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Working Paper

Decomposing pay gaps across the wage distribution: investigating inequalities of ethno-religious groups and disabled people

ISER Working Paper Series, No. 2009-31

Provided in Cooperation with:
Institute for Social and Economic Research (ISER), University of Essex

Suggested Citation: Longhi, Simonetta; Nicoletti, Cheti; Platt, Lucinda (2009) : Decomposing pay gaps across the wage distribution: investigating inequalities of ethno-religious groups and disabled people, ISER Working Paper Series, No. 2009-31, University of Essex, Institute for Social and Economic Research (ISER), Colchester

This Version is available at:
https://hdl.handle.net/10419/92187

ISER Working Paper Series

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No. 2009-31
November 2009

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Decomposing Pay Gaps across the Wage Distribution: Investigating inequalities of ethno-religious groups and disabled people

Non-technical Summary

This report provides a contemporary account of inequalities in pay of disabled people and those from selected minority ethno-religious groups. Disabled people and ethnic minorities are two populations where there has been extensive analysis of employment outcomes, but much less investigation of pay differentials. Moreover, they are populations where aggregate categories hide substantial heterogeneity. In this report we make that heterogeneity our focus. In the case of ethnicity, we investigate specific ethno-religious groups, and in the case of disabled people we explore pay differentials in relation to specific conditions, as well as taking account of co-morbidities.

We aim to understand the causes for differences in pay by ethno-religious group and disability status and type. We investigate whether pay gaps are a consequence of individual earning potential as represented, for example, by educational qualifications, or whether they appear to stem from the particular occupations or types of occupation that the minority groups are concentrated into; or whether they are largely unaccounted for. In the case of remaining unexplained differences, we consider how we might understand them, including engaging with debates on whether we can understand unexplained gaps as possible evidence of employer discrimination.

Most analysis of pay gaps has focused on average pay, typically the mean. In this report we address whether differences in pay are greater or smaller – or the same – for the high paid as for the less well paid. Are pay gaps for disabled people and for minority groups worse for those doing badly or for those doing relatively well? In policy terms, should we be concerned about sticky floors pulling the low paid down or about glass ceilings inhibiting the further advancement of the more successful?

Specifically, then, this report

1. Investigates pay gaps at the mean and at the 10^{th}, 25^{th}, 50^{th}, 75^{th} and 90^{th} percentiles
    a) across 6 minority ethno-religious groups compared with White British Christians
    b) across those with a long-term health problem and those with an activity limiting health problem compared to non-disabled and according to whether the health problem is physical or mental
2. Explores
    a) the extent to which these differences can be understood in relation to individual and job characteristics,
    b) which characteristics are most important to explain the pay gaps, and
    c) whether the characteristics contributing to the gap vary according to the level of pay
3. Evaluates and discusses the contribution of unexplained differences in pay to overall differences in pay.

In relation to ethnicity we conclude that:

- Average pay across ethno-religious groups shows huge variation: some minority groups have higher pay on average relative to the majority, some have much lower pay.
- There is also variation across the distribution of earnings for different ethno-religious groups
- Those groups who have high pay could expect to do a bit better even than they do on the basis of their characteristics. Thus, although the differences tend to be small, they experience some unexplained pay disadvantage despite their apparent advantage.
- Those groups with lower pay experience some unexplained disadvantage, but much of the gap, particularly at the bottom of the distribution can be accounted for by differences in personal and job characteristics.
- For some groups those characteristics include concentration in particular occupations and in part-time work, indicating the role of labour market opportunities and constraints in influencing pay.

In relation to disability we conclude that:

- Those with a long-term health condition suffer pay disadvantage relative to non-disabled. For those for whom the condition is activity limiting the disadvantage is much greater than for those for whom the condition is not activity limiting, but it is still experienced by both groups.
- Those with activity limiting mental health conditions experience the greatest absolute pay disadvantage.
- Disadvantage for disabled groups is fairly constant across the distribution of pay.
- A substantial proportion of the disadvantage can be accounted for by characteristics, both for the non-activity limiting groups relative to the non disabled and for the activity limited groups relative to the non activity limited, but a proportion remains unexplained, and is greater for those with mental health conditions.
- Relevant characteristics for accounting for pay differences include concentration in part time work particularly at the lower end of the distribution, lower rates of Level 4 qualifications, and concentration in less well paid occupations.
- Experience of long term health condition as work limiting explain much of the difference in pay between those with an activity limiting and those with a non activity limiting LTI, both at the mean and across the distribution of pay.

For both ethnicity and disability we conclude that:

- In most cases, the majority of the pay gaps are explained by characteristics. This is particularly the case for disability.
- The unexplained component (which may include discrimination) tends to be small, both as a proportion of the pay gap and as a proportion of wages.
- Labour market discrimination is potentially more relevant to limiting access to employment and to particular types of occupation than for pay within occupations.

Decomposing Pay Gaps across the Wage Distribution: Investigating inequalities of ethno-religious groups and disabled people

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Abstract
This paper provides a contemporary account of inequalities in pay of disabled people and those from selected minority ethno-religious groups. We aim to understand the causes for differences in pay by ethno-religious group and disability status and type. We investigate whether pay gaps are a consequence of individual earning potential as represented, for example, by educational qualifications, or whether they appear to stem from the particular occupations or types of occupation that the minority groups are concentrated into; or whether they are largely unaccounted for. In the case of remaining unexplained gaps in pay, we consider how far they might provide evidence of employer discrimination.

Keywords: pay; ethnic minorities; disabled people; ethno-religious groups; discrimination

Acknowledgements
This report was commissioned by the National Equality Panel. We are grateful to John Hills and the National Equality Panel for helpful comments on an earlier version of this paper.

We are grateful to the Office for National Statistics and the Northern Ireland Statistics and Research Agency and to the UK Data Archive for permission to use and access to the Labour Force Survey data. These organisations, however, bear no responsibility for their further analysis or interpretation. Crown copyright material is reproduced with the permission of the Controller of HMSO and the Queen's Printer for Scotland

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1. Aims of Research and Overview

This paper provides a contemporary account of inequalities in pay of disabled people and those from selected minority ethno-religious groups. Disabled people and ethnic minorities are two populations where there has been extensive analysis of employment outcomes, but much less investigation of pay differentials. Moreover, they are populations where aggregate categories hide substantial heterogeneity. In this report we make that heterogeneity our focus. In the case of ethnicity, we investigate specific ethno-religious groups, and in the case of disabled people we explore pay differentials in relation to specific conditions, as well as taking account of co-morbidities.

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- Labour market discrimination is potentially more relevant to limiting access to employment and to particular types of occupation than for pay within occupations.

2. Background

2.1. Heterogeneity

The importance of heterogeneity within minority populations is increasingly being recognised; and data sources are more susceptible to exploring differences within aggregate categories. In relation to ethnic minority groups, two potentially important sources of heterogeneity are religious affiliation and generation; that is, whether the minority group member is 1st generation (immigrant) or 2nd or subsequent generation (UK-born). Increasing attention has been paid to the role of religion in influencing employment outcomes, including pay, either through the social network provided by religious affiliation or through discrimination based on religion (Clark and Drinkwater 2005; Purdam et al. 2007). However,

because of the overlap between ethnic group categories and religious affiliation, analysis based on religious affiliation alone is hard to interpret. For example, the majority of Hindus are Indian, though under half of UK Indians are Hindus, 30 per cent are Sikhs and 13 per cent are Muslims. By contrast, almost all British Pakistanis and Bangladeshis affiliate to Islam and between them they make up two thirds of the UK's Muslims. It has therefore been argued that it is more important to examine the experience of specific ethno-religious groups to understand the relative significance of religion and ethnicity in shaping outcomes (Brown 2000; Lindley 2002). For the purposes of disentangling ethnic group and religious affiliation, we examine three groups that overlap in terms of either ethnicity or religion: Indian Hindus, Indian Muslims and Pakistani Muslims.

Generation has been shown to be important in relation to employment and pay (Clark and Lindley 2004; Shields and Wheatley Price 1998), either because of lack of familiarity with the context of the country of immigration, or through positive selection of immigrants relative to the 2nd generation, or because of differences in job-relevant skills such as English language fluency between generations (Dustmann and Fabbri 2003; Leslie and Lindley 2001; Lindley 2002; Shields and Wheatley Price 2002). Though several analyses of labour market outcomes include controls for generation or for time spent in the UK, it is not clear that the relationship between generation and employment outcomes should be – or is – constant across groups. In our analysis, therefore, we prefer to distinguish our groups according to whether they are 1st or 2nd generation. We would anticipate that for the 1st generation there will be more that may be relevant to pay that we cannot incorporate in our models and that therefore there will be a larger unexplained component to pay, but that the extent to which this is the case may differ between groups.

In relation to disability, there is substantial evidence of heterogeneity among disabled people (Berthoud 2006; Hum and Simpson 1996). In particular, those with serious mental health problems experience substantial labour market disadvantage (Baldwin and Marcus 2007; Jones et al. 2006b; Nielsen-Westergaard et al. 1999). For Britain, Jones et al. (2006b) find that mental health-related disabilities are associated with both employment and pay disadvantage relative to other forms of disability. This has been associated with both stigma and difficulties with relevant cognitive skills required by employers (Baldwin and Marcus 2007). In the US mental illness was the most cited disability in employment tribunals; and surveys of employers have also shown that they rate those with mental health-related disabilities at the bottom of the employability scale, considering them less employable than those with physical disabilities (again, see Baldwin and Marcus 2007). Co-morbidities also impact negatively on employment outcomes (Berthoud 2006; Braden et al. 2008; Cook et al. 2007). In this paper, we exploit the range of questions relating to long term health problems to explore differences in pay between different groups.

2.2. Accounting for differences in pay

For both the groups of disabled people and the ethno-religious groups we analyse, we examine the extent to which differences in pay can be attributed to individual characteristics, to job characteristics or types of occupation, and what part remains 'unexplained'. We decompose the gaps into these explained and unexplained elements both for average (mean) pay and across the wage distribution. Employment relevant characteristics are known to vary across ethnic groups and across disabled people, and diversity in educational qualifications is known to have an important bearing on the levels of pay that different subpopulations command. Demographic profiles also vary, with minority ethnic groups being younger on

average than the overall population and disabled people being older. The role of such individual characteristics in affecting labour market outcomes are straightforward to interpret; and their implications for policy are also relatively clear. Disadvantage related to lower average qualifications implies that greater attention should be paid to increasing educational qualifications among both disabled people and ethnic minorities. Though even here, the causal relationship is not necessarily clear cut for disabled people: do disabled people have restricted opportunities to acquire qualifications (Hollenbeck and Kimmel 2008), or do low qualifications lead to disability (Berthoud 2006)? Even aside from the details of their interpretation, individual characteristics also have to be seen to operate within a broader employment context. We thus also consider the contribution to differences in pay of occupation and of part-time work and whether public or private sector. The potential explanatory power offered by these different employment characteristics is not straightforward, and the precise interpretation may not be the same for ethnic minorities and disabled people.

For example, both disabled people and certain minority ethnic groups are over-represented in part-time work. Part-time work also tends to be relatively poorly remunerated and have long-term consequences on wages (Manning and Petrongolo 2008; Olsen and Walby 2004). For both groups part-time work can be seen as being an available option that allows labour market participation in the absence of full-time possibilities;[1] but there is some evidence that for disabled people, part-time work facilitates labour market participation, even though its rewards are typically poor (Jones 2007). It is, by contrast, hard to envisage why men from minority ethnic groups would *prefer* part-time work. Part-time work is, therefore, potentially more likely to be felt as a constraint by minority group members and as an opportunity by disabled people (if, for example, through fatigue or pain they could not sustain a full-time job). Nevertheless, we would argue that the role of occupational sorting or overrepresentation in part-time work and its influence on pay is important in drawing attention to processes of labour market stratification and the constraints that both disabled people and ethnic minorities face. For both disabled people and ethnic minorities over-representation in (poorly paid) part time work represents a constraint on alternative opportunities for participation, whether full-time work or better paid part time work. (See also the discussion of a similar point in Manning and Petrongolo (2008)).

In the US, a high degree of occupational concentration into less skilled jobs has been found for disabled people (Kaye 2009). Kaye suggests that there are range of possible reasons for these patterns that might be related to employment expectations as well as to (unmeasured) job-relevant skills and experience and employer discrimination. Others have argued more specifically that forms of occupational sorting should be understood in relation to the job quality hypothesis, where jobs with greater concentrations of a minority are worse paid because of measured and unmeasured differences in productivity between minority and majority (Schumacher and Baldwin 2000). While differences in productivity may seem a plausible explanation for at least part of the differences in pay between disabled and non-disabled people, it is hard in practice to distinguish between the potential limits on the individual relative to limits of the job, or the fact that discrimination may increase with severity of disability or in jobs in which disabled people are over-represented. We return to this point when discussing unexplained elements of pay differences, below. Additionally,

[1] Similar arguments have also been made for self-employment (Clark and Drinkwater 2000; Pagan 2009). See also the discussion of patterns of labour market participation, below.

empirically we find relatively little overrepresentation in specific (3-digit) occupations among disabled people in the UK.

It is less clear why productivity should vary with ethnicity, and thus why the 'quality sorting' argument should apply, particularly when we focus on the 2nd generation, where there are less likely to be omitted potentially job relevant characteristics, such as levels of English language fluency. Differences in relevant experience can themselves stem from constraints on opportunities and discrimination. Moreover, we find that patterns of occupational clustering into specific (3-digit) occupations for the selected ethno-religious groups are much greater than those for disabled people, whereas we might expect the opposite to be the case if sorting was driven by individual productivity rather than structural constraints. In addition, occupational clustering covers a range of occupations including relatively highly paid ones.

To the extent that occupational clustering in low paid occupations does appear to contribute to lower pay, we need to consider the constraints in terms of exclusionary labour market practices, discrimination and patterns of residence and social organisation that might bring them about and how these might be addressed.

2.3. Interpreting unexplained differences in pay

In addition to individual and employment-related characteristics we also consider the relative contribution of unexplained factors to pay differences. We adopt decomposition analyses (Blinder 1973; DiNardo et al. 1996; Firpo et al. 2007; Oaxaca 1973) to estimate the proportion of the overall pay gap that cannot be accounted for by our measured characteristics (see, further, 3.3. Methods). The unexplained component can be interpreted as a pay penalty. That is, that there are particular features or experiences of the disadvantaged group that prevent equality in pay for otherwise similar individuals, and that may include both unmeasured and unmeasurable aspects. In much economic analysis, both of disability and ethnicity the unexplained component is often interpreted directly or implicitly as discrimination (Blackaby et al. 2005; Denny et al. 1997). We treat it more cautiously as comprising the effect of individual or labour market characteristics we have been unable to measure directly, but which may include employer discrimination. Additionally, as noted above, factors such as employment experience which have a direct bearing on current pay may themselves be shaped by discrimination. See, further, the discussion of this point in Longhi and Platt (2008).

While some have assumed that the unexplained component of decomposition analyses or the ethnic group/disabled dummy coefficient in pooled regressions corresponds to discrimination, other researchers have aimed to provide explanations which are seen as alternatives to discrimination. Following the approach of DeLeire (2001), Jones (Jones 2006; Jones et al. 2006b) uses the distinction between those with a health condition that limits their work and those with a health condition that does not limit their work to attempt to net out the impact of disability related discrimination from productivity differences related to disability. However, this approach only works if discrimination does not vary with productivity; and there is some evidence from comparing those with a mental health problem and their employment rates with those with other forms of disability among the non-work limited disabled that it does. Therefore, the whole unexplained component could still be viewed according to the conventional interpretation as an upper bound for employer discrimination. This is setting aside the fact that discrimination may shape some of the explanatory factors instead such as type of occupation and access to work (Altonji and Blank 1999). The difference between non

work-limited and non disabled would, on this same conventional approach, constitute the lower bound, though that is only assuming that there are not omitted relevant characteristics in the decomposition. Even if we accepted the assumptions underlying this interpretation of upper and lower bounds, it still neglects to acknowledge the fact that perception of a health condition as work limiting among those in work may tell us about employers' response to the condition as much as individual productivity.

We use a somewhat similar approach to Jones et al. (2006) in employing comparisons between those with activity limiting conditions and those for whom the condition is not activity limiting. This enables us to consider the potential role of co-morbidity (and thus a proxy also for severity) in contributing to pay differences.[2] But given that we are using activity limiting rather than work limiting conditions to define our disabled group, we can also explore the contribution to pay differences of whether the condition is work limiting. This could tell us about limits on productivity or about particular forms of sorting into occupations on the basis of hours and type (over and above our distinctions between full-time and part time and broad occupational category). It could also tell us about workplace constraints that may be related to employers' attitudes and levels of 'accommodation'. And it could be indicating a greater level of discrimination for those with more severe or restrictive forms of a particular condition. In our interpretation we remain open to these various potential aspects. But if we treat the contribution to explaining differences of whether the condition limits type or amount of work as a proxy for productivity, any remaining unexplained component of the gap can then be interpreted as the additional discrimination faced by those with a more severe or limiting disability. This gives us the advantage of being able to estimate the extent to which there are such additional penalties, rather than having to assume, as Jones et al. have to, that discrimination is constant across a given type of health condition, regardless of its severity.

In relation to ethnic differences in labour market outcomes, much analysis has, instead of attributing significant differences between ethnic groups in employment or earnings, attempted to identify the ethnic group characteristics that can explain it. As mentioned, a great deal of attention has been paid to variation in English language fluency as a partial explanation of employment and earnings differences, though, clearly this is only relevant to the 1st generation, to certain ethnic groups, and to certain occupations (Dustmann and Fabbri 2003; Leslie and Lindley 2001; Lindley 2002; Shields and Wheatley Price 2002). Conversely, differences in idiom that are not relevant to job-relevant skills have been shown to be potentially disadvantaging to immigrants (Roberts and Campbell 2006). Similarly, focusing on the reluctance of employers to, for example, recognise qualifications or experience obtained outside the UK does not necessarily contribute to filling the 'discrimination gap'. Others have suggested job contacts as a missing element (Battu et al. 2004); though Frijters et al. (2003) argue that job search has little bearing on employment differentials in the UK. Battu et al. (2005) have further argued that a 'taste for isolation' is demonstrated by patterns of employment and residence, but such an argument starts from an assumption that individual characteristics and preferences are the route to explain employment differentials, rather than discrimination or structural processes. Overall, as Heath and Yu (2005) argue, the effort to

[2] As those without a long term health condition are not asked about the nature or number of health conditions, we cannot explore the role of comorbidity except by comparing two groups who both experience a long-term health condition and therefore get asked about the type and number. We explain our approach further in the next section.

explain the whole of the employment (or earnings) gap in terms of individual differences may tend to miss the point.

