	Unemployed	Inactive
Professional	70.2	10.6	5.8	6.0	0.4	1.3	1.4	4.3
Managerial	6.6	62.7	7.5	10.1	1.7	4.9	1.9	4.6
Intermediate	5.9	9.4	66.3	8.3	0.5	3.5	1.3	4.8
Routine	4.3	6.8	5.2	67.8	2.3	4.7	2.6	6.4
Manual	1.3	4.1	1.4	9.7	77.1	1.7	2.9	1.8
Service	2.8	7.0	6.8	9.1	0.7	58.2	2.6	12.7
Unemployed	9.3	7.3	9.0	25.2	3.9	11.2	20.7	13.5
Inactive	10.4	9.7	8.5	22.0	2.7	12.5	3.0	31.3

Tables 3.6 and 3.7 show the transitions made between different occupational groups for each of the two cohorts when both were at a similar age: 1986-1991 for the NCDS cohort and 1996-2000 for the BCS cohort. These show that the BCS cohort was more occupationally mobile even comparing individuals of a similar age. This confirms the trend highlighted in section 2 – occupational mobility has increased in recent years. One reason for this may be that the younger cohort have higher levels of academic attainment, which is associated with greater mobility. Similarly, they have fewer vocational qualifications tying them to particular jobs that employ those skills. Changes in the occupational structure may also have played a role if younger workers were in the labour market during a more turbulent period. In the next section, we test for the importance of these factors on those in routine jobs.

Table 3.6: NCDS cohort mobility matrix, 1986-1991

% Origin	Destination							
	Professional	Managerial	Intermediate	Routine	Manual	Service	Unemployed	Inactive
Professional	79.0	7.2	4.1	2.7	0.4	0.9	1.2	4.5
Managerial	3.2	76.8	3.9	6.5	0.9	2.9	1.2	4.5
Intermediate	6.0	7.7	67.0	6.3	0.6	3.2	1.3	8.0
Routine	3.3	6.4	3.6	69.8	1.6	4.7	2.5	8.2
Manual	0.4	1.9	1.6	5.4	85.3	1.2	2.7	1.6
Service	2.3	5.9	4.8	12.5	0.7	60.8	1.9	11.3
Unemployed	3.2	3.7	4.8	24.3	4.5	9.8	36.2	13.7
Inactive	3.9	3.3	5.4	14.3	0.4	13.8	1.2	57.8

Table 3.7: BCS cohort mobility matrix, 1996-2000

	%	Destination							
		Professional	Managerial	Intermediate	Routine	Manual	Service	Unemployed	Inactive
Professional		69.1	10.9	6.4	5.5	0.4	0.7	2.2	4.9
Managerial		7.3	57.3	8.8	11.3	1.4	5.3	2.8	5.9
O r i g i n	Intermediate	6.0	8.7	62.0	10.5	0.4	3.8	2.2	6.6
	Routine	5.0	7.1	4.8	64.8	2.2	4.1	4.0	8.0
	Manual	0.6	3.9	1.3	10.5	74.5	1.7	4.6	3.0
	Service	3.2	8.5	7.4	8.2	0.4	49.7	4.3	18.2
	Unemployed	6.1	3.2	6.3	15.5	3.4	8.0	33.7	24.0
	Inactive	6.0	2.9	3.7	5.8	0.6	8.9	7.3	65.0

3.4 Results

Displacement

In the first estimation, we test what factors affect the probability of remaining in routine occupations. The results of a number of specifications of the logit model are shown in Table 3.8. The first specification can be thought of as a basic econometric estimation of transitions, controlling for demographic differences, qualifications and experience. Model (2) shows that omitting the displacement leaves out an important driver of mobility. Cross-cohort differences also matter. Finally, the full model (4) includes displacement, cohort and interaction effects.

Differences in qualifications affect the likelihood of remaining in routine occupations in the expected way, with higher level qualifications associated with an increased likelihood of leaving routine occupations. Low level vocational qualifications are also associated with an increased likelihood of moving away from routine occupations (relative to the reference group of level 3 vocational qualifications) while low level academic qualification holders are more likely to remain in routine occupations (relative to those at academic level 3). The destination of such movers is investigated later in this section.

Table 3.8: Logit regression on the probability of remaining in a routine occupation

	(1)	(2)	(3)	(4)
FEMALE	-0.567 ***	-0.571 ***	-0.581 ***	-0.592 ***
NONWHITE	0.078	0.076	0.060	0.062
AGE	0.003	0.003	-0.006	-0.014 **
ROUTINE EXP	0.083 ***	0.089 ***	0.090 ***	0.095 ***
COHORT		-4.964 ***	-0.407 ***	-1.648 ***
DISPLACEMENT			-5.672 ***	-13.874 ***
DISPLACEMENT*COHORT				12.456 ***
VOC LEVEL 0	-0.204 ***	-0.233 ***	-0.203 ***	-0.208 ***
ACAD LEVEL 0	0.353 ***	0.342 ***	0.319 ***	0.312 ***
VOC LEVEL 1	-0.304 ***	-0.293 ***	-0.257 ***	-0.240 ***
ACAD LEVEL 1	0.296 ***	0.289 ***	0.287 ***	0.276 ***
VOC LEVEL 2	0.025	0.030	-0.008	-0.014
ACAD LEVEL 2	0.100 *	0.095	0.073	0.071
VOC LEVEL 4	-0.369 ***	-0.377 ***	-0.382 ***	-0.394 ***
ACAD LEVEL 4	-0.819 ***	-0.839 ***	-0.821 ***	-0.810 ***
VOC LEVEL 5	-0.652 ***	-0.608 ***	-0.731 ***	-0.749 ***
ACAD LEVEL 5	-1.085 ***	-1.090 ***	-1.055 ***	-1.051 ***
CONSTANT	0.948 ***	1.416 ***	1.926 ***	3.014 ***
N	19878	19878	19878	19878
Pseudo R ²	0.069	0.073	0.079	0.087

Estimation: Logit (remain in routine occupation | started in routine occupation) Note: *** = sign. at 1% level; ** = sign. at 5% level; * = sign. at 10% level.

The model controls for age, specific experience in routine occupations and cohort membership (which takes a value of 1 if the individual was in the younger BCS cohort and 0 otherwise). There are two findings here, neither of which is unexpected. First, prior experience in routine occupations increases likelihood of remaining in these jobs. Second, the younger cohort, everything else being equal, is less likely to remain in routine occupations.

Finally, the model shows a large negative effect on the decline in the overall employment share of routine jobs on the likelihood of remaining in these jobs. However, this effect is only found for the older NCDS cohort. The mobility of the BCS cohort is unaffected by this change in the occupational structure – this can be

seen through the interaction term between DISPLACEMENT and COHORT, which almost cancels out the standalone DISPLACEMENT effect. At first glance, this is surprising – once differences in specific skills and qualifications are controlled for, we would expect that a fall in the overall number of routine jobs would displace all routine workers in a similar way.

Table 3.9: Logit regression on the probability of remaining in a routine occupation, by cohort

	BCS		NCDS	
FEMALE	-0.469***	-0.472***	-0.724***	-0.705***
NONWHITE	0.144	0.146	0.023	0.026
AGE	-0.135***	-0.096***	0.021***	0.028***
ROUTINE EXP	0.133***	0.983***	0.078***	0.293***
AGE * ROUTINE EXP		-0.027***		-0.006***
DISPLACEMENT	1.197**	-0.959	-13.863***	-12.247***
VOC LEVEL 0	-0.192**	-0.193***	-0.171**	-0.162**
ACAD LEVEL 0	0.530***	0.514***	0.016	0.013
VOC LEVEL 1	-0.174	-0.165	-0.289***	-0.251**
ACAD LEVEL 1	0.366***	0.364***	0.152	0.145
VOC LEVEL 2	-0.037	-0.034	0.025	0.031
ACAD LEVEL 2	0.171**	0.157*	-0.073	-0.076
VOC LEVEL 4	-0.409***	-0.419***	-0.392***	-0.378***
ACAD LEVEL 4	-0.712***	-0.720***	-0.920***	-0.903***
VOC LEVEL 5	-0.403	-0.426	-0.808***	-0.805***
ACAD LEVEL 5	-1.321***	-1.307***	-0.644*	-0.655*
CONSTANT	4.254***	3.317***	2.231***	1.798***
N	8040	8040	11838	11838
Pseudo R ²	0.068	0.077	0.113	0.115

To start to investigate this further, the same regression is run for the two cohorts separately. The results are shown in the first and third column of Table 3.9. One difference between the two cohorts is that age affects mobility in different ways – in the BCS cohort, older workers are more mobile than younger workers, whereas in

the NCDS cohort, older workers are more likely to remain in routine occupations.² This suggests that for the BCS cohort, routine jobs were acting more like a ‘stepping stone’ or transitory job. To investigate the relationship between age (a proxy for labour market experience) and specific routine experience, an interaction term for age and routine experience is included in the logit regression. The results in the second and fourth column of Table 3.9 show a negative effect.³ This is consistent with Sicherman and Galor’s (1990) model, where older workers who have built up sufficient experience at one level have access to higher level jobs. It may also be consistent with the idea that older workers who have built up a lot of experience in one area are adversely affected if those specific skills and experiences are found to be in less demand. This section later looks at how these variables relate to the destination of non-routine occupational groups, unemployment and non-employment in an attempt to distinguish between these two views.

However, many of the effects are similar. Demographics, specific experience and qualifications, although there are some differences in magnitude, follow the same general trends. This still leaves an unexplained difference in the way the decline in the overall share of routine occupations is related to mobility of the two cohorts.

Progression opportunities

One explanation for this is that there may be variation within the types of jobs where routine workers are found. Some jobs may be part of a career path that leads upwards to good non-routine jobs, while others are not. However, these career paths may have changed over time, particularly as the occupational structure changes and the relative number of non-routine jobs increases. In addition, the younger cohort has the advantage of entering the labour market once this trend was already underway. They may take this into account when entering into employment and may, as a result, not be

² Estimations based on the combined model are less precise than the separate cohort model because of the different effects of age. Under the full combined model, the probability of 30-year old white male with level 3 academic qualifications only remaining in a routine occupation when 10% of routine jobs have been lost are 75.3% and 86.9%. Under the separate models, these probabilities are 68.8% and 89.3%. For an equivalent 35 year old, the gap in predicted probabilities is even greater under the separate cohort models (53.3% and 90.4%), while the combined model predicts little change.

³ Following Ai and Norton (2003), we note that a significant coefficient and a significant effect on estimated probabilities are not the same when interaction terms are introduced in a logit model. Holmes (2011) discusses how to test for this significance. Throughout this paper, a reported significant effect means that these tests have been carried out. However, they are not included in this paper for reasons of space. These data are available upon request.

as affected by displacement. Potentially, those that do choose to go into routine occupations do so because these jobs offer particular career advantages that outweigh the fall in employer demand for them.

Table 3.10 describes the types of routine jobs that each cohort works in at a comparable point in their employment histories (aged 28 for NCDS cohort and 26 for BCS cohort). The BCS cohort is more likely to be found in administrative routine occupations than the NCDS cohort. They are less likely to work in skilled, semi-skilled or unskilled routine manual work.

Table 3.10: Employment shares of routine occupations, by SOC2000 major group

	NCDS	BCS
Associate professionals and technicians	1.3%	1.1%
Administrative occupations	31.6%	38.2%
Skilled trades	23.9%	22.3%
Process, plant and machine operatives	27.0%	24.0%
Elementary occupations	16.3%	14.3%

One feature of administrative occupations is that they are more likely to be in large firms with internal labour markets that feature career ladders which offer within-firm promotion opportunities to better jobs (many of which may be non-routine). Other routine jobs do not have these sorts of progression routes. There may be ways to better outcomes throughout the working life *within* the occupation (as in a skilled trade like electricians or automobile mechanics), but there is less opportunity to progress to good non-routine jobs without acquiring sufficient formal education and training. Table 3.11 summarises the destination occupations of male routine workers who move out of this group in the earlier NCDS cohort. Those moving out of administrative positions moved to good non-routine jobs around 70 per cent of the time.