On the one hand asserting that any unexplained component of decomposition is employer discrimination is likely to exaggerate the role of discrimination and to oversimplify our understanding of pay disadvantage. On the other hand, assuming that all of the disadvantage could be explained by individual characteristics is likely not only to be elusive, but also oversimplifies the complexities of ways in which people get and are paid for particular jobs, and all the ways and points at which context, opportunities and constraints, and perceived opportunities and constraints shape employment trajectories and outcomes (Rigg 2005), for which absolute differences remain pertinent indicators.

Even if not interpreted directly as discrimination, a large 'unexplained' component of pay gaps begs explanation. There is substantial evidence that employer discrimination does occur (Grewal et al. 2002; Heath and Cheung 2006; Wood et al. 2009), but to attempt to quantify its precise share of overall labour market disadvantage is a difficult undertaking. The problem is potentially confounded when exploring earnings, since we are here considering those who have obtained employment in some form and who may represent a highly selected sample, an issue we discuss further below. Nevertheless, one way we can refine our account is to ascertain whether it affects the lower or the higher paid more. For example, constant unexplained disadvantage across the distribution might be more consistent with employer discrimination. Conversely greater unexplained pay gaps at the top or bottom of the distribution could imply different particular processes of labour market stratification.

2.4. Exploring the whole of the earnings distribution

We consider the whole of the earnings distribution and the contribution of different factors at different points. We build on existing decomposition analyses by decomposing pay gaps at the 10^{th}, 25^{th}, 50^{th}, 75^{th} and 90^{th} percentiles. Moreover for our decompositions we combine weighting and regression based approaches (see further, 3.3. Methods). Weighting approaches are more robust but do not provide a detailed decomposition, that is, a decomposition where the contribution of each covariate can be evaluated. Oaxaca style decompositions have proved popular for their ability to provide the contribution of each characteristic to pay gaps, but they can produce unreliable results if there is not enough overlap between the covariates for the two groups being compared so that the counterfactual is based on out-of-sample predictions. By combining the two approaches we overcome the limitations of each. In addition, by decomposing across the pay distribution, we can identify not only differences in the unexplained component at the different percentiles, but also investigate whether observed characteristics contribute to different degrees at different levels of pay, or, conversely, whether there is a greater unexplained component at higher or lower rates of pay. That is, whether there is evidence of sticky floors or glass ceilings playing a role in the pay of the different populations considered. While much of the focus for marginalised groups has been on those at the bottom of the distribution, it is important for understanding the complex playing out of inequalities in society to understand the extent to which those who are better off as well as those who are worse off are (or are not) disadvantaged in relation to their peers.

2.5. Focus of the analysis

It is worth noting at this point, that we do not incorporate adjustments for selection into employment directly into our analysis. Rather we are considering the situation of those who are actually employed. It is a moot point whether we are concerned with the pay of all those

potentially in the labour market or the differences in pay among those who actually participate. For the purposes of this report we take the view that it is the pay of those who do gain access to the labour market that is the primary concern. Nevertheless, we are able to reflect on whether those who are most highly selected have less pay disadvantage, since we describe the participation levels across the different subpopulations considered.

In addition, our analysis focuses only on men. This is partly due to sample size problems when we attempt to analyse women's pay for the various subpopulations. It is also due to the fact that men's pay is less likely to be influenced by unmeasured (in our data) labour market interruptions resulting from childbearing and child care. When interpreting unexplained differences for women, therefore, it is impossible to distinguish those that are associated with career breaks and loss of experience or periods of part-time work associated with child bearing and/or rearing from those associated with systematic disadvantage (including discrimination) based on the characteristics of the subpopulation. We expect differences in continuous employment also across men from the different groups, consequent on different rates and durations of unemployment across the population groups we consider. These are also unmeasured, and therefore will show up in the 'unexplained' part of the pay gap. However, these labour market interruptions represent a form of disadvantage, and one that can be linked to the characteristics (ethnicity, disability) of interest. As a result, their contribution to the 'unexplained' element of pay differences is consistent with our interpretation of unexplained differences as representing specific labour market disadvantage, including discrimination.

In the next section we outline the data we are using and our variables. This is followed by a brief discussion of our methods and an outline of the models that will be used in the main section of the report. We then go on to consider the key labour market characteristics of both disabled people and ethno-religious groups, as well as their pay and the full distribution of pay. The main section of the report considers the results from our decomposition analysis separately for ethno-religious groups and disabled people. Our discussion and conclusions bring together the insights from both parts of the analysis. Appendices contain additional detail on our methodological approach and tables from our analysis.

3. Data and Methods

3.1. Data

The empirical analysis is based on pooled quarters of the Labour Force Survey (LFS). The LFS is a survey of households, conducted quarterly by the Office for National Statistics (ONS); it is representative of the whole population of the UK and covers not only people resident in private households, but also residents in National Health Service accommodation, and young people living in student halls or similar institutions. The LFS collects data on a large number of individual, household, and job characteristics. The individual characteristics include ethnic group and health status. The job characteristics include firm size, employment sector, industry, occupation, pay and hours of work.

The LFS sample is selected as an unclustered random sample of households, and the target population for the survey is adults aged 16 and above. Members from each responding household are then followed up for a further four quarters. The sample comprises something over 50,000 responding households for each quarter, covering approximately 0.1 per cent of the population, and containing around 130, 000 adults of whom some will be responding for

the first and others for the second, third, fourth or fifth time.[3] Earnings are asked in the first and fifth interviews; we select respondents at their first interviews only, resulting in unique observations for any individual. For the analysis of both ethno-religious groups and disability we focus only on working age men.

For the analysis of ethno-religious groups we take observations from 27 quarters between the second quarter of 2002 and the final quarter of 2008. The end point is the most recent data available at the time of the analysis. The start point is the first point at which religious affiliation was asked in the LFS. We exclude Northern Ireland, where the ethnicity question is not comparable with the question asked for the rest of Great Britain. In order to avoid including those who have not yet completed their education alongside those who typically have, we exclude all men younger than 23 from the analysis of earnings. Given that we are concerned with men of working age, our upper age limit is 64. Our descriptive statistics of employment status, however, include men aged 16-64 since it is relevant to observe participation across the whole working age range, and also to observe the differential impact of involvement in post-compulsory education.

For the analysis of disabled men, we take observations from 47 quarters between the second quarter of 1997 and the final quarter of 2008. Disability questions have been consistent since 1997, when they were adjusted from their previous formulation to reflect recent disability legislation, the Disability Discrimination Act (DDA) 1995. Going back as far as 1997 increases our samples of those with particular conditions and for whom that condition is activity limiting. We base our sample only on those who are White and UK-born, to minimise any potential confounding effects of differential responses by ethnic group[4] or country of birth (Chatterji et al. 2007). Unlike in the ethnicity analysis, we retain observations from Northern Ireland. Our sample currently excludes respondents from the first quarter of 2001, since the file is corrupt and lacks the majority of variables. We have taken this up with ONS. Once again, in the analysis of earnings we restrict our sample to men aged 23-64.

3.2. Concepts and Measures

Pay

Pay is calculated as hourly wage for those in employment, based on usual hours, including paid overtime and usual pay in the main job. Hourly pay is not calculated for income from self-employment. We set hourly pay to prices at 1st quarter 2008 across all waves using the consumer price index (CPI), downloaded from the Office for National Statistics (www.statistics.gov.uk). There is relatively high non-response on earnings questions. As a result, specific weights for pay have been derived and are included in the LFS dataset in addition to those that aim to render the sample as a whole representative of the population, taking account of both response and design effects. We therefore adjust pay by these 'income weights' in all the analysis. Aside from the descriptive earnings statistics (see Section 4, below), we use log transformation of hourly pay in all analysis and express unexplained and explained components of pay differences in terms of log pay.

Ethno-religious groups

[3] For more details on sample and survey methodology see the LFS User Guide, Vol. 1.

[4] Note also that the ethnic categories changed between 1991 and 2001. For pre-2001 respondents our selection is based on those who defined themselves as White and were UK-born. For 2001 onwards we included those who answered to one of the three White categories (grouped within a White) heading and who were UK-born.

Our ethno-religious groups are defined by subjective ethnic group, religious affiliation and by generation. Using the 2001 ethnic group categories, the categories for religious affiliation introduced in 2002 and information on country of birth, year of birth and time of arrival in the UK, we focus on just seven ethno-religious and generation groups. We compare six minority groups with the UK born White British Christian majority in order to highlight similarity or difference within and across ethnic group, religious affiliation and generation. Thus we look at the pay distribution and pay gaps of Indian Hindus, Indian Muslims and Pakistani Muslims, breaking each down by whether they were born in the UK or came while they were still young enough to participate in compulsory education at age 11 or under (2nd generation) or whether they arrived in the UK as adults or as they approached school leaving age (1st generation).

Disability

Measurement of disability in surveys is the subject of much discussion and debate, focusing in particular around objective versus subjective (or self-report measures). Kreider and Pepper (2008) explore the robustness of self-report of work limiting disability and find that it is not robust when compared with 'objective' measures of functional limitation. See also Moon and Shin (2006). However, Burkhauser et al. (2002) evaluating the commonly used measure of work limiting disability in US data suggest that self-report data provides an adequate measure for many purposes. A summary of the different measures commonly used in the UK can be found in Bell and Heitmueller (2009). These include questions relating to activities of daily living, as well as work limiting measures. Berthoud (2008) uses a much richer set of questions on functional limitations as well as on the nature of conditions from a specialist disability follow-up survey. However, few non-specialist surveys contain such an array of questions. Since the implementation of the DDA, a recommended suite of questions has been developed and included in the LFS since 1997, and are advised as providing an appropriate basis for the definition of the disabled population (Smith and Keyte 2008). We draw on these questions in both defining out disabled populations and in distinguishing their experience.

Prior to 1997, given the focus of the LFS on employment, the main concern was with whether the health problem limited either the type or amount of work the respondent could carry out. Since 1997, however, while the work-related health questions remain, the extended set of questions on health problems have aimed to reflect disability as defined for the purposes of the Disability Discrimination Act 1995. Thus there are questions on whether the respondent experiences a long-term health condition, whether that condition limits their ability to carry out activities, the type of condition or conditions, and whether the respondent has experienced a long-term condition in the past (and the type of condition). We construct a measure of disability based on whether the respondent experiences a long-term illness (LTI) and whether it is activity limiting ('activity limiting LTI'). This for us represents a measure of disability that approximately accords with the DDA definition.[5] We compare these populations not only with the non disabled (those who have no long-term illness) but also with those who have a long-term illness but do not consider it limits their daily activity ('non activity limiting LTI'). This second group are, in many ways, more similar to the non-disabled population than the disabled population, as we can see from the descriptive statistics, below; but they are not as similar to non-disabled as was found by Jones et al. (Jones et al. 2006b) for non-work limiting long term ill compared to non-disabled in an earlier period of the LFS data. In the population as a whole aged 16 and over, 64.7 per cent do not have any long lasting health condition; 15 per cent have a long lasting health condition that does not limit activity; the remaining 20.3

[5] The DDA definition also takes account of past disability, but we do not use that information in this analysis.

per cent have a long lasting health condition that also limits activity. Additionally, we can specify the disabled (activity limiting LTI) group and those with a less restrictive condition (non activity limiting LTI) more specifically by taking account of whether the disability is physical or mental. Given the wealth of information on the extra penalties associated with a mental health condition, it could be important both to ascertain the extent to which non activity limiting mental LTI is associated with pay disadvantage relative to the majority compared to the pay disadvantage of those with non activity limiting physical LTI. Moreover, we can compare the pay of those with a mental or physical condition according to whether that condition is activity limiting or not. Among those with non activity limiting LTI, 84.3 per cent have a physical disability as their main health problem, while for 3.5 per cent the main health problem is a mental condition. (The remaining people have learning disabilities; progressive illnesses; or other health problems, but we do not analyse them separately in this report.) Among those with activity limiting LTI, for 76 per cent the main disability relates to a physical condition, while for 9.1 per cent the main health problem is a mental condition.

Thus we have seven populations we consider and compare (see further Table 1): non disabled people; those with non activity limiting LTI (all types of condition); those with activity limiting LTI (all types of condition); and two subgroups each of the non activity limiting and activity limiting groups: those with a non activity limiting physical LTI; those with a non activity limiting mental LTI; those with an activity limiting physical LTI and those with an activity limiting mental LTI.

If these measures define the *groups* we consider we can also use additional information on health experience to help explain differences between disabled people (those with a condition that is activity limiting) and those with a condition that does not limit their activity. This additional information is potentially important in helping understand the sources of pay differences between those with common types of condition. Thus we use measures of whether the disability limits the type or amount of work and the number of conditions as additional *predictors* when comparing those who share a type of condition. We can also control for whether those with a physical disability also experience a mental health condition, and, for those with a mental health condition as their main health problem whether that is depressive illness or 'mental illness'.[6] This enables us to give a much finer grained picture of the relationship between types of disability and pay than has typically been the case. The work limiting variables can be informative about the extent to which it is apparent differences in productivity compared to differences in, say, occupational distribution that contribute to pay gaps between those with a long term illness. And using additional information on mental health status can help to give some insight into whether that is associated with greater pay deficits even among those with the same type of long term health condition. We specify these additional variables further below.

Table 1 summarises the minority subpopulations analysed for both ethnicity and disability, and the respective comparison groups.

[6] For more detail on the series of health questions asked see the Appendix.

Table 1: Sub-populations and comparison groups

Ethno-religious groups		**Disability**	
Minority group	***Reference group***	***Minority group***	***Reference group***
1st generation Indian Hindus	White British Christian, UK born	Activity limiting LTI	Non disabled
2nd generation Indian Hindus	White British Christian, UK born	Non Activity limiting LTI	Non disabled
1st generation Indian Muslims	White British Christian, UK born	Activity limiting LTI	Non activity limiting LTI
2nd generation Indian Muslims	White British Christian, UK born	Non activity limiting LTI: physical conditions	Non disabled
1st generation Pakistani Muslims	White British Christian, UK born	Activity limiting LTI: Physical conditions	Non activity limiting LTI: Physical conditions
2nd generation Pakistani Muslims	White British Christian, UK born	Non activity limiting LTI: Mental health conditions	Non disabled
		Activity limiting LTI: Mental health conditions	Non activity limiting LTI: Mental health conditions

The comparisons of wages between the minority group and comparison population take two forms. (We use minority here to refer to both ethnic minorities and disabled people.) First we calculate the counterfactual for pay of those who match the minority group on characteristics but come from the majority group. Second, we decompose the absolute pay gap between minority and majority into the amount that can be explained by characteristics, illustrating which characteristics explain the most, and the amount that remains unexplained. We use a combined regression approach to compute the counterfactual. Weights are based on the predicted probability of belonging to the minority rather than the reference group. The probability is predicted using both direct pay-related variables and variables that are associated with membership of the minority group; whereas the wage regressions are estimated using only those characteristics that can be expected to influence pay: human capital and job characteristics. As noted in the introduction, differences in the distribution of job characteristics may themselves invite explanation as much as 'explain' pay differences.

Pay-related variables

For both disability and ethnicity wage models we include qualifications, occupation, age, firm size, job tenure, region, whether work is part-time rather than full-time, and whether work is in the public rather than the private sector. These are not always formulated in precisely the same way across the two sets of analyses.

Following the National Vocational Qualification classification (NVQ), for the ethnicity analysis we identify six qualification groups: (1) NVQ 4 or above; (2) NVQ 3; (3) NVQ 2; (4) Less than NVQ 2; (5) other qualifications; and (6) no qualification. The group of "other qualifications" is a heterogeneous one, including all qualifications obtained abroad that are not directly comparable with British qualifications. This will have a bearing on our interpretation of the contribution of these other qualifications to pay gaps in the analysis of

ethno-religious groups, since it may capture other unmeasured sources of heterogeneity between the UK and the non-UK born. We use the highest level of qualifications, level 4 plus as our reference category. The data used in the disability analysis includes breaks in the categories and therefore we can only use a consistent set of three categories across our observations: (1) NVQ 4 or above; (2) NVQ 3; (3) NVQ 2 or less. Here we use NVQ 2 or less as our reference category.

Age and age squared are both included in the disability analysis as continuous variables. The probability of disability itself increases dramatically with age, and hence it is important to include age in this form. In the ethnicity analysis, we include age as a dummy for whether aged over 34. This is because the age ranges of our minority samples are much younger than the comparison group on average for the 2nd generation, and the age distribution is curtailed. Average age differs significantly between 1st and 2nd generations. While the average age of 1st generation Indian and Pakistani men was around 40-45, and is comparable to the average age of British Christian men, the average age of the 2nd generations of both ethnicities was only 32-34. To include age as a linear variable would reduce the overlap between the two populations and invalidate any attempt to interpret the contribution of age to differences in pay.

Job tenure and qualifications can be thought of as the human capital that the individual brings to the job. Job tenure is included as a dummy variable in the analysis distinguishing those with 5 or more years in the job from those with 0-4 years. The choice of this dummy was to maximise the overlap between our minority and our references populations in the variables used. We also considered that it better captured the difference between long and short jobs than a linear variable, which could be restricted by date of immigration and by disability onset.

Whether individuals are in full-time or part-time occupation and the particular type of occupation can be seen to represent constraints on possible pay. We discussed above the potential relevance of pay as both a constraint on employment and enabling participation in some form. For our analysis, part time is defined as fewer than 30 hours per week. It thus includes a potentially wide range of actual hours, a point we discuss further in our interpretation.

For occupation, we include at 1-digit Standard Occupation Classification (SOC) level the nine major occupational groups, which are associated with different levels of pay. We use higher managerial and professional as our reference category. The span of our disability analysis includes a change in occupational coding. Rather than attempt to harmonise across the change in SOC, we include dummies for both the SOC90 and the SOC2000 categories, using the higher professional and managerial from both as the reference category as the most consistent across the series break. For the ethnicity analysis, we also incorporate five occupations at the three digit level in which certain minority groups show relatively high concentrations. Overall, minority groups appear to be more concentrated in specific occupations than white British Christians are; however, 2nd generations are much less concentrated than 1st generations.