To test whether the composition of administrative and non-administrative jobs has an effect on mobility patterns, a dummy variable is introduced for being in a routine administrative (SOC major group 4) occupation. To test the hypothesis that it is the greater propensity for BCS cohort members to work in administrative occupations that drives the different effects of routinisation, interaction terms between DISPLACEMENT, COHORT and ADMIN are introduced. The coefficient on the

DISPLACEMENT-COHORT interaction term should disappear if it is driven by the occupational composition of routine workers.

Table 3.11: Destination of occupational groups for admin and non-admin routine occupations

Destination non-routine occupation	Origin routine occupation	
	Admin occupations	Non admin occupations
Non employment	5.7%	15.9%
Unemployment	4.5%	15.1%
Managerial	41.8%	22.8%
Professional	19.7%	8.3%
Associate professionals and technicians	18.0%	12.8%
Administrative occupations	2.0%	0.3%
Skilled trades	2.5%	13.3%
Personal service occupations	1.6%	1.7%
Sales and customer service occupations	1.6%	3.2%
Elementary occupations	2.5%	6.6%

The regressions show that those in administrative routine occupations are generally more mobile in the BCS cohort, but are less affected by the decline in the employment share of routine jobs. This pattern is exactly reversed for the NCDS cohort. This suggests that the career implications of working in routine jobs have changed significantly between the two cohorts. In the older cohort, relatively few routine workers made upward moves – those in administrative occupations which provided greater opportunity to do this tended to remain in these jobs. Those in non-admin positions were more likely to move, but these moves were typically to lower level positions or out of employment entirely. However, the decline of routine jobs (and the growth of non-routine jobs) appears to have driven upward mobility for this cohort, with many more in administrative positions moving out of these jobs as a result. We could interpret the growing demand for non-routine occupations as a labour market shock which provided many more opportunities for some existing routine workers.

For the younger cohort, those in administrative routine occupations were typically more mobile, implying that these jobs have increasingly become stepping

stones. However, there is still a smaller displacement effect for the younger cohort once differences in types of job have been accounted for. These results suggest that even if the number of non-routine jobs is growing, upward mobility opportunities are less readily available, compared to the experience of the earlier cohort. This might indicate that the labour market has reached a new equilibrium (i.e. the change in the occupational structure is no longer acting as a shock), with many of the growing non-routine occupations meeting this demand by hiring new labour entrants (particularly the growing number of graduates).

Table 3.12: Logit regression on the probability of remaining in a routine occupation with admin, cohort and displacement interaction

	(1)	(2)
FEMALE	-0.590 ***	-0.499 ***
NON-WHITE	0.066	0.071
ADMIN		0.546 ***
AGE	-0.007 *	-0.009 **
ROUTINE EXP	0.240 ***	0.251 ***
ROUTINE EXP * AGE	-0.004 ***	-0.004 ***
COHORT	-1.483 ***	-1.098 ***
DISPLACEMENT	-12.538 ***	-10.126 ***
COHORT * DISPLACEMENT	10.391 ***	7.240 ***
ADMIN * DISPLACEMENT		-6.114 ***
COHORT * ADMIN		-0.926 ***
COHORT * DISPLACEMENT*ADMIN		7.760 ***
VOC LEVEL 0	-0.202 ***	-0.202 ***
ACAD LEVEL 0	0.313 ***	0.261 ***
VOC LEVEL 1	-0.222 ***	-0.218 ***
ACAD LEVEL 1	0.277 ***	0.236 ***
VOC LEVEL 2	-0.009	0.013
ACAD LEVEL 2	0.070	0.050
VOC LEVEL 4	-0.386 ***	-0.373 ***
ACAD LEVEL 4	-0.798 ***	-0.798 ***
VOC LEVEL 5	-0.753 ***	-0.734 ***
ACAD LEVEL 5	-1.033 ***	-1.007 ***
CONSTANT	2.676 ***	2.466 ***
N	19878	19878
Pseudo R ²	0.090	0.091

Table 3.13 illustrates these results with two examples. In both examples, we calculate the estimated probabilities of remaining in a routine occupation for a white 28 year old male with four years of routine work experience, given differences in the type of routine job, the overall decline in routine jobs and cohort membership. The first example assumes the individual has the reference group level of qualifications – both level 3 for academic and vocational – while in the second example we consider a university graduate. The table shows that in all cases, the younger BCS cohort was more mobile than the NCDS cohort, particularly those with a university degree. However, the decline of routine jobs affects this mobility in a very limited way, compared to how much additional mobility resulted for the NCDS cohort. The magnitude of this effect is particularly noticeable for graduates, especially those in administrative occupations. By comparison, very few additional graduates leave routine jobs as a result of a declining number of routine occupations.

Table 3.13: Estimated probabilities of remaining in routine occupations (based on estimates in Table 3.12)

		Example 1			Example 2 (graduates)		
DISPLACEMENT		0%	10%	Difference	0%	10%	Difference
All	BCS	82%	78%	3%	62%	57%	5%
	NCDS	95%	85%	10%	88%	67%	20%
	Cohort difference	<i>13%</i>	<i>7%</i>	<i>7%</i>	<i>26%</i>	<i>10%</i>	<i>15%</i>
Non-admin	BCS	84%	80%	4%	66%	59%	7%
	NCDS	94%	85%	9%	85%	68%	18%
	Cohort difference	<i>10%</i>	<i>5%</i>	<i>5%</i>	<i>19%</i>	<i>9%</i>	<i>11%</i>
Admin	BCS	78%	76%	2%	57%	54%	3%
	NCDS	96%	84%	12%	91%	66%	25%
	Cohort difference	<i>18%</i>	<i>8%</i>	<i>10%</i>	<i>34%</i>	<i>13%</i>	<i>22%</i>

Non-routine job opportunities

Next, the destinations of routine workers leaving non-routine occupations are examined, and what may explain them. Table 3.14 shows estimates of the logit models for the probability of moving to each non-routine occupational group, as well as unemployment and inactivity. This uses the combined cohort specification.

Table 3.14: Logit regression on the probability of moving to non-routine occupations

	Professional	Managerial	Intermediate	Service	Unemployed	Inactive
FEMALE	-0.966***	-0.672***	-0.100	1.904***	-0.330**	1.869***
NONWHITE	0.159	-0.152	-0.421*	-0.216	0.402*	0.024
ADMIN	0.878***	0.859***	0.583***	-0.596***	-0.285*	-0.154**
AGE	0.017	0.012	-0.001	0.037***	0.011	-0.043***
ROUTINE EXP	-0.038	-0.034	-0.160**	-0.178***	-0.353***	-0.312***
AGE* ROUTINE EXP	-0.001	-0.001	0.002	0.003*	0.006**	0.007***
COHORT	1.881***	1.301***	1.266***	0.614***	1.925***	0.830***
DISPLACEMENT	10.012***	8.599***	9.097***	8.321***	10.033***	12.193***
DISPLACEMENT *COHORT	-11.316***	-7.961***	-6.224***	-3.148*	-20.125***	-9.571***
VOC LEVEL 0	-0.096	-0.076	-0.024	0.429***	0.189	0.277***
ACAD LEVEL 0	-1.430***	-0.794***	-0.991***	0.405**	0.573***	0.139
VOC LEVEL 1	0.166	0.026	-0.187	0.199	0.142	0.406***
ACAD LEVEL 1	-0.897***	-0.395***	-0.367***	0.543***	-0.061	-0.155
VOC LEVEL 2	0.021	-0.264*	-0.250	0.157	0.126	0.202
ACAD LEVEL 2	-0.612***	-0.068	-0.017	0.507***	-0.043	-0.012
VOC LEVEL 4	0.680***	0.295**	0.324**	0.059	-0.217	0.030
ACAD LEVEL 4	1.030***	0.361**	0.657***	0.095	0.047	-0.026
VOC LEVEL 5	0.913***	1.001***	0.114	0.313	-1.087	-0.662**
ACAD LEVEL 5	1.437***	-0.141	0.952***	-0.563	0.633	0.021
CONSTANT	-4.796***	-3.968***	-4.17765***	-6.577***	-4.997***	-3.683***
N	19878	19878	19878	19878	19878	19878
Pseudo R ²	0.1439	0.0668	0.0728	0.1013	0.0621	0.1259

These data show that the factors that affected the probability of remaining in a routine occupation are mirrored when looking at the probability of leaving a routine occupation. The BCS cohort is more mobile in general, but experiences a smaller (or non-existent) mobility effect via displacement. Gender also matters, with female routine workers more likely to move to intermediate or service occupations or unemployment, and less likely to have transitioned to managerial or professional occupations. Higher qualifications (particularly academic ones) increase the likelihood of ‘upward’ transitions, and decrease the likelihood of ‘downward’ transitions (including moves to unemployment). Specific routine experience reduces mobility to intermediate and service occupations, unemployment and inactivity. The

coefficients on age and the age-routine experience interaction suggest that the higher mobility for older routine workers is only related to downwards moves, rather than to career progression. Working in administrative occupations increases the prospects of making upwards moves and protects against downward transitions, which is consistent with the above discussion around career ladders and internal labour markets.

Qualifications

Finally, how does the decline in the total number of routine jobs create opportunities for workers with different levels of qualifications across the two cohorts? Levels of qualifications are grouped to focus just on the impact of higher qualifications (level 4 and 5) relative to lower level qualifications. This can be interpreted as a graduate or equivalent effect. Patterns across lower qualifications are less obvious, and there is little reason to overly complicate the model by adding extra interaction terms at this stage. Table 3.15 shows the results of this estimation.

Table 3.15: Logit regression on the probability of remaining in a routine occupation with qualification-displacement interactions, by cohort

	BCS	NCDS
FEMALE	-0.539***	-0.742***
NONWHITE	0.159	0.018
AGE	-0.096***	0.028***
ROUTINE EXP	0.990***	0.301***
AGE * ROUTINE EXP	-0.027***	-0.006***
DISPLACEMENT	-1.187*	-11.921***
ACAD LVL 4-5	-1.388***	-0.893**
VOC LVL 4-5	-0.380	-0.276
DISPLACEMENT * ACAD LVL 4-5	2.660**	0.103
DISPLACEMENT * VOC LVL 4-5	-0.085	-0.952
VOC LVL 4-5 * ACAD LVL 4-5	0.334	0.452
DISPLACEMENT * VOC LVL 4-5*ACAD LVL 4-5	-1.738	-3.498
CONSTANT	3.490***	1.648***
N	8040	11838
Pseudo R ²	0.074	0.113

The main finding from these results is that the fall in the number of routine jobs does not increase the mobility for university graduates in these jobs in the BCS cohort, and may in fact be associated with lower mobility. This is not observed for the NCDS cohort.

Table 3.16 shows the ways in which cohort and higher qualifications affect transitions to non-routine occupations following a fall in the number of routine jobs. As the variables not related to qualifications have similar effects to those found in Table 3.14, the focus is just on the estimated differences in the probabilities of transition depending on qualifications, cohort and the amount of displacement.

Table 3.16: Logit regression on the probability of moving to non-routine occupations with qualification, cohort and displacement interactions