Our inclusion of five 3-digit occupations into our analysis is based on the distribution of ethno-religious groups across occupations. The occupations are: Health Professionals; Information and Communication Technology Professionals; Functional Managers; Transport

Drivers and Operatives, and Sales Assistants and Retail Cashiers. Nearly 14 per cent of Indian Hindu 1st generation men work as Health Professionals; ten per cent of them work as Information and Communication Technology Professionals; while over six per cent work as Functional Managers.[7] Second generation Indian Hindu men are less concentrated than the first generation. For the 2nd generation, Health Professionals do not occupy a significant proportion. Instead, Functional Managers and Information and Communication Technology Professionals are the most common, with around nine per cent and eight per cent respectively of 2nd generation Indian Hindus working in these two occupations.

Indian Muslims concentrate in somewhat different kinds of occupations. Nearly eight per cent of 1st generation Indian Muslim men work as Health Professionals; but note that the proportion is much smaller than for 1st generation Indian Hindus. A similar proportion work as Sales Assistants and Retail Cashiers; and nearly nine per cent work as Transport Drivers and Operatives. Second generation Indian Muslim men, however, concentrate mostly heavily in Sales Assistants and Retail Cashier occupations (nine per cent).

Pakistani Muslims are the most concentrated group. Among the 1st generation, 24 per cent work as Transport Drivers and Operatives; and among the 2nd generation 14 per cent work as Transport Drivers and Operatives, while nearly 10 per cent work as Sales Assistants and Retail Cashiers. Occupationally, it would seem that Indian Muslim men fall between the patterns of Indian Hindu and Pakistani Muslim men, but are more similar to Pakistani Muslims than to Indian Hindus.

For the disability analysis, we include region in the form of the nine government office regions of England plus Wales, Scotland and Northern Ireland. Controlling for broad regional differences is important as the relationship between disability and labour market outcomes has been shown to vary by region (Jones et al. 2006a). There are also substantial variations in those who claim disability benefits by region in both the US and the UK (McVicar 2006; Rosato and O'Reilly 2006). Regional variation in both rates of disability and the consequences of disability has been linked to differences in deprivation levels, the type of industry, as well as factors such as local diets. Participation rates and wage rates of disabled people echo patterns of regional employment and wage rates: in areas of higher employment, disabled people are also more likely to be in work and to receive higher pay. In areas of deindustrialisation and mass unemployment, lack of employment has itself been regarded as contributing to higher rates of long-term mental illness (Jones et al. 2006a).

The ethno-religious groups we consider are fairly highly concentrated in specific areas. See also Peach (2006) on this point. This makes it hard to control for a large number of regions across all our comparisons. Some groups do not appear in some regions at all; while numbers in others are high for some groups but not for others. For that reason we aggregate the standard regions into three broad geographic areas in order to ensure that all groups have some presence in each region. The three macro-regions are: (1) Scotland and North of England, including Tyne & Wear, Yorkshire, the Rest of the Northern Region, and Scotland ('North'); (2) Wales and Mid England, including the Midlands, East Anglia, Manchester, Merseyside, the Rest of North West, and Wales ('Middle'); and (3) London and the South ('South'). Indian Hindus are heavily concentrated in the South, and only a small proportion is

[7] These, and subsequent occupational proportions are calculated from all men aged 16-64 in employment and whether or not we have pay data for them.

found in the North. Indian Muslims, instead, seem to be more equally distributed across the three regions, but generally tend to concentrate in the Middle. Pakistanis seem to be the most evenly distributed across the three macro-regions.

We control for whether employment is in the public sector rather than the private sector and for the size of the firm where the respondent is employed. There have been debates about how discrimination may be influenced by both sector and firm size (Heath and Cheung 2006). For disabled people firm size has, additionally, been linked to the ability to accommodate disability. We can see this in the fact that small firms were initially exempt from the provisions of the DDA – though this exemption was later repealed (Jones and Jones 2008). For the ethnicity analysis we have dummies for firms with 0-25 workers, 25-250 workers with large firms of over 250 workers as the reference category. For the disability data, changes in the categories over time mean we cannot have exactly the same breakdown. Instead we have just one dummy for firms of size 0-50, and our reference category is all those with more than 50 employees.[8]

For the disability analysis, we include dummies for whether the respondent identifies their long term illness as limiting the amount or type of work that they can carry out. While there have been concerns about justification bias in relation to such work-related questions (i.e. that those out of work are more likely to see their health problem as work limiting), those concerns do not apply in this instance as we are only concerned with those who are in paid work. As we discussed in the background to this report, these variables can be taken as informative about severity of the condition (and consequently productivity), and the impact of that severity on the type of occupation the respondent is in. While Jones et al. (2006b) argue that the whole of the difference between the work-limited and non-work limited disabled can be understood self-evidently as a productivity difference, the difference between the activity limiting LTI and non activity limiting LTI is not so clear cut as it can apply to activities beyond – and irrelevant to – the workplace. Thus the inclusion of the work-limiting dummies can help to explore whether there do appear to be productivity differences between the two groups. However, they may also be informative about the extent to which employers are accommodating and make them feel their disability as work-limiting (Schur et al. 2009). Thus the lower pay of those who are 'work-limited' could in fact be partly the lower pay of those who are not accommodated and thus feel their condition as work-limiting, rather than to their (potential) productivity.

Additional predictor variables for logit equations

In addition to pay-related variables, in calculating the counterfactual on the basis of probability of belonging to the majority group, we additionally included a discrete number of variables that distinguished between minority and comparison groups. These comprised marital status, presence of dependent children aged under 5 and aged 5-15, and, for the ethnicity analysis, whether the respondent had long term health problems. For the disability analysis we also include housing tenure as that has been shown to be different for disabled and non-disabled people, and that those with a long-term condition but for whom it is not limiting have a distribution much more similar to those who have no long-term condition than those who have a limiting long term condition (Jones et al. 2006b). Dummies for housing

[8] Initially we distinguished between firms of 0-25 and 25-50 employees but the smaller category was not statistically significant in our models.

tenure are included for privately rented and local authority housing, with owner occupation as the reference category. Where we compare among those who experience a LTI according to whether it is health limiting or not, we also include variables for the number of conditions and its square. Since, as well as specifying the main health problem, respondents can identify all other types of health problem, we can use this count of conditions (and its square) as a proxy for severity.

Finally, we include a dummy in the equations for those whose main health problem is a physical disability to identify whether they have a mental health condition as well. We know that employment disadvantage and employment discrimination is greatest for those with mental health conditions (Baldwin and Johnson 2000; Berthoud 2006; Kidd et al. 2000), so this may be important as a potential confounding factor when we are decomposing the difference between those whose main condition is an activity limiting physical LTI and those whose main condition is a non activity limiting physical LTI. Similarly, while in defining those who have a mental health problem as combining the two groups of those with a depressive disorder and those with a mental illness, we also include a dummy in the equations to distinguish between them, since there may well be differences in stigma and possibly in ability to hold down particular sorts of employment associated with the distinction (Baldwin and Marcus 2007; Braden et al. 2008).

3.3. Methods

Most of the decomposition analyses of the pay gap have been based on the Blinder-Oaxaca method. But, because this method relies on a linear regression assumption and on out-of-sample predictions, it can be applied only to explain mean differences and it can lead to misleading results (Barsky et al. 2002). Nevertheless, its popularity has not decreased and this is because it allows for a detailed decomposition of the pay gap. That is, it enables an account of the pay gap which distinguishes the contribution of each specific covariate considered. This detailed decomposition is not in general possible by using other methods such as the weighting technique proposed by Di Nardo et al (1996). But, by adopting a recent method proposed by Firpo et al (2007), we overcome the drawbacks of the Blinder-Oaxaca decomposition and provide a detailed decomposition of the pay gap at the mean as well as at different percentiles of the distribution. This is possible thanks to the use of weights to equalize the empirical distributions of the covariates between groups and of recentered influence function regressions. This method is a combination of the more well-known weighting method (DiNardo et al. 1996) and Oaxaca style decomposition (Blinder 1973; Oaxaca 1973).

The weighting technique involves estimating a model for the probability of belonging to a minority rather than the majority using a set of explanatory variables. In our empirical application we consider a logit model for each of the minority groups examined, and we use its predictions to compute weights given by the ratio between the probability of belonging to the majority and the probability of belonging to the minority. We could then compute the weighted mean and quantiles of log pay for each minority group. These weighted statistics are the counterfactual mean and quantiles of log pay for each minority group as if it had the same distribution of characteristics (explanatory variables in the logit model) of the majority group. We can decompose the mean (or quantile) pay gap between each of the minority groups considered and the majority group into two additive components: the difference between the mean pay for the minority group and its counterfactual mean (‘explained’) and the difference

between the counterfactual mean and the mean pay for the majority group ('unexplained'). The main advantage of weighting methods are that they require specifying and estimating a model only for the probability of belonging to the minority. On the other hand, their main drawback is that they do not provide a detailed decomposition. That is, a decomposition where the contribution of each single covariate can be separated out.

Oaxaca decomposition (Blinder 1973; Oaxaca 1973) uses a regression approach, regressing the pay of minority and majority separately on their characteristics. By making linearity assumptions, the difference between the pay of majority and minority can then be decomposed into that due to differences in characteristics (explained) and the difference due to differences in coefficients on those characteristics (unexplained). Further, the two components can be decomposed into the contribution of each of the covariates.

The main advantage of the Oaxaca decomposition is that it can be used to provide a detailed decomposition and evaluate the contribution of each covariate in explaining the pay gap. On the other hand, its two major drawbacks are that (1) it is not applicable to nonlinear regression models such as quantile regressions; and (2) it can produce unreliable results if the linearity assumption is too restrictive and if the covariates for the two groups do not have common support so that the counterfactual mean estimation is based on out of the sample predictions (see Barsky et al 2002).

Firpo et al (2007) show how to generalise the Oaxaca decomposition of the mean gap to quantiles, variance and other potential summary statistics by using the recentered influence function (RIF) approach. The RIF for a statistic (for example a quantile) is a transformation of the outcome variable, in our case the log pay, such that its mean equals the actual statistic.[9] By assuming a linear relationship between the RIF and the explanatory variables, we can then use the Oaxaca decomposition to explain differences in pay quantiles or other statistics. This approach, which we call a generalized Oaxaca or regression based approach, includes the Oaxaca decomposition as special case because the RIF of the mean is the actual outcome variable, log pay. The computation of the counterfactual in this approach is still based on a linearity assumption and possibly on out of the sample predictions.

To overcome this limit, we can further combine weighting and regression based approaches. In other words, we estimate the weighted linear regression of the RIF for each minority group by using weights as described above. This estimation is consistent if either the weights (i.e. the logit model) are correctly estimated or the linear regression model is correctly specified.[10] The counterfactual mean or quantile are computed as in the Oaxaca decomposition but considering the coefficients estimated using the weighted regression (RIF) model instead of the simple mean regression model. Given the counterfactual, we can again decompose the pay gap into the part *explained* by difference in the covariate distribution (the difference between the minority group and the counterfactual statistics) and the residual *unexplained* part (difference between the counterfactual and the majority statistics). We can further decompose the explained part into two components: (1) the explained component based on the regression (generalized Oaxaca) approach; (2) the difference between the 'explained' component in the generalized Oaxaca and in the combined weighting and regression based approaches. The size

[9] We refer to Firpo et al. (2009) for more details on the definition of recentered influence function.
[10] In summary, the combined weighting and regression based estimation method is double consistent (Robins and Rotnitzky 1995).

of the second component tells us how close the generalized Oaxaca decomposition of the pay gap is to the amount explained according to our double-robust counterfactual, and thus the confidence with which we can use the detailed results for the contribution of different characteristics deriving from the generalized Oaxaca decomposition. (See Firpo et al (2007) for more details.)

4. Descriptive statistics

4.1. Labour market participation

We start by examining the share that those in paid employment make up of working age men from the different groups within our two minority populations, ethnic minorities and disabled people. This provides the context for our analysis of pay gaps. For both disabled people and for ethnic minority groups, it has been argued that it is at the point of access to employment that labour market disadvantage is most salient (Baldwin and Johnson 2000; Heath 2001); though others have argued that it is important to consider in-work barriers in addition (Rigg 2005), and that there is substantial pay disadvantage within employment (Longhi and Platt 2008).

The UK's ethnic groups have been shown to have very different levels of labour market participation (Platt 2007). Though the variation for men is not as great as it is for women, there are distinctive differences in rates of economic inactivity among men, with relatively high rates among Pakistani men and the lowest rates among Indian and White British men. However, even among those economically active there are also some striking differences in terms of proportions in full-time and part-time employment, with large proportions of Bangladeshi men in part-time employment, in self-employment with substantial proportions of Pakistani men (and, to a lesser extent Indian men) self-employed, and unemployment, with higher rates of unemployment for all ethnic minorities relative to the majority (Longhi and Platt 2008). As measures of earnings are only available for those in employment all of these sources of variation influence the proportion of any group subject to analysis of pay. Moreover, the variations are also informative about structural aspects of the labour market and the extent to which particular opportunities for economic activity are accessed by minority groups.

There is also clear evidence of lower labour market participation rates among disabled people in the UK (Berthoud 2006). While the rate varies according to the definition used, Berthoud suggests that in the mid 1990s only 29 per cent of disabled people were in work of 16 hours or more, while the rate for non-disabled people was 76 per cent. There is also evidence of lower pay for those who are in employment. Disabled people have higher rates of part-time employment (Jones 2007), which tends to attract lower pay than full-time work. But even among those working full-time, rates of pay for disabled people are lower than for non disabled people (Longhi and Platt 2008). Jones (Jones 2007) has suggested that part-time work offers a means for disabled people to participate in employment in a way that accommodates them more effectively. Thus, given the major part-time pay deficit, greater access to employment by these means might actually serve to increase disabled people's pay gaps.

Figures 1 and 2 illustrate the extent and type of labour market participation across ethno-religious groups and disability groups, respectively, from our data. They thus reveal the extent

to which those in employment (whether full or part time) are a selected sample. We can also see the relative importance of self-employment and unemployment among the economically inactive. Rates of unemployment are clearly indicative of labour market disadvantage, and it has also been argued that for some minority ethnic groups self-employment represents a response to constrained opportunities rather than an expression of entrepreneurship or the exploitation of particular, niche opportunities (Clark and Drinkwater 2000; Clark and Drinkwater 2002). For disabled people, self-employment, like part-time employment has been argued to represent a means to accommodating disability in ways that cannot be achieved in the employed work (Jones 2007), as has self-employment (Pagan 2009). Economic inactivity can represent a variety of different circumstances. Ill-health will clearly contribute to it, and this is likely to be the primary, though not the sole factor in the inactivity rates of disabled people. For some ethnic minority groups rates of inactivity through ill-health are also quite high (Salway et al. 2007). Many students and those in full-time education will also be economically inactive and the proportions of these will vary with age – and thus also with generation. Inactivity can also represent unemployment for those who have become discouraged from actively searching for work – and thus do not meet the ILO definition of unemployed. And finally some inactive will be those caring for dependents – though for men this typically has a much less significant bearing on participation than it does for women.

Figure 1 shows that Indian Hindu 1st generation men of working age have the highest rates of employment of all our groups, closely followed by White British Christian men. These groups also have the highest rates of economic activity. Indian Hindu 2nd generation men and Indian Muslim 1st generation men have very similar rates of economic activity (and of paid work), but 2nd generation Indian Hindus have higher rates of employment because self-employment plays such an important role for 1st generation Indian Muslims. Indeed, 2nd generation Indian Muslims have higher employment rates than the 1st generation, though they have lower activity rates. Pakistani Muslim 1st generation men have economic activity rates that are slightly higher than those of 2nd generation Indian Muslims, but their employment rates are relatively low, as a result of the highest rates of self-employment of any group. The lowest employment rates are experienced by 2nd generation Pakistani men. Inactivity rates (students) are relatively high for this group, but employment rates are also affected by the highest unemployment rates of any group and higher rates of self-employment than any of the other 2nd generation groups.

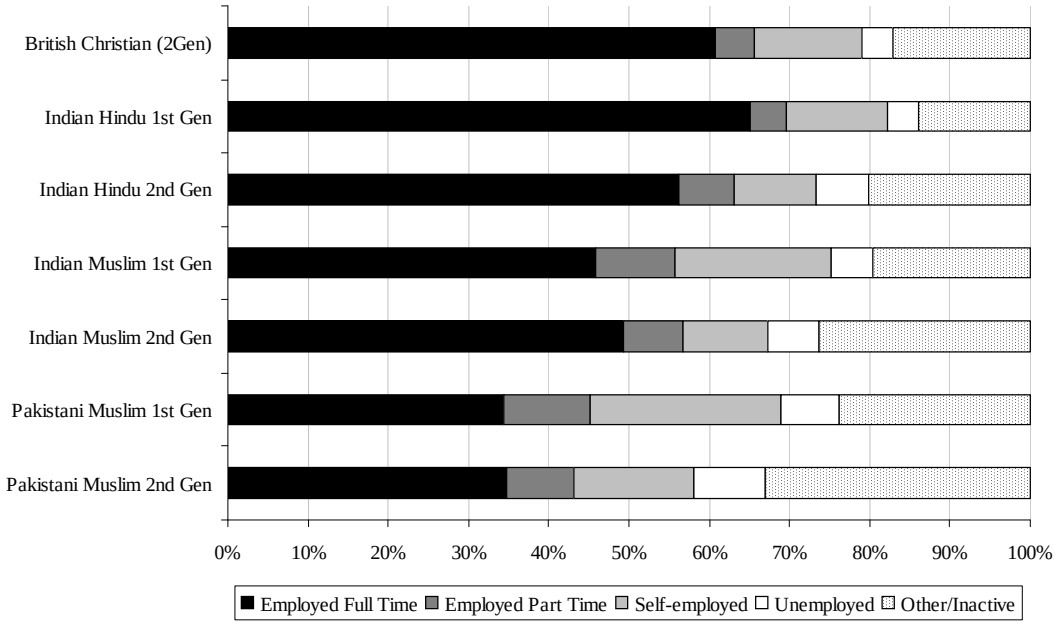

Figure 1: Employment status of men by ethno-religious group and generation, men 16-64
Source: Labour Force Survey, 2002-2008, weighted.

We immediately see that earnings from employment play a different role for the different groups and that there is evidence of substantial labour market constraints in the form of high rates of unemployment for 2nd generation minorities and high rates of self-employment for 1st generation minorities.

Figure 2 shows that if we focus on men aged 16+, we can see very large differences across disability status, and by kind of disability. Those with non activity limiting physical LTI have employment patterns that are very similar to those of non disabled people. Activity limiting physical LTI reduces employment and labour force participation somewhat.
Those with a mental health condition are less likely to be in employment, and more likely to be either unemployed or inactive than people with a physical disability. Employment of workers with non activity limiting mental LTI is higher than people with activity limiting physical LTI, but lower than people with non activity limiting physical LTI. Those with activity limiting mental LTI are the least likely to be in the labour market.

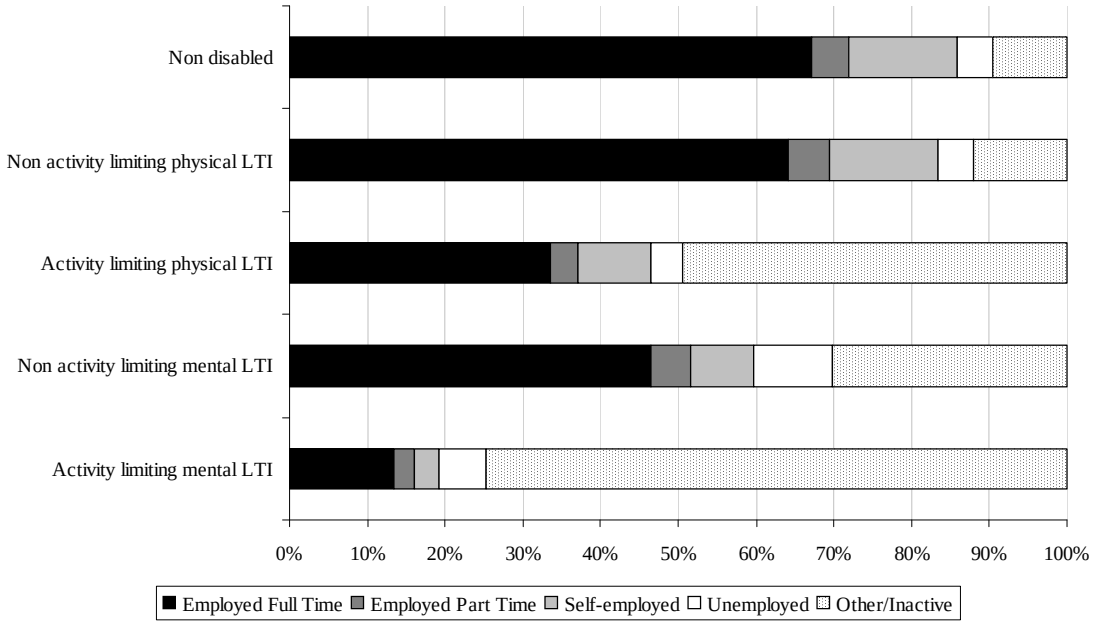

Figure 2: Employment status of men aged 16-64, by disability group
Source: Labour Force Survey, 1997-2008, weighted

4.2. Pay

What are the pay differences across the earnings distribution of those in employment? Here we necessarily consider only those who are in paid full-time or part-time employment, excluding self-employment; and, as in our analysis sample, only men aged 23-64. Results are adjusted by income weights (as discussed in Section 3.2).

Table 2 shows the pay of the seven ethno-religious groups who form the basis of our analysis. The rest of the analysis focuses on log pay; and Table A1 shows the means and quantiles of log pay for the different groups (and their standard errors). However, for descriptive purposes, real pay provides a clearer indication of the scale of the differences across groups. Focusing just on the mean pay, shows that Indian Hindus earn more on average that White British Christians, but that all the other groups earn less. Indian Muslims earn substantially less on average than Indian Hindus, but rather more than Pakistani Muslims. For each group the 2nd generation fares better than the 1st generation; but the differences between groups are such that 2nd generation Pakistani Muslims earn on average not much more than 1st generation Indian Muslims and substantially less than 1st generation Indian Hindus.

Table 2: Mean pay and pay at different percentiles of the wage distribution by ethno-religious group (men aged 23-64, £ per hour)

Ethno-religious Group	Mean wage	P10	P25	P50	P75	P90	Obs.
White UK Christian	13.38	6.20	8.00	11.08	16.06	22.81	54848
Indian Hindu 1st Generation	14.20	5.89	7.80	11.55	18.48	25.14	537
Indian Hindu 2nd Generation	15.39	6.40	9.15	13.18	18.31	26.28	253
Indian Muslim 1st Generation	11.55	4.84	5.76	8.50	14.89	22.63	110
Indian Muslim 2nd Generation	12.72	5.27	6.60	8.31	17.05	22.57	78
Pakistani Muslim 1st Generation	8.25	4.51	5.32	6.63	9.22	14.62	392
Pakistani Muslim 2nd Generation	12.03	5.06	6.60	8.98	14.48	21.61	256

Source: Labour Force Survey, 2002-2008, weighted means and quantiles. Pay measured at constant prices (first quarter 2008).

There would appear to be a hierarchy of pay that is captured both by ethnicity and religious affiliation. In addition, there is variation in the patterns across the distribution. At the bottom of the distribution all the groups except 2nd generation Indian Hindu men experience a deficit relative to the majority, but 1st generation Hindus outstrip the majority by the top of the distribution. This suggests that there may be a polarised distribution within this group possibly as a result of different skills and occupational levels. Second generation Hindus have a pay advantage relative to the White British Christian majority across the distribution. First generation Indian Muslims have pay well below that of White Christians at the bottom of the distribution, but come close to catching up towards the top, indicating a similar pattern to that of 1st generation Indian Hindus, but at a slightly lower level. However, 2nd generation Indian Muslim's pay echoes quite closely that of 1st generation Indian Muslims, suggesting this is not simply an issue of generation. Pakistanis of both generations (though particularly the 1st generation) lag behind the pay of the majority at all points on the distribution, thus failing to show the polarization or 'catch-up' that seems to be reflected in the experience of the other groups.

Full-time pay (Table 3) reflects this pattern of overall pay. Numbers of those in part-time work from certain groups are too small for us to be able to draw clear conclusions about distributions and differences in part-time pay. But part-time is a low-paying option; and this would imply limited access to better paying options.

Table 3: Mean pay and pay at different percentiles of the wage distribution for full-time workers by ethno-religious group (men aged 23-64, £ per hour)

Ethno-religious Group	Mean wage	P10	P25	P50	P75	P90	Obs.
Full-time							
British Christian	13.51	6.40	8.19	11.25	16.23	22.98	52114
Indian Hindu 1st Generation	14.49	6.20	8.10	12.09	18.66	25.38	508
Indian Hindu 2nd Generation	15.53	6.70	9.31	13.20	18.39	26.29	249
Indian Muslim 1st Generation	12.50	5.20	6.67	10.38	15.96	22.80	93
Indian Muslim 2nd Generation	12.81	5.27	6.69	8.46	17.05	22.57	74
Pakistani Muslim 1st Generation	8.83	4.57	5.67	7.18	10.48	15.11	306
Pakistani Muslim 2nd Generation	12.75	5.43	7.27	9.63	15.28	22.39	228
Total	13.49	6.36	8.15	11.24	16.23	22.99	53572

Source: Labour Force Survey, 2002-2008, weighted means and quantiles. Pay measured at constant prices (first quarter 2008).

Turning to disability, workers with non activity limiting physical LTI have slightly lower wages than non disabled workers (Table 4). These gaps occur over the whole wage distribution. The gaps are slightly larger for workers with non activity limiting mental LTI, followed by those with activity limiting physical LTI. Workers with activity limiting mental LTI fare much worse than all the others in pay, just as they did in employment. For this group, being very highly selected does not appear to improve chances of higher pay. Instead, perhaps the low pay prospects form further discouragement to this group in engaging with the labour market.

These figures refer only to white people born in the UK. We can compare the pay deficits associated with disability with those associated with ethnicity. The descriptive statistics on wages seem to suggest that people with activity limiting LTI (whether physical or mental) fare worse than most ethnic groups we investigated. It is both striking and somewhat surprising however, to note that 1st generation Pakistani Muslims face lower average pay than White UK-born with activity limiting mental LTI. It is true that our ethnic groups also include disabled people, but, as Table 7 below shows, the rates of long term illness for the 1st generation of Pakistani Muslims in our sample are substantially lower than those for the White British majority and even slightly lower than for the other 1st generation groups. Disability tends to be associated with inactivity for minorities, so it cannot account for these very low levels of pay.

Table 4: Mean pay and pay at different percentiles of the wage distribution by disability (men aged 23-64, £ per hour)

Disability Group	Mean wage	P10	P25	P50	P75	P90	Obs.
Non disabled	12.75	5.87	7.61	10.59	15.34	21.84	105391
Non activity limiting physical LTI	12.04	5.62	7.25	9.99	14.61	20.68	18513
Activity limiting physical LTI	11.16	5.21	6.72	9.25	13.36	18.88	9367
Non activity limiting mental LTI	11.54	4.80	6.64	9.32	13.88	19.90	581
Activity limiting mental LTI	9.71	4.69	6.00	7.90	11.38	17.21	701

Source: Labour Force Survey, 1997-2008, weighted means and quantiles. Pay measured at constant prices (first quarter 2008).

For disabled people, the comparison between full- time pay (Table 5) and part-time pay (Table 6) is potentially interesting given that part-time work has been suggested as a way that disability can be accommodated within employment. For disabled people, part-time work retains a clearly differentiated distribution across the quantiles for each group; and part-time gaps are substantial for disabled people, especially for those with activity limiting mental LTI. For most disabled groups, though, full-time gaps would appear to be somewhat larger.

Table 5: Mean pay and pay at different percentiles of the wage distribution for full-time workers by disability (men aged 23-64, £ per hour)

Disability Group	Mean wage	P10	P25	P50	P75	P90	Obs.
Non disabled	12.82	5.99	7.73	10.71	15.42	21.92	101532
Non activity limiting physical LTI	12.16	5.81	7.43	10.17	14.76	20.74	17462
Activity limiting physical LTI	11.23	5.46	6.98	9.52	13.56	19.06	8581
Non activity limiting mental LTI	11.64	5.26	6.79	9.50	14.01	19.88	528
Activity limiting mental LTI	10.23	4.99	6.41	8.34	11.95	17.58	589
Total	12.61	5.92	7.61	10.53	15.19	21.55	128692

Source: Labour Force Survey, 1997-2008, weighted means and quantiles. Pay measured at constant prices (first quarter 2008).

Table 6: Mean pay and pay at different percentiles of the wage distribution for part-time workers by disability (men aged 23-64, £ per hour)

Disability Group	Mean wage	P10	P25	P50	P75	P90	Obs.
Non disabled	10.81	4.17	5.23	7.09	11.51	19.11	3856
Non activity limiting physical LTI	9.97	4.15	5.13	6.74	10.39	18.60	1048
Activity limiting physical LTI	10.37	4.02	5.06	6.26	9.42	16.40	786
Non activity limiting mental LTI	10.51	4.01	4.58	6.47	10.40	22.81	53
Activity limiting mental LTI	6.91	3.37	4.72	5.85	7.93	11.89	112
Total	10.52	4.14	5.17	6.86	10.91	18.60	5855

Source: Labour Force Survey, 1997-2008, weighted means and quantiles. Pay measured at constant prices (first quarter 2008).

4.3. Descriptives for the variables used in the analysis

We move on to describe the distributions of the variables that we include in our analysis as potentially relevant to these differences in pay. Figures 3 and 4 show the distribution of qualifications according to ethno-religious group and type of LTI, respectively. Qualifications are after all a very significant determinant of pay; and average qualifications tend to be lower on average among disabled people, and among many minority ethnic groups (Platt 2007); though the extent to which they can account for differences in employment outcomes between disabled and non-disabled varies across studies. Contrast, for example, Berthoud (2008) with Jones et al. (2006a). Figure 3 shows that qualifications for the 1st generation of minorities are somewhat bimodal, dominated by higher qualifications at one end and by those with other or no qualifications at the other. By the 2nd generation, there has been a shift just to the higher qualifications so that all minority groups have higher rates of qualifications at levels 4 and higher than the majority population (though this will in part be a result of these 2nd generations being dominated by younger, more highly educated cohorts).

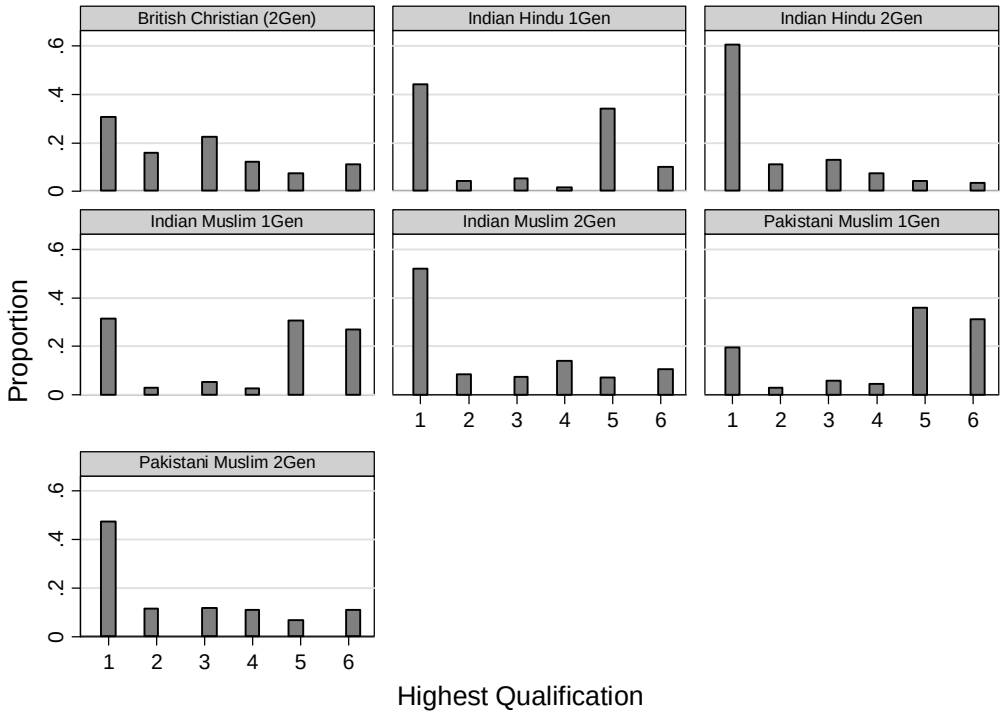

Figure 3: Qualification levels across ethno-religious groups, men 23-64 (weighted)
(1) NVQ 4 or above; (2) NVQ 3; (3) NVQ 2; (4) Less than NVQ 2; (5) other qualifications; (6) no qualification

Turning to our disability sample, as Figure 4 illustrates and consistent with previous research, those with mental disability seem to be slightly better educated than those with physical disability. However, we do not know the extent to which disability was or was not associated with educational choices and trajectories. We could assume that in most cases the onset of disability succeeded the completion of education, so that what we see is that the less-well educated are more susceptible to disability. However, Hollenbeck and Kimmel (2008) argue that disability can itself influence education decisions and options. According to the US literature (Loprest and Maag 2003), those who become disabled after their early 20s are less likely to have completed school or acquired qualifications than those who do not become disabled, they are still more likely to have qualifications than those who experienced early onset or were born with a disability. This is consistent with Berthoud's (2006) findings for the UK, though he represented the causal path in the opposite direction, suggesting that completing education relatively early was associated with greater chance of onset of disability (and severe disability). His results are, however, perhaps as well explained in terms of the constraints on acquiring good qualifications and completing post-compulsory education experienced by (severely) disabled young people.

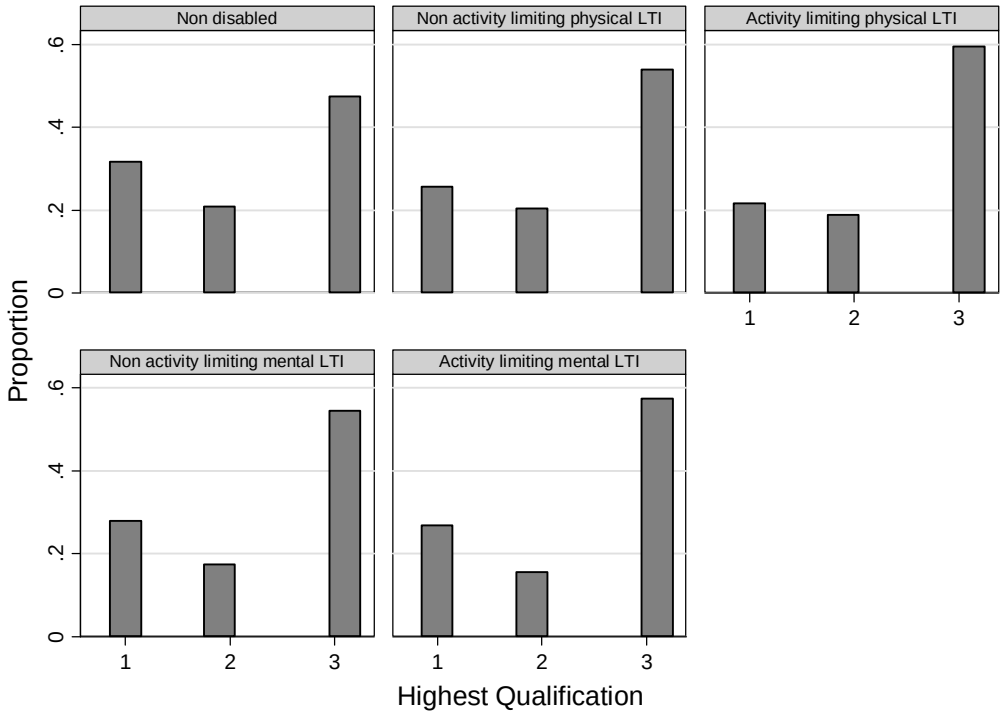

Figure 4: Qualification levels across disability groups, men 23-64 (weighted)
(1) NVQ 4 or above; (2) NVQ 3; (3) NVQ 2 or less

Figure 5 shows the distribution of 1-digit occupations across our ethno-religious groups. As we discussed above, there are distinctive patterns of occupational concentration even at this one-digit level. Table 7, which illustrates the proportions of all the variables in our analysis sample shows the concentrations for the 3-digit occupations in which one or more of our minority ethno-religious groups show particularly marked distribution.