	Professional	Managerial	Intermediate	Service	Unemployed	Inactive
FEMALE	-1.063***	-0.741***	-0.131***	1.957***	-0.283***	1.919***
NON WHITE	0.141	-0.189	-0.414*	-0.278	0.441*	0.020
ADMIN	1.178***	1.071***	0.755***	-0.684***	-0.470***	-0.202***
AGE	0.020*	0.012	-0.001	0.035***	0.011	-0.042***
ROUTINE EXP	-0.046	-0.031	-0.161**	-0.179***	-0.357***	-0.321***
ROUTINE EXP * AGE	-0.001	-0.001	0.002	0.003*	0.006**	0.007***
COHORT	1.532***	1.261***	1.264***	0.585***	1.932***	0.937***
DISPLACEMENT COHORT *	9.062***	9.112***	9.677***	7.846***	10.024***	12.193***
DISPLACEMENT GRADUATE	-8.183***	-8.062***	-6.064**	-2.986	-20.494***	-10.296***
DISPLACEMENT * GRADUATE COHORT *GRADUATE	1.354**	0.933*	1.326**	-2.008	0.639	0.491
DISPLACEMENT * GRADUATE COHORT *GRADUATE	6.327	0.060	-2.258	9.126	-17.301	-3.852
DISPLACE*COHOR T *GRADUATE	1.010	-0.296	-0.049	1.830	-0.346	-1.586**
DISPLACE*COHOR T *GRADUATE	-14.514**	-2.051	-2.882	-7.874	18.905	13.057*
CONSTANT	-5.470***	-4.330***	-4.554***	-5.687***	-4.682***	-3.515***
N	19878	19878	19878	19878	19878	19878
Pseudo R ²	0.1215	0.0521	0.0612	0.097	0.0539	0.123

To illustrate, Table 3.17 shows the estimated probabilities of making transitions from non-routine occupations (again using the example of a 28 year old white male who has worked for four years in an administrative routine occupation).

These estimates show the same pattern as discussed previously. The younger BCS cohort is generally more mobile towards non-routine occupations, particularly those at the higher end; however, the change in the occupational structure does not particularly increase these prospects. The older NCDS cohort, on the other hand, is generally less mobile, but these workers (particularly those with a university degree) do benefit from the shift towards non-routine jobs. Therefore, the NCDS cohort behave in a way consistent with the model and empirical work in Cortes (2012), where higher qualifications were associated with moves up to good non-routine jobs following a decline in routine jobs. The BCS cohort, by comparison, does not fit this relationship. Autor and Dorn (2009) observed that only subsets of college-educated workers (specifically younger graduates) experienced this. The results for the UK point to the opposite story as the younger cohort that are university educated do not move upwards to good non-routine jobs, while the older cohort do.

Table 3.17: Estimated probabilities of moving to non-routine occupations (based on estimates in Table 3.16)

	DISP	Cohort	Professional	Managerial	Intermediate	Service	Unemployed	Inactive
Graduates	0%	NCDS	6.7%	9.9%	5.2%	0.0%	0.7%	0.8%
	10%	NCDS	25.1%	21.6%	10.3%	0.2%	0.3%	1.7%
	0%	BCS	47.8%	22.4%	15.6%	0.5%	3.3%	0.4%
	10%	BCS	30.6%	20.8%	13.7%	0.9%	1.4%	1.2%
Non-graduates	0%	NCDS	1.8%	4.1%	1.4%	0.3%	0.4%	0.5%
	10%	NCDS	4.4%	9.7%	3.7%	0.7%	1.0%	1.5%
	0%	BCS	7.9%	13.2%	4.9%	0.6%	2.5%	1.2%
	10%	BCS	8.6%	14.5%	6.9%	0.9%	0.9%	1.4%

3.5 Discussion

This section has extended the analysis started in Holmes (2011) by comparing the effect of the decline in routine occupations (displacement) on mobility patterns across two cohorts in the UK, compared to other observable factors which are associated with job mobility. The main finding is that while the younger BCS cohort is generally more mobile, as well as better educated and more commonly found working in certain sorts of routine occupations that may provide internal career advancement,

displacement affects the older NCDS cohort much more than it affects the younger BCS cohort, leading to more instances of both upward transitions and worsening of labour market positions. Including measures of how displacement interacts with education and type of job has not been able to explain this difference between the two cohorts in response to the decline of routine jobs. This points to barriers of mobility, currently unobservable, that do not relate to human capital differences.

One explanation for this would be that there may be unobserved individual heterogeneity in specific occupationally-related skills. In particular, given that demand for routine jobs (and hence wages) is falling, only those who have particular abilities which increase their productivity in routine jobs will choose to go into them. Although we control for education and experience differences, some of these abilities may be more innate or developed through non-formal or observable means. Differences between the two cohorts in this way would help to explain why there appears to be unexplained differences in mobility prospects between them.

A second explanation for this might be unobservable variation at the level of the particular occupation. In particular, even within a given routine occupation, some jobs may be in firms which offer more career advantages or other benefits which could compensate for the expected decline in demand for that occupation. The younger cohort is more likely to select into these ‘better’ firms, while the older cohort did not have such considerations. This would again suggest the presence of non-human capital barriers preventing the older cohort moving between routine jobs to improve their future prospects in a way the younger cohort was able to.

A final explanation, which is one that merits more research, is the way recruitment practices have changed between these two cohorts for the growing number of non-routine jobs. In particular, while increased demand for good non-routine jobs was met by hiring routine occupation workers for the NCDS cohort, the BCS cohort do not experience these opportunities. An increase in the number of these good, non-routine jobs may increasingly come through hiring new labour market entrants (including graduates), rather than through recruiting existing workers. There are parallels with Rhein and Trübswetter’s (2012) study of the connection between mobility and occupational structure change. In particular, they found that the UK had a much weaker relationship between occupational mobility and occupational structure change than somewhere like Germany.

4 Changing Career Paths Over Time

In this section of the paper, changes in occupational mobility are examined across the whole labour market. The focus is on aggregate mobility patterns (particularly upward mobility and progression) from declining routine occupations and growing service occupations, utilising the UK Labour Force Survey data (LFS).

4.1 Data

The LFS is a quarterly representative sample survey of households living at private addresses in the UK, first conducted in 1973. Since 1992 the survey has been held quarterly covering between 40,000 and 60,000 households every quarter, which represents about 0.1 per cent of the UK. In addition, the LFS uses a rotational sampling design. Once initially selected for interview, a household is retained in the sample for a total of five consecutive quarters. This gives the data a longitudinal component that allows the observation of labour market mobility during a period of 12 months. LFS data are analysed from three periods: 1992 to 1994, 2001 to 2003 and 2008 to 2010. The first two periods were designed to compare any differences in transition patterns over the previous two decades. In an attempt to control for other cyclical macroeconomic factors that might affect aggregate mobility, both are time periods following a downturn, although the 1990-2 downturn was much more severe than the 2000 dot-com crash. The final time period allows an examination of any effects relating to the 2007 global financial crisis and subsequent recession as a comparison.