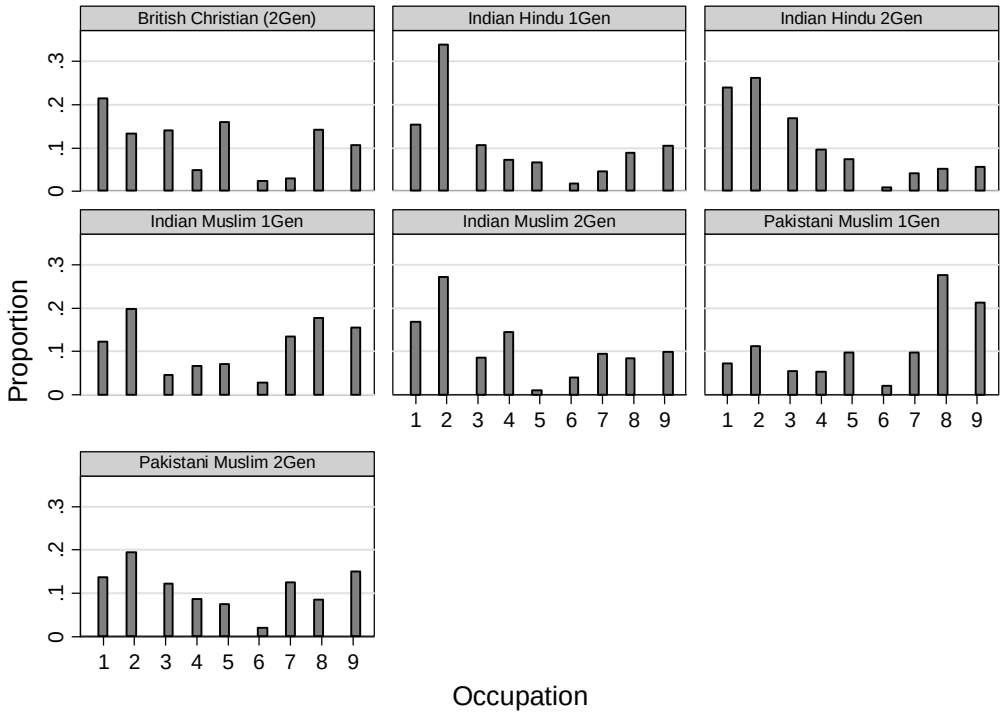

Figure 5: Occupations across ethno-religious groups, men 23-64 (weighted)
(1) Managers and senior officials; (2) Professional occupations; (3) Associate professional and technical; (4) Administrative and secretarial; (5) Skilled trades occupations; (6) Personal service occupations; (7) Sales and customer service occupation; (8) Process, plant and machine operatives; and (9) Elementary occupations

We can see the distribution of all the independent variables across our analysis samples in Table 7 (for the ethnicity analysis) and Table 8 (for the disability analysis).

Table 7: Descriptive statistics of the ethnicity estimation sample (men 23-64 for whom wage data is available)

	White British Christian	Indian Hindu 1 Gen	Indian Hindu 2 Gen	Indian Muslim 1 Gen	Indian Muslim 2 Gen	Pakistani Muslim 1 Gen	Pakistani Muslim 2 Gen
No of observations	50778	508	234	105	76	349	241
Aged 34-64 (Ref: 23-33)	79.5	60.8	56.0	70.5	47.4	62.2	40.2
Working part-time (Ref: full-time)	5.0	4.9	1.7	16.2	5.3	22.1	12.0
Public sector (Ref: private)	21.4	25.6	17.9	23.8	19.7	11.2	19.9
Job tenure > 5 years	61.2	40.0	44.9	48.6	51.3	39.3	41.1
Qualifications							
Level 4 or more	32.0	45.5	62.8	33.3	47.4	21.8	47.3
Level 3	16.8	4.7	13.2	4.8	6.6	3.4	13.7
Level 2	22.7	5.1	12.8	5.7	6.6	5.2	15.4

Less than 2	12.2	1.8	6.8	3.8	17.1	5.2	10.4
Other qualifications	6.7	32.7	2.1	31.4	9.2	37.8	2.1
No qualifications	9.7	10.2	2.1	21.0	13.2	26.6	11.2
Occupations:							
1. Managers and senior officials	22.1	12.8	23.9	12.4	22.4	6.9	10.8
2. Professional occupations	13.8	38.2	26.5	20.0	23.7	11.2	22.8
3. Associate professional and technical	14.3	10.4	15.8	6.7	7.9	6.6	14.9
4. Administrative and secretarial	4.9	6.7	9.4	5.7	10.5	4.9	7.1
5. Skilled trades occupations	15.4	5.7	8.1	4.8	2.6	10.9	7.5
6. Personal service occupations	2.5	1.4	0.4	4.8	3.9	2.3	2.9
7. Sales and customer service occupation	2.8	3.5	3.8	13.3	13.2	10.3	12.0
8. Process, plant and machine operatives	13.9	9.6	6.4	21.0	7.9	26.9	8.7
9. Elementary occupations	10.3	11.6	5.6	11.4	7.9	20.1	13.3
113. Functional Managers	7.6	5.3	10.7	3.8	6.6	2.0	5.0
213. Information And Communication Technology Professionals	2.1	13.4	7.3	1.9	2.6	1.1	6.6
221. Health Professionals	0.5	15.6	5.1	9.5	3.9	4.6	2.9
711. Sales Assistants And Retail Cashiers	1.5	3.3	2.1	9.5	9.2	9.5	8.3
821. Transport Drivers And Operatives	6.1	2.4	1.3	5.7	2.6	9.5	3.3
Firm size: 0-25	29.5	21.9	27.4	37.1	42.1	39.0	30.3
Firm size: 26-250	40.9	31.3	35.9	31.4	26.3	34.4	37.8
Firm size: 250+	29.6	46.9	36.8	31.4	31.6	26.6	32.0
Scotland and North of England	27.0	10.8	3.4	17.1	17.1	28.9	29.5
Wales and Mid England	36.9	30.3	37.2	48.6	50.0	31.5	40.7
London and the South	36.1	58.9	59.4	34.3	32.9	39.5	29.9
Whether health problem	26.8	18.9	16.7	23.8	15.8	17.8	14.5
With children 0-4	6.8	10.6	9.4	13.3	23.7	15.5	15.8
With children 5-15	28.9	27.8	34.2	46.7	46.1	44.4	48.5
Married or cohabiting	78.8	79.7	67.9	90.5	80.3	88.8	81.7

Note: all variables in percentages

Table 8: Descriptive statistics of the disability estimation sample (men 23-64 for whom wage data is available)

	Non disabled	Non activity limiting LTI	Activity Limiting LTI	Non activity limiting physical LTI	Activity limiting physical LTI	Non activity limiting mental LTI	Activity limiting mental LTI
Observations	94944	18769	10004	16643	8445	512	625
Mean age	41	45	47	45	47	42	42
Working part-time (Ref: full-time)	3.7	6.0	9.5	5.7	8.4	9.0	15.8
Public sector (Ref: private)	21.2	21.8	22.5	21.5	21.7	24.0	28.0
Job tenure > 5 years	58.1	61.1	62.1	61.2	62.4	52.0	57.6
Qualifications							
Qualif. Level 4 or more	33.0	27.9	23.1	27.3	22.4	31.1	27.5
Qualif. Level 3	22.2	21.1	19.5	21.6	20.1	17.6	16.0
Qualif. Level 2 or less	44.9	51.0	57.4	51.2	57.6	51.4	56.5
Firm size: 0-50	40.1	42.0	43.3	42.0	43.6	42.4	44.2
Firm size: 50+	59.9	58.0	56.7	58.0	56.4	57.6	55.8
Occupation - pre 2001							
managers & administrators	8.5	6.5	5.1	6.7	5.2	4.5	4.2
professional occupations	5.2	3.7	2.7	3.6	2.8	4.3	2.2
associate prof & tech	3.9	3.1	2.3	3.1	2.3	4.7	2.9
clerical, secretarial	2.8	2.6	2.7	2.6	2.6	4.1	2.9
craft and related	7.1	6.2	5.3	6.4	5.6	3.3	3.0
personal, protective occupations	2.8	2.3	2.4	2.2	2.4	2.1	2.9
sales	1.6	1.3	1.3	1.3	1.3	1.6	1.1
plant and machine operatives	6.1	5.6	5.9	5.7	6.1	5.5	4.0
other	2.5	2.6	2.7	2.5	2.5	3.5	4.0

occupations							
Occupations-2001 onwards							
managers and senior officials	13.2	13.2	11.6	13.2	11.7	10.0	8.5
professional occupations	9.0	9.0	7.8	8.6	7.6	10.0	8.5
associate professional and technical	8.9	8.5	8.5	8.4	8.6	7.8	7.8
administrative & secretarial	2.8	3.5	4.4	3.4	4.0	6.6	8.2
skilled trades occupations	9.1	10.8	10.4	11.0	10.6	10.2	9.3
personal service	1.3	1.8	2.5	1.8	2.5	3.1	2.6
sales and customer service	1.7	2.0	2.4	1.9	2.1	3.5	6.1
process, plant and machine operatives	7.8	9.6	11.8	9.8	12.5	5.1	6.4
elementary occupations	5.7	7.7	10.3	7.6	9.7	10.2	15.5
Regions							
North East	5.6	6.3	7.2	6.3	7.4	6.6	6.1
Yorks and Humberside	9.3	11.2	10.2	11.3	10.3	10.9	9.8
East Midlands	7.9	8.5	8.3	8.7	8.3	7.2	9.4
East	3.7	4.0	3.1	4.0	3.2	5.1	2.9
London	7.1	5.8	5.5	5.6	5.3	7.8	5.8
South East	21.4	21.6	20.8	21.2	20.7	24.4	21.6
South West	9.2	9.4	9.8	9.5	9.9	8.0	9.6
West Midlands	9.2	9.0	9.2	9.2	9.3	9.0	8.2
North West	10.1	10.3	9.7	10.4	9.6	7.8	10.4
Wales	5.0	4.3	5.2	4.4	5.2	5.1	4.6
Scotland	10.3	8.6	10.0	8.6	10.0	7.4	10.7
Northern Ireland	1.4	0.8	0.8	0.8	0.8	0.6	1.0
With children aged 0-4	8.5	5.8	4.8	5.8	5.1	6.4	3.4
With children aged 5-15	30.5	25.9	24.4	26.0	24.8	26.4	23.8
Married or cohabiting	78.3	79.3	78.8	80.3	80.9	68.0	62.6

LTI limits amount of work	14.3	43.7	14.0	41.9	23.2	51.4
LTI limits kind of work	26.6	56.7	26.3	55.5	37.5	65.9

Note: All variables are percentages, except age

5. Decomposition results

In the decomposition results that follow, we supply the difference in pay at the mean and five quantiles, the amount that is explained according to the combined weighting and regression approach, the amount unexplained (i.e. the gap minus the explained), and the amount that is explained according to a generalized Oaxaca decomposition. Where the two explained components are close, we use the generalized Oaxaca decompositions to explore what characteristics are contributing to the explained component of the pay gap. For reasons of space we do not provide full tables for the Oaxaca decomposition, but we draw on them in our interpretation. Similarly we also draw on the logit equations to discuss the characteristics that most clearly distinguish the particular minority from the majority, but do not provide full tables.

5.1. Ethno-religious groups

Table 9 summarises the absolute pay gaps (in log £) across the minority groups relative to the mean log wage of the White Christian majority (2.44) and across the distribution of logged pay.[11] Since the mean pay gaps are in logs, they are approximately equal to the mean relative change rather than to the mean absolute change in pay. Table 2 gives an indication of what these gaps are when pay is measured in absolute terms rather than in logs. While in log terms the differences may look small they can amount to several £s per hour. Moreover, since they are expressed in logs they can be interpreted as the proportion of the reference wage. Thus, for example the pay gap of 1st generation Indian Muslim men amounts to 16.8 per cent of White British Christian mean wages. Some of the gaps are in fact 'negative gaps', where pay is higher than the reference wage. In Tables 2 and 9, as in all succeeding tables, for the purposes of presentation the signs have been set so that gaps (or pay deficits) are expressed as positive and pay advantage (or the reverse of gaps) are expressed as negative.

[11] Table A1 in the Appendix provides the means and quantiles of logged wages from which these differences are derived, and their standard errors.

Table 9: Differences in Log Pay compared to White British Christians at mean and quantiles, by ethno-religious group (SEs in parenthesis)

Ethno-Religious Group	Mean log wage difference	P10 log wage difference	P25 log wage difference	P50 log Wage difference	P75 log Wage difference	P90 log Wage difference
Indian Hindu 1st Generation	-0.035	0.064	0.026	-0.058	-0.139*	-0.097
	(0.028)	(0.037)	(0.030)	(0.033)	(0.044)	(0.057)
Indian Hindu 2nd Generation	-0.126*	0.003	-0.126*	-0.157*	-0.128	-0.167
	(0.040)	(0.050)	(0.041)	(0.051)	(0.069)	(0.116)
Indian Muslim 1st Generation	0.168*	0.235	0.300*	0.221*	0.059	-0.028
	(0.064)	(0.231)	(0.127)	(0.070)	(0.082)	(0.137)
Indian Muslim 2nd Generation	0.102	0.200	0.181	0.272*	-0.067	-0.014
	(0.085)	(0.281)	(0.113)	(0.090)	(0.116)	(0.168)
Pakistani Muslim 1st Generation	0.460*	0.268	0.407*	0.511*	0.551*	0.429*
	(0.028)	(0.221)	(0.092)	(0.054)	(0.031)	(0.028)
Pakistani Muslim 2nd Generation	0.124*	0.195	0.166*	0.187*	0.056	0.021
	(0.042)	(0.107)	(0.056)	(0.045)	(0.051)	(0.075)

Notes: Standard errors in parentheses. * = statistically significant at the 5% level.

Looking at the Table 9 we find that there are pay gaps for all ethnic-religious minority groups except for Indian Hindu men. For this last minority there are statistically significant pay advantages towards the top of the distribution (at the 75th percentile[12]) for the first generation, and at the mean and across the whole distribution except the extremes (10th and 90th percentile) for the second generation. For Indian Muslim and Pakistani Muslim men there is a quite substantial pay gap at the mean for both the 1st and 2nd generations. This mean gap is not statistically significant for the 2nd generation Indian Muslim men, but we should be aware of the small sample size for this group. As expected the mean gap reduces considerably when moving from the first to the second generation. It is worth noting that, even though there is a bit more spread across the distribution in statistically significant gaps for the first generation, most of the significant gaps cluster around the centre of the distribution, and not at the tails.

Tables 10-16 go on to summarise the extent to which these gaps are explained by differences in job, worker and firm characteristics across minorities and the White Christian majority. More precisely, we control for the following characteristics: dummies for part-time job, public sector, educational qualification, job tenure, age, type of occupation, firm size, region, and calendar year (in the wage equation). In the logit equations (used to predict the probability of belonging to each of the minority groups with respect to the majority and to compute weights) we also use dummies for the presence of children, long term health problems and being married or cohabiting.

Table 10 summarises the decomposition at the mean for all the ethno-religious groups. It provides the mean pay gap, followed by the amount that is explained according to the combined weighting and regression decomposition approach. That is, the difference between the counterfactual and the actual mean wage. The unexplained is the difference between the majority and the counterfactual mean wage, since these would have the same value if it was

[12] And at the 90th percentile at the 10 per cent level.

only differences in the distribution of characteristics that was causing the gap in pay because the counterfactual mean equalises the distribution of characteristics across minority and majority. The explained and unexplained components sum to the mean pay gap. The final column gives the explained component of the pay gap according to the generalized Oaxaca decomposition. Where this corresponds closely to the actual explained component, then, as discussed in the Methods section, it is appropriate to derive the contribution of particular characteristics to the explained component from the Oaxaca decomposition. Note also that, as mentioned above, because we are working in log wages, the unexplained component can be interpreted as the proportion of the wage of the reference (majority) category that remains unexplained. Thus, for example, we can say that unexplained component of the Indian Muslim 1st generation pay gap amounts to 7 per cent of the reference category log wage.

Looking at Table 10, we can see that the overall decomposition provided by the combined weighting and regression decomposition and by the generalized Oaxaca is generally quite close. The divergence is biggest for the Pakistani Muslim 1st generation, but this is also where the overall gap is largest. In that case, the unexplained component accounts for 15 per cent of the reference category wage, where in the generalized Oaxaca it would amount to 12 per cent.

The first striking finding to emerge from the decomposition is that while Indian Hindus have an advantage in terms of mean pay compared to the White British Christian majority, their individual and job characteristics imply that their pay should be even higher. Not only do their characteristics 'explain' their pay advantage, they over-explain it, particularly for the 1st generation. But we should remember that for the 1st generation Indian Hindu sample we are decomposing a mean pay difference of three per cent which is not significantly different from zero. If we turn to the detailed decomposition[13] to ascertain what the characteristics are in this case that 'over-explain' the pay advantage, we find that the largest (statistically significant) contributory factors are associated with occupational distribution: over-representation in professional occupations and under-representation in skilled trades; and over-representation in the three digit occupations of health professionals and sales assistants etc. Thus, it would appear that this group, though making their way into the more highly paid occupations and demonstrating achievement in absolute terms are not fully obtaining the levels of pay that might be expected from those professional occupations. As the final two columns of Table 10 show education contributes to the explained part of the gap, but occupational distribution plays a much larger part in the contribution to explaining the pay difference. But because occupational distribution and concentration in fact explains much more than the small pay advantage experienced by this group, it leaves a substantial unexplained component.

The 2nd generation Indian Hindus experienced a much more substantial (and statistically significant) mean pay advantage. But again, we can see that this is more than explained by their characteristics, though the resulting unexplained element is small, amounting to only three per cent of the reference wage. The final two columns of Table 10 show that educational and occupational distributions account for the majority of the explained part of the pay advantage. For this group over-representation among health professionals and under-representation in part-time work contribute to the higher pay levels.

[13] We do not provide the full tables from the detailed decomposition, but they are available from the authors on request.

Though the estimation differs between this study and the approach used in Longhi and Platt (2008), the unexplained component for the two Indian Hindu groups falling between three per cent of the reference category wage (for the second generation) and ten per cent of the reference category wage (for the first generation) is consistent with the four per cent 'pay penalty' found for Indian Hindu men in the earlier study.[14]

Table 10: Mean pay gaps and decomposition by ethno-religious group (log wages)

Ethno-Religious Grp	Difference	Explained	Unexplained	Explained Oaxaca	Of which†: Education	Of which†: occupation
Indian Hindu 1st Generation	-0.035	-0.139	0.104	-0.150	-0.017	-0.141
Indian Hindu 2nd Generation	-0.126*	-0.156	0.029	-0.134	-0.031	-0.097
Indian Muslim 1st Generation	0.168*	0.094	0.073	0.126	0.019	0.064
Indian Muslim 2nd Generation	0.102	-0.041	0.143	-0.028	0.200	-0.090
Pakistani Muslim 1st Generation	0.460*	0.306	0.154	0.241	0.093	0.077
Pakistani Muslim 2nd Generation	0.124*	0.048	0.075	0.059	0.010	0.004

Notes: *=statistically significant difference at the 5% level. †These show the combined contribution of different educational levels and different occupations, respectively, which may include offsetting effects. In the text we draw attention to those specific educational levels and occupations which have the most substantial contribution and are statistically significant.

As we see, the remaining four groups experience pay gaps rather than pay advantages. Turning to the Indian Muslims, the 1st generation experience a substantial pay gap (17 per cent of majority mean wage); but over half of this appears to be explicable by characteristics. Again, these characteristics are related to occupational distribution and include over-representation in sales and customer service occupations and in part-time work. As the final two columns of Table 10 show, overall educational and occupational distribution account for the majority of the explained part of the pay gap. But, as with Indian Hindus, occupational distribution plays a bigger role than educational qualifications, suggesting that it is the sorts of jobs that Indian Muslims end up in – given their qualifications – that are more pertinent to their pay disadvantage than simply their average differences in qualifications. There is some indication, then, that lower pay may stem from lower access to suitable full-time work opportunities and some sorting or selection into lower paid occupations. The 2nd generation experiences a smaller absolute pay gap which is not statistically significant but which also remains unexplained. We should note that the sample size for this group is very small, which may impact not only on the statistical significance we can identify but also on the ability to 'explain' the gap. However, it would appear that for second generation Indian Muslims, by contrast with 1st generation Indian Muslims, the critical factor in the explained part of the

[14] In Platt and Longhi (2008) we did not separate out the generations as we do in this study (part of the contribution of this report as discussed). Simply controlling for whether UK born is not an effective way of distinguishing generations. Therefore the pay penalty in Platt and Longhi's study would be expected to summarise the unexplained group effect across the generations.

their mean pay gap is qualifications, with occupation counteracting this impact to a certain extent.

Finally the Pakistani Muslim men experience the largest pay gaps compared to White British Christians. But the decomposition indicates that a substantial proportion of this can be explained by job and individual characteristics: around two-thirds for the 1st generation and around a third for the 2nd generation. However, the size of the original gaps and the proportion unexplained mean that there is still a substantial unexplained element to pay across this group. For Pakistani Muslims, as with Indian Hindus the range of the unexplained part of the pay gap across the generations accords with the pay penalty found in Longhi and Platt (2008). The range of the unexplained element for the group across the generations is from eight per cent to 15 per cent of reference category wage, which compares with the pay penalty of 13 per cent found in Longhi and Platt's (2008) study. The comparability is only to be expected given that both studies use the LFS, and as noted there is a parallel between the 'pay penalty' of the earlier study and the unexplained component of pay gaps in this, even though there are some differences in the estimation and the definition of groups.

For the 1st generation, over-representation in part-time work, possessing other qualifications and no qualifications, relative to higher qualifications, presence in less skilled occupations (process plant and machinery and elementary occupations), and working in small firms all contribute to the explaining some part of the substantial pay gap. These are slightly offset by over-representation among health professionals and regional distribution, but still manage to explain over half of the total pay gap. This group perhaps most clearly demonstrates the ways in which, unless they can find a particular skilled niche as health professionals, 1st generation minorities may well end up in lower skilled occupations and be constrained to work part-time. The contribution of small firm size may also suggest small businesses that use personal networks to fill vacancies and which offer lower rewards.

For 1st generation Pakistani Muslim men (by contrast with the other minority groups), lack of qualifications plays a significant role in explaining their pay gap at the mean. In addition, the fact that other qualifications are important may suggest lack of recognition of foreign qualifications (Hudson et al. 2006), or, as discussed above, the explanatory contribution of these other qualifications may stem from the fact that they are capturing various unmeasured aspects of being an immigrant which can shape employment outcomes. Even after the extensive explanatory role played by these characteristics, these 1st generation Pakistani Muslims face an unexplained pay gap amounting to 15 per cent of the reference wage.

Pakistani Muslim men from the 2nd generation have a substantially lower mean pay gap than the 1st generation, though a lower proportion of it is explained by characteristics. In relation to qualifications, we saw in Section 4 how patterns of qualifications are shifting between generations, and thus would not expect them to play such an important role for this 2nd generation group. Concentration in part time work makes a marginally statistically significant contribution towards the explained part of the decomposition. The youth of this group also contributes to lower pay. Over-representation in sales and customer service occupations also explains some part of the pay gap, though it is largely compensated for by under-representation in two other relatively low-paying occupations, skilled trades occupations and elementary occupations). The result is that the overall occupational distribution does little to account for the pay gap for this group. Differences across qualifications levels also play a smaller role for this group than for others in contributing to pay differences.

From this analysis at the mean, then, it would appear that these ethno-religious groups experience not only distinctive patterns of pay, but we can make few general statements about its interpretation. For Indian Hindus and Pakistani Muslims, the unexplained component is higher in the 1st generation, which is what we might expect, but this is not the case for Indian Muslims. The most successful group, 2nd generation Indian Hindu men have the smallest unexplained component, but there is not a consistent pattern across the remaining groups. Turning to the explanatory characteristics, interestingly, differences in educational qualifications, which might be thought to be most directly related to pay of all the variables we consider, generally contribute little to explaining differences in pay. On the other hand, occupational clustering and, in some cases, over-representation in part-time work do contribute to explaining the pay gap. The implication would appear to be that the way the labour market is organised and the sorts of jobs people have access to – or select into, for whatever reason – are important in determining pay. The results, including the findings on the unexplained component of the pay gaps are consistent with the existence of some within employment employer discrimination that impinges on pay among the disadvantaged and the advantaged, but do not suggest that this is a substantial issue – rather, it would seem to be the sorts of jobs individuals end up in, or the lack of jobs, or full-time jobs that are more significant issues. Employer discrimination may play a role in providing or limiting access to these jobs, but it appears to have less of a role in specifically suppressing pay. To illuminate our interpretation further we turn to look at the results across the pay distribution.

In the next tables we use the same headings as in Table 10 but look at the whole distribution for each group in turn. For each quantile difference we report again when the difference is significantly different from zero at the 5 per cent level of significance. We comment only on the decomposition results where the quantile difference is significant at least at the 5 per cent level. As noted, these tended to occur around the middle of the distribution for most groups. We discuss the Indian Hindus (Tables 11 and 12) separately from the other four groups, since both the 1st and 2nd generation Indian Hindu men experience a pay advantage over most of the distribution, whereas the other four groups experience a pay gap across most of the pay distribution.

Starting with Indian Hindu men, we can see that their pay advantage is only statistically significant at the 75th percentile for the 1st generation (Table 11) and for the 25th, 50th for the second generation (and for the 75th percentile at the 10 per cent level) (Table 12). Interestingly for both generations at the 75th percentile it is occupational distribution – and the same occupations – that contribute to explaining the pay advantage, namely under-representation among skilled trades occupations, personal service occupations, process, plant and machine operatives and over-representation among health professionals. Thus, though there has been some shift in distribution across the generations, it is the continuities in occupational patterns that appear to matter for ongoing advantage – at least towards the upper end of the distribution. Under-representation in elementary occupations also contributes to the advantage of the 2nd generation, and these are occupations in which the 1st generation are not under-represented, so we can also see some impact of mobility across the generations being beneficial for pay as well as for position. For the 2nd generation at the 25th percentile, only under-representation in part time work contributes significantly to pay advantage; and at the 50th percentile their qualifications, though there is evidence that the overall occupational distribution plays a substantial role even if it is harder to pin it down to particular occupations. So there is some indication that qualifications gained from one generation to the

next can benefit pay other than through determining occupation, at least around median earnings.

Table 11: Decomposition across the pay distribution: 1st Generation Indian Hindu men

Quantile	Difference	Explained	Unexplained	Explained	Of which†:	
				Oaxaca	Education	Occupation
P10	0.064	-0.105	0.169	-0.182	-0.027	-0.058
P25	0.026	-0.065	0.091	-0.132	0.031	-0.069
P50	-0.058	-0.160	0.102	-0.087	-0.023	-0.121
P75	-0.139*	-0.134	-0.004	-0.099	0.016	-0.156
P90	-0.097	-0.193	0.096	-0.134	-0.036	-0.164

Notes: *=statistically significant difference at the 5% level. †These show the combined contribution of different educational levels and different occupations, respectively, which may include offsetting effects. In the text we draw attention to those specific educational levels and occupations which have the most substantial contribution and are statistically significant.

Table 12: Decomposition across the pay distribution: 2nd Generation Indian Hindu men

Quantile	Difference	Explained	Unexplained	Explained	Of which†:	
				- Oaxaca	Education	Occupation
P10	0.003	-0.066	0.069	-0.191	-0.109	-0.077
P25	-0.126*	-0.155	0.029	-0.105	-0.004	-0.098
P50	-0.157*	-0.240	0.084	-0.175	-0.043	-0.122
P75	-0.128	-0.145	0.016	-0.164	-0.026	-0.155
P90	-0.167	-0.331	0.165	-0.146	0.031	-0.132

Notes: *=statistically significant difference at the 5% level. †These show the combined contribution of different educational levels and different occupations, respectively, which may include offsetting effects. In the text we draw attention to those specific educational levels and occupations which have the most substantial contribution and are statistically significant.

We now move on to look at those who experience pay gaps (rather than pay advantage), namely, Indian Muslims and Pakistani Muslims. Specifically, we focus on the median gaps for Indian Muslims (Tables 13 and 14), gaps at the 25th, 50th, 75th and 90th percentiles for 1st generation Pakistani Muslims (Table 15), and gaps at the 25th and 50th percentiles for 2nd generation Pakistani Muslims (Table 16). These are pay differences that are statistically significant at the 5 per cent level. While the size of the actual gaps shows some variation across the particular quantiles we are considering, ranging from 17-19 per cent of reference group earnings for 2nd generation Pakistani Muslims to between 40 and 55 per cent of reference group earnings for 1st generation Pakistani Muslims, with the Indian Muslims having intermediate gaps of 22 and 30 per cent, the proportion explained is high across the board over 2/3rds and up to 9/10ths (with the single exception of the 90th percentile for the 1st generation Pakistani Muslims, where only 1/3 of the gap is accounted for). It is therefore to that substantial explained component that we turn now. What can the decompositions tell us about the differences that are contributing to the pay gaps?

Table 13: Decomposition across the pay distribution: 1st Generation Indian Muslim men

Quantile	Difference	Explained	Unexplained	Explained - Oaxaca	Of which†:	
					Education	Occupation
P10	0.235	0.306	-0.071	0.338	0.320	-0.140
P25	0.300*	0.325	-0.025	0.025	0.106	-0.087
P50	0.221*	0.152	0.070	0.176	0.038	0.103
P75	0.059	0.033	0.026	-0.029	-0.106	0.075
P90	-0.028	-0.011	-0.016	0.199	-0.024	0.162

Note: *=statistically significant difference at the 5% level. †These show the combined contribution of different educational levels and different occupations, respectively, which may include offsetting effects. In the text we draw attention to those specific educational levels and occupations which have the most substantial contribution and are statistically significant.

For 1st generation Indian Muslims, the largest and statistically significant contributions to the median pay gap shown in Table 13 come from over-representation in sales and customer service occupations. Additionally, over-representation in part-time work plays a role (at the 10 per cent significance level). Under-representation in skilled trades occupations acts to reduce the pay gap (as it does at the mean). Interestingly, the distribution of qualifications makes no statistically significant contribution to the pay gap, though it would appear to have a substantial role at the 25th percentile. We see then the importance of constraints on full-time work and, even more importantly, the role of selection or sorting into particular occupational groups as important for the pay of this group at the mid point.

Table 14: Decomposition across the pay distribution: 2nd Generation Indian Muslim men

Quantile	Difference	Explained	Unexplained	Explained - Oaxaca	Of which†:	
					Education	Occupation
P10	0.200	0.223	-0.024	0.342	0.482	0.528
P25	0.181	0.097	0.084	0.083	0.239	-0.090
P50	0.272*	0.223	0.049	-0.015	0.223	-0.117
P75	-0.067	0.181	-0.248	0.033	0.162	-0.147
P90	-0.014	-0.091	0.077	-0.249	0.052	-0.330

Note: *=statistically significant difference at the 5% level. †These show the combined contribution of different educational levels and different occupations, respectively, which may include offsetting effects. In the text we draw attention to those specific educational levels and occupations which have the most substantial contribution and are statistically significant.

For the 2nd generation of Indian Muslims (Table 14), the story is rather different. Here qualifications, specifically low rates of level 2 and level 3 qualifications play the most important role in determining the explained share of pay. As Table 7 showed, while rates of higher (level 4 plus) qualifications are substantial for this group, the distribution of qualifications is rather polarised. They are also over-represented among those with no qualifications and rates of attainment of level 3 and level 2 qualifications, which could be particularly important for mid-range occupations, are very low. In this instance, occupational distribution (under-representation in skilled trades and in process plant and machine operatives) for this group offsets some of the pay disadvantage they might otherwise experience.

Table 15: Decomposition across the pay distribution: 1st Generation Pakistani Muslim men

Quantile	Difference	Explained	Unexplained	Explained - Oaxaca	Of which†:	
					Education	Occupation
P10	0.268	0.083	0.185	0.619	0.468	-0.035
P25	0.407*	0.450	-0.043	0.327	0.048	0.103
P50	0.511*	0.477	0.034	0.387	0.137	0.117
P75	0.551*	0.450	0.101	0.307	0.112	0.123
P90	0.429*	0.134	0.295	0.161	0.025	0.100

Note: *=statistically significant difference at the 5% level. †These show the combined contribution of different educational levels and different occupations, respectively, which may include offsetting effects. In the text we draw attention to those specific educational levels and occupations which have the most substantial contribution and are statistically significant.

Turning to the Pakistani Muslims (Table 15), for the 1st generation and at the 25th percentile, though the gap is large and largely explained (though to a lesser extent in the regression based decomposition), the only variables to contribute significantly to the gap are age, working in smaller firms and, at the ten per cent level, over-representation in part-time work. Overall occupational distribution would appear to play a part in the pay gap, but no particular occupation makes a statistically significant contribution. At the median age again matters, as does possession of other qualifications and of no qualifications. But over-representation in part-time work and in particular occupations (process, plant and machine operatives and elementary occupations) also plays an important role. Over-representation in health professional occupations works in the opposite direction. So, even given qualifications, occupational distribution matters and constraints on full time working do as well. It is worth reiterating what we noted above that for migrants other qualifications often include those obtained abroad for which it is not always straightforward to identify a UK equivalent. Possession of other qualifications may, therefore proxy for a number of aspects of migrant experience which can result in labour market disadvantage, whether through lack of recognition (of e.g. experience or skills) or through lack of congruence between jobs gained and skills or lack of familiarity with the UK labour market. The story is very similar at the 75th percentile, except that part-time work does not contribute to the gap at this level of pay. Age, possession of other qualifications and of no qualifications, and some degree of occupational concentration (as process, plant and machine operatives, in elementary occupations, and in sales and customer services occupations) all contribute to explaining the gap. Finally, at the 90th percentile, a much smaller proportion of the gap is explained, leaving an unexplained component that is nearly 30 per cent of reference category wages. For the part of the gap that is explained, under-representation in the public sector contributes. At the 10 per cent significance level, having no qualifications, age and under-representation among functional managers also make a difference.

Table 16: Decomposition across the pay distribution: 2nd Generation Pakistani Muslim men

Quantile	Difference	Explained	Unexplained	Explained - Oaxaca	Of which†:	
					Education	Occupation
P10	0.195	0.137	0.058	0.167	0.035	0.017
P25	0.166*	0.188	-0.022	0.125	-0.007	0.042
P50	0.187*	0.126	0.061	0.087	-0.033	0.012
P75	0.056	-0.014	0.070	0.013	-0.009	-0.016
P90	0.021	0.015	0.005	0.000	0.012	-0.010

Note: *=statistically significant difference at the 5% level. †These show the combined contribution of different educational levels and different occupations, respectively, which may include offsetting effects. In the text we draw attention to those specific educational levels and occupations which have the most substantial contribution and are statistically significant.

For 2nd generation Pakistani Muslims (Table 16), although the majority of the gap at the 25th and 50th percentiles is explained by characteristics, the absolute size of the gap is not as big as for the first generation, and it is harder to point to individual characteristics that contribute to it, other than age (or youth). At the 25th percentile over-representation in part-time work also has an effect in reducing pay. As the effects of youth should simply disappear with age, this is a positive message. It is interesting that for this group, neither education nor occupational distribution make a significant difference to accounting for the pay gap.

Summarising the experience of these four groups occupational distribution is far more salient for the first generation. Part-time work plays a part in explaining pay differences particularly at the bottom of the distribution, but for the second generation as well as the first. Educational qualifications matter for the pay of first generation Pakistani Muslims, but also, perhaps more surprisingly, for second generation Indian Muslims – though it is difficult to say much about this latter group given the small overall sample size. Age (or rather youth) contributes to pay disadvantage for both the first and second generation. This may reflect both the overall age distribution of the populations but also the extent to which older members of the first generation leave or are excluded from the labour market altogether.