The LFS covers a wide range of topics related to labour market outcomes, including household and family information, employment information and income. The relevant variables relate to age, ethnicity, sex, marital status, economic activity, sector of employment, highest qualification, type of workplace, occupation and occupation one year ago. Occupations are regrouped into the six occupational groups used in the previous section, along with unemployment and non-employment.

Each quarter of QLFS consists of five waves. Respondents are interviewed for five successive waves at three-monthly intervals. For 1992-1994 the required variables were only available for the second quarter (March-May). In order to avoid individuals appearing more than once in the analysis, four waves of each year were used for 1992-1994 and 2008-2010. The variables needed were not available in the

2001-2003 quarterly datasets. In its place, the derived five quarter longitudinal dataset is used which follows one particular wave for five quarters. For every year there are three waves used. As a result, the sample size for this period is smaller than for the other two.

Job transitions may be quite commonplace as many young individuals move between education and labour market. Some of those recorded may be between low-skilled part-time work whilst studying and full time employment. As this sort of mobility is not central to this paper, data are restricted to workers over the age of 25.

Occupational structure and mobility

Naturally, the structure of the UK labour market is not the same between the time periods chosen for analysis. In particular, the occupational structure has changed significant within the last two decades. Table 4.1 shows the employment shares for the six groups for each of the three periods (1992-1994, 2001-2003 and 2008-2010). Whereas the share of routine jobs has dropped over time, the share of service jobs has increased (as observed in table 3.2).

Table 4.1: Changes in occupational employment share

	1992 (q2)	1994 (q2)	2001	2003	2008 (q1)	2010 (q4)
Managerial	14.9	15.4	13.5	14.7	15.8	15.7
Professional	11.5	11.7	13.6	13.9	14.7	15.5
Intermediate	13.4	14.0	13.1	13.9	13.5	14.4
Routine	39.9	38.4	36.0	33.1	29.1	27.6
Manual	5.6	5.4	5.5	5.4	5.9	5.5
Service	14.7	15.2	18.2	19.0	20.9	21.2

Given the shorter time horizon available in this data compared to the cohort studies, transitions into a different occupational group within a year happen less frequently. Table 4.2 shows the movement across six occupational groups as well as unemployment and inactivity for the three periods.

The data suggest that transitions out of routine occupations were slightly more commonplace in 1992-4 and 2008-10, which is consistent with the smaller fall in routine occupations during this time period. The majority of routine workers that

make a transition become either unemployed or inactive or switch to service work. Transitions to other types of work do happen, but not very often. The period of 2001-2003 differs from the two other periods. Not only was a transition into managerial, professional and intermediate occupations more likely, relatively fewer workers became unemployed and movement between routine occupations and service occupations happened relatively more often.

Table 4.2: Changes in occupation within 12 months

		Destination								
		Manage.	Profess.	Inter	Routine	Manual	Service	Unempl.	Inactive	N
Origin 12 months ago	Managerial									
	<i>1992-1994</i>	91.3	0.7	0.9	1.4	0.1	0.5	2.6	2.6	21821
	<i>2001-2003</i>	91.8	0.8	1.1	1.5	0.1	1.1	1.4	2.3	6195
	<i>2008-2010</i>	91.8	0.9	0.8	1.1	0.1	0.8	1.8	2.7	17685
	Professional									
	<i>1992-1994</i>	1.1	93.2	0.5	0.7	0.1	0.2	1.5	2.8	16600
	<i>2001-2003</i>	1.0	94	0.8	0.7	0.1	0.4	0.9	2.2	5972
	<i>2008-2010</i>	0.9	93	0.7	0.6	0.1	0.3	1.3	3.1	16827
	Intermediate									
	<i>1992-1994</i>	1.4	0.6	91.3	1.4	0.1	0.5	1.9	2.8	18148
	<i>2001-2003</i>	1.4	0.8	92.6	1.6	0.1	0.8	0.8	1.9	5968
	<i>2008-2010</i>	1.1	0.8	91.5	1.1	0.1	0.8	1.6	3	15616
	Routine									
	<i>1992-1994</i>	0.7	0.2	0.5	89.1	0.2	0.9	3.8	4.6	55709
	<i>2001-2003</i>	0.7	0.5	0.9	90.6	0.4	1.8	1.8	3.3	15115
	<i>2008-2010</i>	0.6	0.4	0.6	88.9	0.3	1.4	3.5	4.4	31931
	Manual									
	<i>1992-1994</i>	0.2	0.1	0.2	1.4	86.8	0.4	7.7	3.1	7122
	<i>2001-2003</i>	0.6	0	2	0.2	93.6	0.7	1.1	1.8	2346
	<i>2008-2010</i>	0.2	0.1	0.3	1.4	89.4	0.7	4.6	3.3	6425
	Service									
	<i>1992-1994</i>	0.9	0.2	0.8	2.5	0.1	86.6	2.7	6.2	16369
	<i>2001-2003</i>	1.1	0.4	1.3	3.3	0.1	88	1.3	4.5	8067
	<i>2008-2010</i>	0.7	0.5	0.9	2.2	0.1	87.4	3	5.2	21494

Transitions from service occupations became slightly less frequent in the early 2000s, compared to the early 1990s, due to a fall in transitions out of the workforce. For those who transferred into another job, routine work was the most likely destination. Similar to the mobile routine workers, 2001-2003 was a distinct period of frequent upward movements as well as relative low unemployment. Upward mobility

increased during this time period, with a greater proportion of service workers moving to higher skill non-routine jobs, reflecting the growing demand for these jobs. Interestingly, there is also an increase in the frequency of transitions towards routine jobs, even though the number of these jobs has declined. The onset of the recession did not increase the frequency of leaving service occupations, but these transitions were more frequently towards unemployment and inactivity.