Overall, for ethnicity we have shown that there are distinctions to be made in terms of mean pay and pay distribution both by ethnic group and religious affiliation, and by generation across the ethno-religious groups. Although the groups have distinctive patterns of characteristics and of pay, and while there would appear to be a hierarchy with Indian Muslims falling between the levels of pay of Indian Hindus and Pakistani Muslims, the experience of Indian Muslims would appear to be somewhat closer to that of Pakistani Muslims than to Indian Hindus, on average. The latter group by and large achieve above average pay and they are also the least selected group for pay with high rates in paid employment (even discounting self-employment).

Statistically significant pay gaps are found for most groups around the middle of the pay distribution, though in some cases also (or instead) toward the upper or lower ends (25th or 75th percentile). There is little evidence of pay gaps – or pay advantage – at the extremes of the distribution. At the bottom of the distribution, the minimum wage anyway acts as a floor on disadvantage, and for 'successful' groups is less likely to be where advantage is realised. For most gaps, the majority of the differences can be explained by characteristics, though interestingly it is distribution of occupation that appears to be important compared to qualifications. Though education will affect the types of occupations, especially as they are associated with different levels of pay, there is enough variation that educational qualifications might be expected to play more of a role. It is also interesting that qualifications are not noticeably more important in explaining differences in pay for the 1st compared to the 2nd generation. Part time work has an important bearing on earnings, particularly towards the lower part of the distribution. Finally, it is worth noting again that the pay advantage experienced by Indian Hindus is more than explained by their characteristics – that is they face a deficit relative to what they might expect, and this unexplained component is similar to to that faced by other groups. Unexplained components are approximately six to seven per

cent of White British Christians wages, for those groups who face a pay gap, except for the 90th percentile gap for the 1st Generation Pakistani Muslim men. For Indian Hindus, the unexplained components of statistically significant gap are from three to eight per cent. So while they are doing well they do seem to face some limits on their pay. Apart from the substantial unexplained component at the top of the distribution (where the advantage itself is large, though not statistically significantly different from the reference category wage) for 2nd generation Indian Hindu men, there is not compelling evidence of the unexplained component being a 'glass ceiling', as it does not generally concentrate towards the top of the distribution. But we could speculate that it represents discrimination and if so, the discrimination the more advantaged groups face is apparently no less than more disadvantaged groups: it acts to set a cap to their pay rather than resulting in a pay gap. As we have made clear we are cautious about interpreting the unexplained component as – or solely as – discrimination. It could also be related to differences in other unobserved variables.

5.2. Disabled people

Looking first in Table 17 at the simple differences in log pay both at the mean and across the distribution for the different disability groups, we see that while the gaps are greater for the activity limiting LTI groups, as we would expect, they are not negligible for the non-activity limiting disabled. They also appear relatively constant across the distribution until we focus on mental health problems where the gaps between the activity limiting and non-activity limiting are not statistically significant at the extreme of the distribution, and those for the non activity limiting compared to the non-disabled are large across the distribution except for at the very top.

Table 17: Differences in log pay compared to non disabled at mean and quantiles, by disability group

Disability Group	Mean Log wage gap	P10 Log wage gap	P25 Log wage gap	P50 Log wage gap	P75 Log wage gap	P90 Log wage gap
Non activity limiting LTI v. Non disabled	0.052* (0.005)	0.048* (0.006)	0.052* (0.005)	0.060* (0.005)	0.045* (0.006)	0.050* (0.008)
Activity limiting LTI v. Non disabled	0.159* (0.006)	0.136* (0.012)	0.144* (0.008)	0.148* (0.007)	0.145* (0.007)	0.142* (0.009)
Activity limiting LTI v. Non activity limiting LTI	0.107* (0.007)	0.088* (0.010)	0.092* (0.008)	0.088* (0.009)	0.099* (0.010)	0.090* (0.012)
Non activity limiting physical LTI v. Non disabled	0.050* (0.005)	0.042* (0.007)	0.046* (0.006)	0.057* (0.006)	0.046* (0.007)	0.055* (0.008)
Activity limiting physical LTI v. Non activity limiting physical LTI	0.091* (0.008)	0.073* (0.010)	0.078* (0.009)	0.078* (0.009)	0.092* (0.011)	0.084* (0.013)

Non activity limiting mental LTI v. Non disabled	0.130* (0.028)	0.183* (0.066)	0.134* (0.036)	0.135* (0.031)	0.128* (0.032)	0.094* (0.042)
Activity limiting mental LTI v. Non activity limiting mental LTI	0.168* (0.038)	0.042 (0.049)	0.110* (0.038)	0.161* (0.041)	0.169* (0.058)	0.152 (0.087)

Notes: Standard errors in parentheses. * = statistically significant at the 5% level.

As before, in the following tables (Tables 18-25) we decompose these pay gaps into two components (explained and unexplained). The explained component is the part of the pay gap explained by difference in characteristics. We control for the following characteristics: age and age square, dummies for part-time job, public sector, educational qualification, job tenure, type of occupation, firm size, region, calendar year, housing tenure (in the wage equation). In the logit equation (used to predict the probability to belong to a specific disability group and the weight) we also use dummies for the presence of children, being married or cohabiting. Furthermore, when comparing activity limiting with non activity limiting LTI we also consider dummies for health problems limiting the type or amount of work, and a dummy for the presence of any mental disability (for the comparison between activity limiting and non activity limiting physical LTI) and a dummy for the type of mental illness (for the comparison of activity limiting and non activity limiting mental LTI). Note that as we discussed, these additional variables can proxy for reduced productivity or for the severity of the illness.

Looking first at the decomposition at the mean (Table 18), we see again that in general the amount of the gap explained by the generalized Oaxaca ('Oaxaca – explained') is roughly consistent with the explained component derived from the combined weighting and regression decomposition ('Explained'). We find that the characteristics explain about 80 per cent or more of the pay the gap when comparing activity limiting and non activity limiting LTI (physical, mental or overall). This is not surprising because for these three decompositions we are able to control for proxy measures of the reduced work productivity related to the conditions, or the constraints of the working environment (Schur et al. 2009). Characteristics explain more than 40 per cent of the pay gap when comparing different types of non activity limiting LTI with non disabled men, with the exception of non activity limiting physical LTI. Here the pay differences are small but are largely unexplained.

If we follow the approach of DeLeire (2001) utilised by Jones (Jones 2006; Jones et al. 2006b), we could attribute the unexplained element of the gap between the non-activity limiting and the non disabled (Table 18: rows 1, 4, 6) to employer discrimination. This would amount to three per cent of the reference wage for long-term illness in general, rising to seven per cent for those with a long-term mental health condition. However, as we discussed, this is based on some quite simple assumptions about how discrimination operates. Moreover, it is worth scrutinising the characteristics that contribute to the explanation and the relationship between non-activity limiting and activity limiting disability a bit more closely before attributing particular values in this way.

If our work-limiting activity and severity variables genuinely identified limits on productivity in employment associated with disability, when comparing those with an activity limiting and

a non activity limiting LTI, we could interpret the unexplained component in this comparison as a measure of the greater discrimination experienced by those with a more serious long-term condition compared to a less severe form of condition. We would expect this difference to be small for three reasons. First because we might (on DeLeire's argument) expect that most discrimination would be associated with the condition rather than its specific severity; second, because the proxies for 'productivity' (though not for severity) might themselves capture something about employer attitudes or discrimination for more severe conditions, in the extent to which the work environment was enabling (and thus didn't limit work) or disabling (and therefore did limit work) for activity limiting LTI. And third, those who have an activity-limiting condition are more highly selected in employment than those whose condition is not activity limiting, and we might therefore expect them to have unobserved characteristics associated with *greater* productivity which counteracts some of the impact of discrimination.

We do, indeed, see that the unexplained component in the comparisons between activity limiting and non-activity limiting LTI is very small, between 0.018 and 0.032 and it is smaller than the unexplained component (Table 18: rows 3, 5, 7) for the pay gap between non activity limiting LTI and non-disabled. This would suggest that wage discrimination increases slightly, but only slightly, for activity limiting compared to non activity limiting LTI .

Table 18: Pay gaps and decomposition of gap at the mean by disability group

Disability Group	Difference	Explained	Unexplained	Explained Oaxaca	Of which†: Education	Occupation
1. Non activity limiting LTI v. Non disabled	0.052*	0.024	0.028	0.019	0.014	0.027
2. Activity limiting LTI v. Non disabled	0.159*	0.069	0.089	0.061	0.027	0.056
3. Activity limiting LTI v. Non activity limiting LTI	0.107*	0.085	0.021	0.079	0.012	0.031
4. Non activity limiting physical LTI v. Non disabled	0.050*	-0.009	0.059	0.020	0.016	0.027
5. Activity limiting physical LTI v. Non activity limiting physical LTI	0.091*	0.073	0.018	0.068	0.012	0.027
6. Non activity limiting	0.130*	0.065	0.065	0.071	0.007	0.055

mental LTI v. Non disabled						
7. Activity limiting mental LTI v. Non activity limiting mental LTI	0.168*	0.136	0.032	0.091	0.012	0.050

Note: *=statistically significant difference at the 5% level. †These show the combined contribution of different educational levels and different occupations, respectively, which may include offsetting effects. In the text we draw attention to those specific educational levels and occupations which have the most substantial contribution and are statistically significant.

Moving to the decomposition analysis of pay gaps at different quantiles (Tables 19-25) we find results in line with the mean decomposition. Characteristics explain almost the whole pay gap when looking at the pay differences between activity limiting and non activity limiting LTI except for physical LTI. The explained component reduces but still makes up a substantial proportion of the gap when comparing different types of LTI with non disabled men, the exception being non activity limiting mental LTI at the 25th percentile, where characteristics do not contribute to explaining the difference.

If we continue to interpret the unexplained components as measure of discrimination, the results across the distribution are encouraging. The unexplained component of the gap between non activity limiting LTI and non disabled is lower then 0.038 for all quantiles (Table 19); and the unexplained component of the gap between activity limiting and non activity limiting LTI is 0.024 at the most (Table 21). Following the earlier interpretation of the decomposition, this would imply that 'discrimination' explains at the most a 3.8 per cent difference in pay.[15] But, once again, we note the caveats associated with this interpretation. Again, assuming that our variables control adequately for reduced productivity related to disability when comparing activity limiting and non-activity limiting conditions, we can infer that the wage discrimination gap associated with greater severity and/or lower productivity is 2.4 per cent at its highest.[16] This would imply that the gap explained by wage discrimination for activity limiting LTI is a maximum of 6.2 per cent.

Using the same line of reasoning, we can speculate that wage discrimination accounts for at most 7.2 per cent of the pay difference for non activity limiting physical LTI and at most 9.5 per cent pay difference for the activity limiting physical LTI. These upper bounds for the effect of wage discrimination increase substantially, however, when we turn to mental LTI, where they reach 15 per cent and 17 per cent, respectively[17] indicating greater discrimination

[15] Note that we interpret the quantile difference in log pay as an approximation for the relative change in the quantile of the un-logged pay.

[16] Our ability to control directly for 'productivity-related variables' means that we can distinguish between productivity-related factors and additional discrimination related to increased severity. This is an extension of the approach used in Jones et al.'s analysis, where they had to make the assumption that all the difference between those with a work limiting and those with a non-work limiting condition was productivity and that severity (and productivity) had no bearing on discrimination, which was not a fully tenable assumption. Instead, as we show we can break down the additional gap into productivity related aspects and discrimination.

[17] To compute these values we have considered the maximum of the unexplained components in Table 26 and 25 excluding the cases where the wage gap is not significantly different from zero (no star).

against workers with mental illness, which is consistent with earlier research. Considering the largest unexplained component across the quantiles perhaps tends to overstate the overall contribution of discrimination. For example, discrimination for both non activity limiting and activity limiting mental LTI seems to account only for about 4 per cent when considering pay gaps at the median.

Having given this overview of the disability gaps both at the mean and across the distribution, we now inspect the contributory characteristics to the substantial explained component in more detail. Given that the majority of the difference is explained in most cases, the detailed decomposition[18] can potentially give us insight into those factors that matter for pay differentials of disabled people. We see that almost all gaps are statistically significant. The personal and job characteristics that give the largest contribution to the explanation of the pay gaps tend to be the same across disability groups. This suggests that the disadvantage faced by disabled people is similar across kinds – and severity – of disability.

In general, pay gaps of disabled people compared to non disabled ones are mostly due to their slight over-representation in low-paying qualifications such as elementary occupations and, apart from those with mental health conditions, in process, plant and machine operatives. At the bottom of the distribution, part of their gap is explained by their over-representation in part-time jobs, while at the top it is lack of high level qualifications, and especially their under-representation among people with Level 4 or more qualification, which makes a more important contribution to the explanation of the pay gap. When comparing people with activity limiting (physical or mental) LTI to people with non activity limiting LTI we can see that in many cases a significant part of the gap can be explained by the severity of the condition and its impact on their work. In the descriptive statistics we saw that people with activity limiting LTI were twice as likely to say that their condition limits the kind of work they can do, and were almost three times more likely to say it limits the amount of work they can do. Interestingly, limits on the *amount* of work seem to play a greater role in explaining pay differences at the bottom of the distribution, whereas limits to the *kind* of work play, if anything a more important role towards the top of the distribution. There was some evidence from the decompositions that as we had anticipated, being from a smaller firm contributed in a small, but significant way to the pay gap, across the distribution.

We turn now to discuss each kind of disability in more detail.

[18] Again, we do not provide the full tables from the detailed decomposition, but they are available from the authors on request.

Table 19: Decomposition across the pay distribution: Non activity limiting LTI v. non disabled

Quantile	Difference	Explained	Unexplained	Explained - Oaxaca	Of which†:	
					Education	Occupation
P10	0.048*	0.010	0.038	0.007	0.005	0.007
P25	0.052*	0.019	0.033	0.013	0.008	0.018
P50	0.060*	0.035	0.024	0.028	0.014	0.033
P75	0.045*	0.030	0.015	0.024	0.020	0.037
P90	0.050*	0.027	0.023	0.021	0.023	0.036

Note: *=statistically significant difference at the 5% level. †These show the combined contribution of different educational levels and different occupations, respectively, which may include offsetting effects. In the text we draw attention to those specific educational levels and occupations which have the most substantial contribution and are statistically significant.

At the mean (Table 18), the pay gap of people with non activity limiting LTI compared to non disabled people tends to be explained by education, and it under-representation among people with Level 4 qualifications, in particular, and occupational distribution. In particular the over-representation of those with a non activity limiting disability in process and plant operative and elementary occupations. Looking across the distribution (Table 19), their over-representation in part-time jobs contributes to the explanation of pay gaps in the lower part of the wage distribution, while their under-representation among people with Level 4 qualifications explains the gaps across the distribution, but particularly in the middle/upper part of the distribution (50^{th}, 75^{th} and 90^{th} percentiles). Their over-representation in elementary occupations contributes to the explanation of gaps over the whole distribution, while their over-representation as process, plant and machine operatives contributes to the explanation of gaps in the middle/upper part of the distribution (50^{th}, 75^{th} and 90^{th} percentiles). Finally, their over-representation in skilled trades occupations contributes to the explanation of the gaps in the upper part of the distribution (75^{th} and 90^{th} percentiles).

Table 20: Decomposition across the pay distribution: Activity limiting LTI v. non disabled

Quantile	Difference	Explained	Unexplained	Explained - Oaxaca	Of which†:	
					Education	Occupation
P10	0.136*	0.046	0.090	0.025	0.014	0.014
P25	0.144*	0.074	0.070	0.071	0.017	0.039
P50	0.148*	0.086	0.063	0.081	0.023	0.067
P75	0.145*	0.068	0.077	0.064	0.031	0.068
P90	0.142*	0.056	0.087	0.050	0.036	0.064

Note: *=statistically significant difference at the 5% level. †These show the combined contribution of different educational levels and different occupations, respectively, which may include offsetting effects. In the text we draw attention to those specific educational levels and occupations which have the most substantial contribution and are statistically significant.

At the mean (Table 18), the pay gap of people with activity limiting LTI compared to non disabled people is explained by their over-representation in part-time jobs; in elementary occupations; in process, plant and machine operatives jobs; and by their under-representation among those with Level 4 qualifications. Looking across the distribution (Table 20), their over-representation in part-time jobs explains gaps in the lower and middle part of the distribution, while their lower levels of education and their concentration in low-skill occupations explain the pay gaps over the whole distribution.

Table 21: Decomposition across the pay distribution: Activity v. non activity limiting LTI

Quantile	Difference	Explained	Unexplained	Explained - Oaxaca	Of which†:	
					Education	Occupation
P10	0.088*	0.070	0.017	0.069	0.005	0.009
P25	0.092*	0.080	0.012	0.080	0.007	0.022
P50	0.088*	0.083	0.005	0.089	0.010	0.038
P75	0.099*	0.075	0.024	0.082	0.016	0.042
P90	0.090*	0.076	0.015	0.077	0.017	0.036

Note: *=statistically significant difference at the 5% level. †These show the combined contribution of different educational levels and different occupations, respectively, which may include offsetting effects. In the text we draw attention to those specific educational levels and occupations which have the most substantial contribution and are statistically significant.

When comparing people with activity limiting LTI to those with non activity limiting LTI (Table 18 and Table 21) we see that at the mean the largest contributors to the explanations of the pay gap are the two variables identifying whether the respondent thinks her condition limits the kind of work or the amount of work she can do. However, limits on the amount of work only contribute to pay gaps at the bottom and middle of the distribution whereas limits on the kind of work apply across the distribution. This also tallies with the finding that distribution of part-time work is only relevant to gaps in the lower half of the distribution and not in the upper half. As we discussed above, we can speculate that a large part of the gap between disabled people with a condition which might or might not be activity limiting could be due to productivity. Part of the gap is also explained by qualifications and by distribution in elementary occupations, and process, plant and machine operatives. Qualifications would appear to be more important at the top of the distribution and occupational distribution across the distribution.

Table 22: Decomposition across the pay distribution: Non activity limiting physical LTI v. non disabled

Quantile	Difference	Explained	Unexplained	Explained - Oaxaca	Of which†:	
					Education	Occupation
P10	0.042*	0.011	0.032	0.005	0.005	0.007
P25	0.046*	0.019	0.027	0.015	0.008	0.018
P50	0.057*	0.035	0.023	0.029	0.014	0.033
P75	0.046*	0.030	0.016	0.026	0.023	0.037
P90	0.055*	0.027	0.027	0.023	0.026	0.034

Note: *=statistically significant difference at the 5% level. †These show the combined contribution of different educational levels and different occupations, respectively, which may include offsetting effects. In the text we draw attention to those specific educational levels and occupations which have the most substantial contribution and are statistically significant.

When comparing workers with non limiting physical LTI to non disabled workers (Table 18 and Table 22), at the mean the pay gap is explained by their under-representation among those with Level 4 qualifications and their over-representation in elementary occupations, and in process, plant and machine operatives jobs. Over-representation in part-time work also contributes to the gap. Looking across the distribution (Table 22), part-time work is once again a contributory factor in pay differences only in the lower part of the pay distribution, while qualifications are important across the range; and, from the 25th percentile part of the gap is also explained by their over-representation in particular low-paying occupations.

Table 23: Decomposition across the pay distribution: activity limiting physical LTI v. non activity limiting physical LTI

Quantile	Difference	Explained	Unexplained	Explained - Oaxaca	Of which†:	
					Education	Occupation
P10	0.073*	0.057	0.016	0.055	0.004	0.009
P25	0.078*	0.067	0.012	0.068	0.007	0.019
P50	0.078*	0.078	0.000	0.080	0.010	0.033
P75	0.092*	0.069	0.022	0.077	0.017	0.035
P90	0.084*	0.071	0.013	0.071	0.019	0.029

Note: *=statistically significant difference at the 5% level. †These show the combined contribution of different educational levels and different occupations, respectively, which may include offsetting effects. In the text we draw attention to those specific educational levels and occupations which have the most substantial contribution and are statistically significant.

At the mean, the gap between workers with activity limiting physical LTI and workers with non activity limiting physical LTI is explained in large part by the differences in regarding the amount of work their condition enables them to do. Similarly, some pat of the difference is also accounted for by different probabilities of doing part time work. Differences in (higher) qualifications also play some part. Looking across the distribution (Table 23), qualifications appear to be more important in explaining pay gaps towards the top of the distribution, and occupational differences also increase in the amount they contribute to the pay gap. At the bottom half of the distribution both part time work and the extent to which the condition is seen as limiting the amount of work play a role in explaining the pay gap; while towards the top of the distribution it is limits on the kind of work that contribute to the differentiation of pay. At the mean, part of the gap is explained by having a mental health condition in addition to the main, physical condition, but this contribution to reduced pay is not found across the distribution.

Table 24: Decomposition across the pay distribution: Non activity limiting mental LTI v. non disabled

Quantile	Difference	Explained	Unexplained	Explained - Oaxaca	Of which†:	
					Education	Occupation
P10	0.183*	0.085	0.098	0.051	0.001	0.027
P25	0.134*	0.042	0.093	0.061	0.003	0.035
P50	0.135*	0.093	0.042	0.080	0.004	0.053
P75	0.128*	0.077	0.052	0.065	0.008	0.059
P90	0.094*	0.147	-0.053	0.069	0.011	0.070

Note: *=statistically significant difference at the 5% level. †These show the combined contribution of different educational levels and different occupations, respectively, which may include offsetting effects. In the text we draw attention to those specific educational levels and occupations which have the most substantial contribution and are statistically significant.

The pay gap between workers with non activity limiting mental LTI and non disabled workers is explained, at the mean (Table 18) and over the distribution (Table 24), mostly by occupations and by job tenure. At the bottom of the distribution part of the gap is explained by shorter job tenure, while their over-representation in elementary occupations contributes to the explanation of the pay gap over the whole distribution. In the top half of the distribution (75^{th} and 90^{th} percentiles) the gap is explained by their over-representation in clerical occupations.

Table 25: Decomposition across the pay distribution: Activity limiting mental LTI v. non activity limiting mental LTI

Quantile	Difference	Explained	Unexplained	Explained - Oaxaca	Of which†:	
					Education	Occupation
P10	0.042	0.113	-0.071	0.062	0.008	-0.009
P25	0.110*	0.106	0.004	0.114	0.002	0.036
P50	0.161*	0.104	0.057	0.091	0.006	0.045
P75	0.169*	0.080	0.089	0.108	0.011	0.086
P90	0.152	0.052	0.100	0.089	0.023	0.119

Note: *=statistically significant difference at the 5% level. †These show the combined contribution of different educational levels and different occupations, respectively, which may include offsetting effects. In the text we draw attention to those specific educational levels and occupations which have the most substantial contribution and are statistically significant.

For the pay gap between those workers with activity limiting mental LTI and those workers with non activity limiting mental LTI, despite the fact that, except at the 90th percentile the majority of the gap is explained, there are no single factors that play a particular significant role in account for the difference, either at the mean or across the distribution. In fact, as Table 25 shows, the gap itself is not statistically significant pay gap at the 10th and 90th percentiles. At the mean, and across the distribution, differences in representation in elementary occupations is a significant contributory factor; and variation in the extent to which the condition is regarded as limiting the amount of work contribute to explaining the gap at the 25th and 75th percentiles. Interestingly, in this comparison differences in qualifications are not pertinent.

In summary, then, part-time work, qualifications and occupational distribution matter for the pay of disabled people, with lack of higher qualifications tending to be more important at higher levels of earnings and concentration in part-time work more important at the bottom. Less well paid occupations contribute to pay gaps across the distribution and across the different comparisons, between those whose condition limits their activity and those for whom it doesn't; between those with a long term health condition and those without and when focusing just on those with a mental health condition or a physical condition as their main condition, respectively. There are thus issues about the extent to which those who are disabled end up in particular occupations (or, conversely, whether disability is caused by particular occupations); and similarly the extent to which disabled people have limited educational choices (or conversely, whether being less well educated has consequences for long term health conditions). Interestingly, though, the actual pay gaps associated with disability are very similar (in proportional terms) across the distribution, so pay disadvantage is no more of an issue for the less well paid than it is for the better paid. The role of part-time work in reducing pay is also evident. Since part-time work has been seen as facilitating participation, the issue is not so much access to full time work as the fact that part-time work commands lower rewards and that part time opportunities are less readily available in better paid jobs. This is also reinforced by the finding that the fact that the condition limits the amount of work it is possible to do have more of a bearing on pay gaps at the bottom of the distribution. The substantial explanation provided by whether a disability limits the type or the amount of work someone can do (between activity limiting and non activity limiting LTI), is consistent with our discussion of the differentiation between these groups. It is clearly not the only way they differ, however, since occupational distribution remains important.

6. Conclusions and Discussion

In this discussion we have shown how pay varies between ethno religious groups and between those with different health status and across the distribution of pay. We have attempted to identify the extent to which there is an unexplained element to pay gaps relative to the reference population and what factors help to explain the pay differences – whether they are predominantly individual or occupational. By these means we have attempted to isolate the ways in which group level pay disadvantage can occur and may be perpetuated or mitigated. Our contribution is in looking at sub-populations of larger, heterogeneous groups, thus reducing the complexity of explaining pay for varied ethnic groups or disabled people who differ in key ways such as generation, and religious affiliation on the one hand or type of condition and its severity on the other. Furthermore we provide insights by looking across the distribution and ascertaining both where differences in pay are larger or smaller, whether they are more likely to be unexplained at different parts of the distribution and how the factors helping to explain them themselves differ across the distribution. Overall, we found little evidence for a greater share to be unexplained either at the top of the distribution (which could be associated with glass ceilings) or at the bottom of the distribution (which could be associated with 'sticky floors'). A possible exception was second generation Indian Hindu men, where there was a suggestion from the results that they may be being held back at the top of the distribution relative to their characteristics. Further investigation with larger samples would allow us to investigate this further.

While, there was not substantial evidence of variation in the unexplained component of pay gaps across the distribution, there was clear variation in many of the factors contributing to the explained component at different parts of the distribution, which we briefly summarise below. This suggests that efforts to address pay disadvantage need to consider the relevance of differentiated interventions for those in different circumstances, for both disabled people and minority ethnic groups.

Looking more specifically at the conclusions from the two parts of our analysis. In relation to ethnicity, we consider our key findings to be five-fold. First that there are striking differences in pay between ethnic religious groups: Indian Hindus have the highest pay and Pakistani Muslims the lowest. Both religion and ethnicity seem to be important in determining groups' pay since Indian Muslims fare worse than Indian Hindus but better than Pakistani Muslims. Second, within all three minority ethno-religious groups the second generation achieves higher pay than the first generation, but the amount that is 'explained' by characteristics does not necessarily increase with generation. Third, the sorting out of ethnic–religious groups in specific occupations and their concentration in part-time (or full-time) work explain part of the mean pay differences with respect to the majority. A portion of the pay advantage for Indian Hindus is explained by their over-representation in some highly paid occupations such as professionals (especially health professionals) and under-representation in part-time work; whereas the pay gap for both Indian Muslims and Pakistani Muslims is explained partially by their concentration in low paid occupations, like sales and customer service, and in part-time work. And fifth, in our analysis of the statistically significant pay gaps across the distribution, the unexplained components are small at between three and seven per cent of wages in most cases and sometimes less. However, first

generation Pakistani Muslims are an exception with substantial unexplained components, particularly towards the top of the distribution. Interestingly, unexplained components are also found for Indian Hindus who face an advantage in pay that can be between three and eight per cent of reference wages. Even if Indian Hindus have a pay advantage, they may still be subject to wage discrimination.

When we looked at disability we found that pay gaps are generally larger than those facing minority groups, though interestingly and somewhat surprisingly, for 1st generation Pakistani men the pay gaps associated with ethnicity are larger than those associated with disability. We highlight four key findings in relation to these pay gaps.

First, as we would expect, pay gaps are larger for those with activity limiting LTI than for those with non activity limiting LTI; and for those with mental health as opposed to physical health conditions. Second, when we look to explain the pay gaps, pay gaps of disabled people compared to non disabled ones are mostly due to their slight over-representation in low paid occupations (for example elementary occupations, and process, plant and machine operatives). At the bottom of the distribution part of their gap is explained by their over-representation in part-time jobs, while at the top it is lack of high level qualifications, which contributes to the explanation of the pay gap. Addressing both the opportunities for qualifications that (younger) disabled people have access to is therefore an important issue, as well as understanding the extent to which less well qualified people are more vulnerable to disability. Part-time work may offer valuable access to the labour market for disabled people in a way that allows them at the same time to manage a long term health condition. But opportunities for part time work are typically in lower paid occupations. More opportunities for flexible working could potentially impact positively on the pay gaps faced by less well paid disabled people.

Third, when comparing workers with activity limiting (physical or mental) LTI to workers with non activity limiting LTI a significant part of the gap can be explained by the presence of health problems limiting the type or amount of work. These variables may capture reduced productivity due to illness and consequent lower wages. It is worth noting that limits on the amount of work appear more salient in relation to pay gaps, while limits on the kind of work suppress pay towards the top of the distribution.

Fourth, there is some evidence that discrimination may increase with severity of condition or the extent to which it limits productivity, and that it is worse for those with mental rather than physical health conditions. However, overall, the evidence suggests that discrimination within employment in relation to pay is much less of an issue for disabled people than access to better paid occupations and to qualifications.

7. References

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Appendix

A1. Data Acknowledgements

The data sets we have drawn on for this study are as follows:
Office for National Statistics. Social and Vital Statistics Division and Northern Ireland Statistics and Research Agency. Central Survey Unit, *Quarterly Labour Force Survey,* computer files distributed by the UK Data Archive, Colchester Essex: *April-June 1997*: SN5414; *July-September 1997* SN5870; *October-December 1997* SN5415; *January – March 1998* SN5865; *April-June 1998*: SN5866; *July-September 1998* SN5867; *October-December 1998* SN5868; *January – March 1999* SN5863; *April-June 1999*: SN5416; *July-September 1999* SN5864; *October-December 1999* SN5417; *January – March 2000* SN5856; *April-June 2000*: SN5857; *July-September 2000* SN5858; *October-December 2000* SN5859; *January – March 2001* SN5854; *April-June 2001*: SN5418; *July-September 2001* SN5855; *October-December 2001* SN5419; *January – March 2002* SN5846; *April-June 2002*: SN5420; *July-September 2002* SN5847; *October-December 2002* SN5421; *January – March 2003* SN5844; *April-June 2003*: SN5422; *July-September 2003* SN5845; *October-December 2003* SN5423; *January – March 2004* SN5842; *April-June 2004*: SN5424; *July-September 2004* SN5843; *October-December 2004* SN5425; *January – March 2005* SN5426; *April-June 2005*: SN5427; *July-September 2005* SN5428; *October-December 2005* SN5429; *January – March 2006* SN5369; *April-June 2006*: SN5466; *July-September 2006* SN5547; *October-December 2006* SN5609; *January – March 2007* SN5657; *April-June 2007*: SN5715; *July-September 2007* SN5763; *October-December 2007* SN5796; *January – March 2008* SN5851; *April-June 2008*: SN6013; *July-September 2008* SN6074; *October-December 2008* SN6119.

A2. Health questions

The following questions are used to define the groups used in the analysis of disabled persons' pay gaps.

First respondents are asked:
A) Do you have any health problems or disabilities that you expect will last for more than a year?
In our analysis, this defines those with a long-term illness (LTI).

Those who answer yes to the question about long term health problems are then asked:
B) Does this health problem affect the kind of paid work that you might do?
C) Does this health problem affect the amount of paid work that you might do?
We use responses to these two questions (limit kind and limit amount) to understand the role that work limitations (or productivity differences) play in pay differences.

Respondents are then asked about the nature of the health problem or problems. They are asked:
D) Do you have
1 problems or disabilities (including arthritis or rheumatism) connected with your arms or hands?
2 ...legs or feet?
3 ...back or neck?
4 do you have difficulty in seeing (while wearing spectacles or contact lenses)?
5 difficulty in hearing?
6 a speech impediment
7 severe disfigurement, skin conditions, allergies?
8 chest or breathing problems, asthma, bronchitis?
9 heart, blood pressure or blood circulation problems?
10 stomach, liver, kidney or digestive problems?
11 diabetes?
12 depression, bad nerves or anxiety?
13 epilepsy?
14 severe or specific learning difficulties (mental handicap)?
15 mental illness or suffer from phobias, panics or other nervous disorders?
16 progressive illness not included elsewhere (e.g. cancer not included elsewhere, multiple sclerosis, symptomatic HIV, Parkinson's disease, muscular dystrophy)?
17 other health problems or disabilities?
Respondents can identify as many health problems as apply to them. We use these responses to give a count of the number of health conditions. We use this count as a measure of severity. We also use responses to 12 and 15 to identify if respondents with a physical health condition as their main condition also have a mental health condition.

If respondents identify more than one condition at D, they are asked
E) Which of these is your main health problem/disability?
With the same response list as for D.
We use this information to identify type of LTI, whether physical (responses 1-11), or mental (responses 12 and 15).

Respondents are then asked:
F) Do these health problems or disabilities, when taken singly or together, substantially limit your ability to carry out normal day to day activities? If you are receiving medication or treatment, please consider what the situation would be without the medication or treatment.
We use the response to this question to distinguish between those with a non activity limiting LTI and those with an activity limiting LTI.
There are additional questions on past health problems which are included for the purposes of the Disability Discrimination Act; but we do not use those in our analysis.

A3 Supplementary tables

Table A1: Log pay at the mean and across the pay distribution by ethno-religious group

Ethno-Religious Group	Mean log wage	P10 log wage	P25 log wage	P50 log wage	P75 log wage	P90 log wage
Indian Hindu	2.479	1.761	2.056	2.466	2.918	3.231
1st Generation	(0.028)	(0.036)	(0.030)	(0.033)	(0.043)	(0.057)
Indian Hindu	2.571	1.822	2.208	2.564	2.908	3.301
2nd Generation	(0.040)	(0.050)	(0.041)	(0.051)	(0.069)	(0.116)
Indian Muslim	2.277	1.589	1.782	2.186	2.721	3.162
1st Generation	(0.064)	(0.231)	(0.127)	(0.070)	(0.082)	(0.137)
Indian Muslim	2.342	1.625	1.901	2.136	2.847	3.148
2nd Generation	(0.085)	(0.281)	(0.113)	(0.090)	(0.116)	(0.168)
Pakistani Muslim	1.985	1.557	1.675	1.896	2.229	2.705
1st Generation	(0.028)	(0.221)	(0.092)	(0.054)	(0.030)	(0.028)
Pakistani Muslim	2.321	1.630	1.916	2.220	2.724	3.114
2nd Generation	(0.041)	(0.107)	(0.056)	(0.045)	(0.051)	(0.075)

Note: Standard errors in parentheses

Table A2: Log pay at the mean and across the pay distribution by disability group

Disability Group	Mean Log Wage	P10 Log wage	P25 Log Wage	P50 Log Wage	P75 Log Wage	P90 Log Wage
Non activity limiting LTI	2.345	1.724	1.982	2.305	2.690	3.039
	(0.004)	(0.006)	(0.005)	(0.005)	(0.006)	(0.007)
Activity limiting LTI	2.239	1.636	1.890	2.217	2.591	2.948
	(0.006)	(0.009)	(0.007)	(0.007)	(0.008)	(0.009)
Non activity limiting physical LTI	2.347	1.730	1.987	2.308	2.689	3.034
	(0.004)	(0.006)	(0.005)	(0.005)	(0.006)	(0.008)
Activity limiting physical LTI	2.256	1.657	1.909	2.230	2.598	2.950
	(0.006)	(0.009)	(0.007)	(0.007)	(0.008)	(0.010)
Non activity limiting mental LTI	2.267	1.589	1.899	2.230	2.607	2.994
	(0.028)	(0.066)	(0.036)	(0.031)	(0.032)	(0.042)
Activity limiting mental LTI	2.100	1.547	1.788	2.069	2.439	2.846
	(0.026)	(0.028)	(0.030)	(0.024)	(0.034)	(0.048)

Note: Standard errors in parentheses