4.2 Routine transitions

As we have seen in the cohort analysis, age affects the likelihood of making a transition. Table 4.3 presents the age distribution of those in routine jobs, and those that leave them. Younger workers make up a greater proportion of those making a transition than are found in routine occupations overall, indicating younger workers are more mobile. Moreover, consistent with Autor and Dorn (2009), routine workers are becoming older, with fewer new labour market entrants in the 2000s than in the 1990s. The table also shows that the 2007 recession may have impacted on this trend, as few 26-30 year old routine workers in 2008-2010 switched occupational groups compare to previous periods. Potentially, the rapid growth in youth unemployment might have deterred risk-taking when faced with (youth) unemployment.

Table 4.3: Age of routine workers

	26-30	31-40	41-50	51-60	61 and up	N
All routine						
<i>1992-1994</i>	15.8	29.0	29.2	19.8	6.2	56569
<i>2001-2003</i>	8.4	28.6	29.4	27.6	5.9	19365
<i>2008-2010</i>	10.3	23.8	29.5	25.3	11.1	38483
Routine transition						
<i>1992-1994</i>	28.8	34.2	23.9	11.6	1.6	1419
<i>2001-2003</i>	17.9	34.4	30.2	15.7	1.8	497
<i>2008-2010</i>	6.9	32.5	20.5	23.8	3.5	1041

Tables 4.4, 4.5 and 4.6, show the highest education for the three periods for routine workers, as compared to those moving out of routine occupations to either category of non-routine jobs.

Table 4.4: Educational distribution of routine workers, 1992-1994

<i>1992-1994</i>	Graduates (%)	No qualification (%)	Apprenticeships (%)	N
Routine workers	3.4	19.6	12.2	55285
Routine transition	4.1	17.6	11.2	5938
Routine upward transition	17.0	9.3	10.7	765
Routine to service transition	2.1	14.7	7.9	470

Table 4.5: Educational distribution of various groups, 2001-2003

<i>2001-2003</i>	Graduates (%)	No qualification (%)	Apprenticeships (%)	N
Routine workers	5.0	18.4	12.6	19236
Routine transition	10.4	13.0	4.9	617
Routine upward transition	15.5	2.3	5.8	258
Routine to service transition	5.1	15.4	7.7	273

Table 4.6: Educational distributions of various groups, 2008-2010

<i>2008-2010</i>	Graduates (%)	No qualification (%)	Apprenticeships (%)	N
Routine workers	8.6	15.5	7.8	31223
Routine transition	10.2	17.2	7.7	2836
Routine upward transition	29.6	2.0	4.7	406
Routine to service transition	9.8	11.3	2.2	450

The share of graduates in routine jobs has increased over time, while the share of workers without qualifications or with a trade apprenticeship has declined. These tables show that routine workers who make a transition into another occupation group are more likely to have university degrees and less likely to have no qualification than the workers that remain in these jobs. Those with apprenticeships seem to be more likely to stay within routine occupations. This might be because of the investment they have made in acquiring relevant specific skills within their sector or company.

The period 2001-2003, when fewer individuals were displaced from routine jobs, the proportion of those that do leave routine jobs who are graduates increases. This suggests that displacement affects non-graduates more, as was also observed in the cohort analysis for younger generations.

Each table also looks at different types of transition and provides the shares for the same educational categories for those who ‘upgrade’ to managerial, professional and intermediate occupations. This group has significantly more graduates and less workers without qualifications than the total of routine workers. Education seems to have some role in making transitions into the first three occupational groups. Those with tertiary-level qualifications might use routine occupations as a stepping stone, similar to the younger cohorts in the cohort analysis. It is also noticeable that graduates are becoming an increasingly large proportion of all routine workers, and that they have become more mobile over time, both upwards and towards service occupations. Finally, the recession years increased all groups’ mobility, largely towards unemployment and inactivity, and particularly for non-graduates.

4.3 Service transitions

This final section looks at how mobility paths from service occupations have changed as service jobs have increased and routine jobs have declined. Table 4.7 shows the age distribution of service occupations. There is some evidence here that those in service occupations have also become older, with the share of worker over 40 rising since 1992. Moreover, these older workers are increasingly making transitions from routine occupations. Tables 4.8, 4.9 and 4.10 break down the transitions within each time period by type of transition and educational attainment.

Table 4.7: Age of service workers

%	26-30	31-40	41-50	51-60	61 and up	N
All service						
<i>1992-1994</i>	15.8	29.2	29.7	19.1	6.2	17230
<i>2001-2003</i>	9.3	31.6	28.6	25.5	5.0	9638
<i>2008-2010</i>	12.6	25.6	30.3	23.4	12.9	23320
Service transition						
<i>1992-1994</i>	24.0	37.0	27.9	9.2	1.9	728
<i>2001-2003</i>	20.2	29.0	27.1	13.4	10.3	336
<i>2008-2010</i>	12.9	38.1	30.1	19.2	8.8	947

Table 4.8 Educational distributions of various groups 1992-1994

<i>1992-1994</i>	Graduates (%)	No qualification (%)	Apprenticeships (%)	N
Service workers	5.6	19.9	9.9	17067
Service transition	6.3	16.9	7.2	2151
Service upward transition	22.1	12.8	6.9	289
Service-routine transition	3.9	16.4	4.9	408

Table 4.9 Educational distributions of various groups, 2008-2010

<i>2001-2003</i>	Graduates (%)	No qualification (%)	Apprenticeships (%)	N
Service workers	6.1	19.9	6.8	9591
Service transition	7.9	16.1	9.7	1028
Service upward transition	19.7	2.0	3.3	152
Service-routine transition	25.7	0.0	1.0	105

Table 4.10 Educational distributions of various groups, 2008-2010

<i>2008-2010</i>	Graduates (%)	No qualification (%)	Apprenticeships (%)	N
Service workers	11.1	13.6	3.6	18907
Service transition	14.1	17.2	2.6	1704
Service upward transition	34.9	3.9	0.7	284
Service-routine transition	15.1	6.6	1.3	471

The share of higher education graduates in service occupations has grown since 1992, while the shares of workers with no qualification and with trade apprenticeships are declining for the group in general but not for those who move out. Apprenticeships are declining for both groups.

Graduates are more upwardly mobile than non-graduates. However, this does not seem to increase between the early 1990s and early 2000s, despite the increase in good non-routine jobs. However, an increase in mobility was noticeable during the recession period of 2008-2010 as hiring to good jobs reduced for many but the most qualified. Interestingly, it is graduates who increasingly became the group that moved from service to routine occupations in the periods 2001-2003 and 2008-2010, compared to the earlier time period, suggesting that the increasing number of graduates filling service occupations had to make less desirable upward transitions.

4.4 Upward progression

The analysis also considered what types of jobs those moving upwards in the labour market moved between, to see if there were particular career paths that existed or changed during this time period. One trend appears to be the increasing proportion of those moving from service occupations to routine occupations entering white collar administrative occupations rather than skilled and semi-skilled manual routine jobs. Between 1992 and 1994, 40 per cent of those who moved from service occupations to routine occupations went to administrative job. In the latter two periods, this proportion had increased to 54 per cent.

There is also a significant group of workers that move ‘upwards’ from routine and service occupations to managerial, professional and intermediate professions. From examining the occupations these workers originally worked in and the occupations they have moved into, it seems that internal career paths are playing a role, particular for service workers. For example, from 2008 to 2010, 23.5 per cent of the upward moving service workers came from healthcare related occupations, suggesting career progression within the NHS. Similarly, an additional 23.2 per cent of upward-moving service workers were in retail and sales related occupations. These workers are likely to be promoted into managerial positions within their companies. For upward moving routine workers between 2008 and 2010, 57.6 per cent transferred from white collar administrative occupations into a wide selection of managerial, professional and intermediate jobs. Their knowledge, skills and experience might have been better suited to move into other mainly white collar jobs.

5 Conclusion

This paper has looked at occupational mobility in the UK between the early 1980s and the late 2000s. It has taken two approaches to investigate what shapes patterns of mobility. First, it has examined labour market transitions for two labour market cohorts. Second, partly to deal with the age specificity of cohort studies, the paper has also examined longitudinal responses in representative cross-sectional data.

The paper has presented evidence to show that changes in the occupational structure represent an important driver of occupational mobility. Displacement following a decline in routine jobs adds to mobility connected to human capital

measures and career progression, and interacts with it. However, it has been argued that human capital theories of mobility do not fully explain patterns of mobility. In particular, a sizeable difference is found between the two cohorts even after controlling for all observable differences in skills and education. The oldest cohort exhibits lower overall mobility, but greater responses to a decline in routine jobs, while the younger cohort are generally more mobile, but are relatively unaffected by displacement. After controlling for the main observable differences between the two groups, there is no explanation for the source of this cross-cohort difference. The conclusion is that something fundamental has shifted in the typical career pathways available to new labour market entrants and the way occupational mobility supports (or does not support) changes in the occupational structure in the UK.

The comparison between different periods in time using a representative sample of the UK labour force adds to what we know about labour market transitions from the cohort analyses. This analysis shows a number of trends consistent with the earlier cohort analysis. Mobility patterns are related to differences in both qualifications and age. Moreover, aggregate changes to the labour market, both through the decline of routine jobs and the onset of the 2008 recession, have had an impact on the relationships between mobility, age and qualification level. In addition, not all routine or service occupations are the same. Certain occupations offer particular opportunities for moving upwards within the labour market, and hiring practices in these occupations may prove a key determinant of occupational mobility.

The current interest in improving social mobility in the UK necessarily requires an understanding of how individuals progress through their working lives and how they acquire opportunities to move towards better jobs. Much of the recent discussion has been driven by the idea that there is growing 'room at the top' for more and more of the workforce to move into better jobs, providing they are suitably qualified, educated and trained (Cabinet Office 2011). The analysis from this paper suggests that in recent years, increased room at the top has not increased upward mobility for those already in work, implying that a growing number of these jobs are predominantly recruiting new labour market entrants rather than offering opportunities. This suggests there is a barrier to a vision of improved social mobility that relies solely on human capital – if it did, well qualified workers would be able to compete on an even footing with similarly educated new labour market entrants for these good, non-routine jobs.

The analyses presented in this paper have attempted to infer what has driven mobility patterns. Additional data is needed to get a better insight as to why workers decide to change occupations. The analysis has shown that it is important to investigate whether transitions are made due to redundancy or the disappearance of jobs, or through individual preference and choice. Future qualitative research may be more suitable for understanding how this process actually occurs.

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Appendix 1: Occupational groups

PROFESSIONAL	MANAGERIAL	INTERMEDIATE	ROUTINE	SERVICE	MANUAL
Business and statistical professionals Health professionals Legal professionals Information and communication technology professionals Public service professionals Architects, town planners, surveyors Science professionals Engineering professionals Teaching professionals Librarians and related professionals Therapists	Functional managers Production managers Protective service officers Corporate managers and senior officials Financial institution and office managers Managers in distribution, storage and retailing Managers and proprietors in hospitality and leisure services Managers and proprietors in other service industries	Transport associate professionals Protective service occupations Artistic and literary occupations Business and finance associate professionals Sales and related associate professionals Public service and other associate professionals Social welfare associate professionals Science and engineering technicians Sports and fitness occupations Health associate professionals Design associate professionals Media associate professionals Administrative occupations: government and related organisations Leisure and travel service occupations Sales related occupations	Draughtspersons and building inspectors Administrative occupations: finance Administrative occupations: records Administrative occupations: communications Secretarial and related occupations Electrical trades Printing trades Metal machining, fitting and instrument making trades Metal forming, welding and related trades Building trades Textiles and garments trades Vehicle trades Skilled trades nec Food preparation trades Construction operatives Mobile machine drivers and operatives Plant and machine operatives Process operatives Transport drivers and operatives Assemblers and routine operatives Elementary administration occupations Elementary process plant occupations Elementary goods storage occupations Elementary cleaning occupations Elementary personal services occupations Elementary agricultural occupations	Healthcare and related personal services Childcare and related personal services Housekeeping occupations Sales assistants and retail cashiers Hairdressers and related occupations Personal services occupations nec Customer service occupations Elementary security occupations Elementary sales occupations	Elementary construction occupations Construction trades Agricultural trades