

# Muslims and the Labour Market: Analysis of the 2001 UK Census

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## Abstract

*Religious identity is hypothesised to be an important determinant of employment, my aim in this paper is to investigate this religion effect. I concentrate my efforts on testing for the existence of a "Muslim Penalty" in the UK Labour Market. I find that there is a very significant difference in employment outcomes between Muslims and the population at large. I deconstruct this difference into three categories: difference in characteristics, difference in responses to having certain characteristics and any remaining disadvantage associated with being Muslim. My analysis shows that all three sources of difference are significant and I propose various policy responses to address these differences.*

## Introduction

Much work has been done to analyse and address gender, racial and ethnicity based disadvantage in the labour market. Now there is increasing interest in whether along with these factors there is an additional religion effect.

Over the last 30 years there have been several key events that have shaped both the external perception of and the self perception of the UK's Muslim population and through this process a British Muslim identity is emerging. Some of these defining moments include: the Islamic Revolution in Iran (1979), the furor around the publication of the Satanic Verses (1989), the first Gulf War (1990/91), the Runnymede Trust report on Islamophobia (1997), the riots in Bradford, Oldham and Burnley (2001), the attack on the World Trade Centre in New York (2001), the Madrid bombings (2004), the London bombings (2005), the riots in Paris banlieue (2006) and the ongoing wars in Afghanistan and Iraq (2001-2008). This is all set in a wider historical context of the crusades and the following era of colonialism which for a long time have shaped perceptions of Muslims in the European mind.

The 2001 UK Census is the first since 1851 to include a religion question, initial analyses of this dataset, largely based on a simplistic examination of the figures (e.g. just looking at a top level average) indicates a much lower level of labour market participation for Muslims and particularly for Muslim women. There is a danger in this kind of analysis to conflate many different effects under a religion heading. It is my aim in this paper to investigate this phenomenon further using established econometric techniques.

There are a number of reasons why Muslims may do worse in the labour market, these include: Muslim's religious beliefs restrict participation in certain industries particularly those associated with alcohol, gambling, pornography and usury. Muslims have certain requirements that may not be provided for in all workplaces e.g. time and place to pray, dietary requirements and dress restrictions. Being Muslim affects believer's attitudes towards various characteristics e.g. marriage, care of dependent children and female employment. Finally the external perception of Muslims can impact their chances in the labour market i.e. there may be discrimination against Muslims by employers.

## Data and Theory

My analysis is based on a sample from the 2001 UK Census. The sample I have used is the 2001 Licensed Individual SAR from the Cathie Marsh Centre for Census and Survey Research, which is a 3 per cent sample and contains over 1.75 million anonymous records. Sampling is done in such a way so as to ensure the sample is fully representative of the population as a whole. Full details of the sampling process can be found in the references at the end of this paper.

The census questionnaire was slightly different for England and Wales as compared to the questionnaires used for Ireland and Scotland. These differences are particularly relevant when looking at the classification of education, ethnicity and religion. Given the size of the data set and the central role that these variables will play in my analysis I have decided to restrict my focus to England and Wales.

Furthermore economic activity was only recorded for those aged between 16 and 74, this reduced my sample size to a final size of 1,163,443 individuals. In what follows I will discuss the variables that I have derived from the census dataset for use in my employment equation, highlight the key features of the data and explain the theoretical relevance of the variables. All charts, tables and regression results are based on this SAR dataset.

### Economic Activity

The dependent variable that I will centre my analysis around is the employment to population ratio which I will call employed. This is defined as the proportion of the working age (16-74) population that is employed<sup>1</sup>. This includes all employees and self employed people and includes both part time and full time workers. The unemployed, students, the retired, those looking after home, the permanently sick and disabled and all others are defined as not employed. The distribution of these economic activity categories are shown in figures 1 and 2 below.

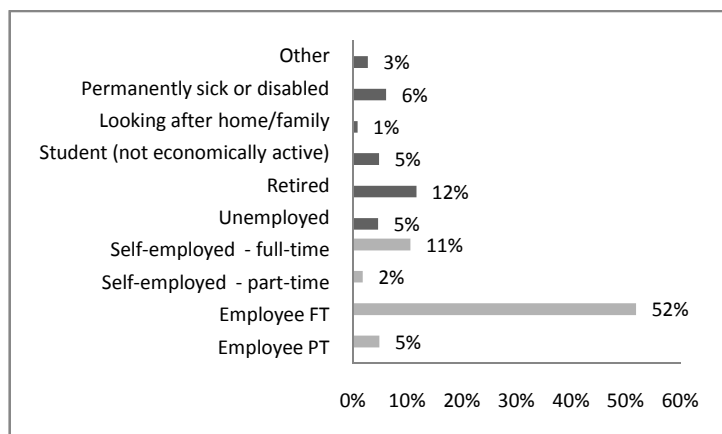


Figure 1 - Economic Activity (male)

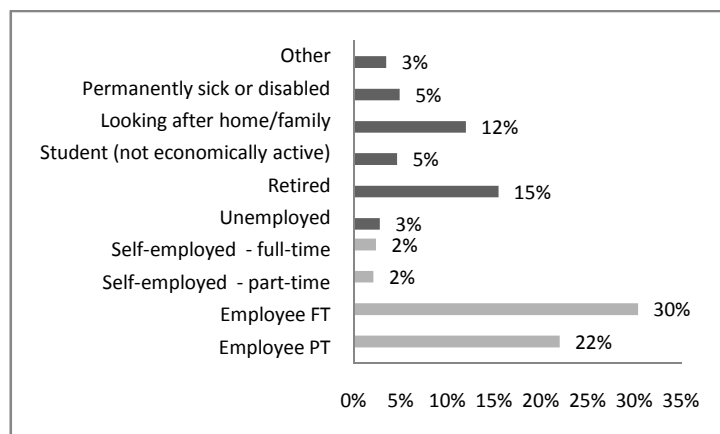


Figure 2 - Economic Activity (female)

Average levels of employment are 69% for men and 57% for women. Particularly striking is the large number of part time employees among women (22% compared to 5% for men) and the high numbers of women not working looking after home/family (12% compared to 1% of men). In the bulk of the analysis that follows I will focus on the aggregated average percentage employed figures.

### Religion

The religion question was optional and 7% of the population chose not to answer. Splitting this not stated response by ethnicity, age and sex it does not appear to contain any real patterns so it seems safe to assume that it does not significantly bias our results. There were 9 possible responses to the religion question: Christian, Buddhist, Hindu, Jewish Muslim, Sikh, Other Religion, No Religion and Not Stated. Because the relatively small numbers of Buddhist, Hindu, Jewish, Sikh and Other Religion responses I have combined them all into the Other Religion category for the purposes of my analysis.

Figures 3 and 4 below show the distribution of the religion variable for men and women. A slightly greater proportion of women in the sample are Christian and a slightly lower proportion adheres to no religion than the men in the sample. Figures 5 and 6 below show percentage employed split by religion. The axes for both graphs are set at the respective population average levels of employment to make it easy to discern the relative differences. For both men and women the most obvious observation is that Muslims have a much lower level of employment than average, this is particularly striking for Muslim women who have an employment rate of 26% as compared with a female population average of 57%. This confirms that there is a Muslim employment gap. The remainder of this paper will aim to explain this employment gap.

<sup>1</sup> This is consistent with the International Labour Organisation Key Indicator of the Labour Market 2 (ILO KILM 2) definition used to make comparisons between countries.

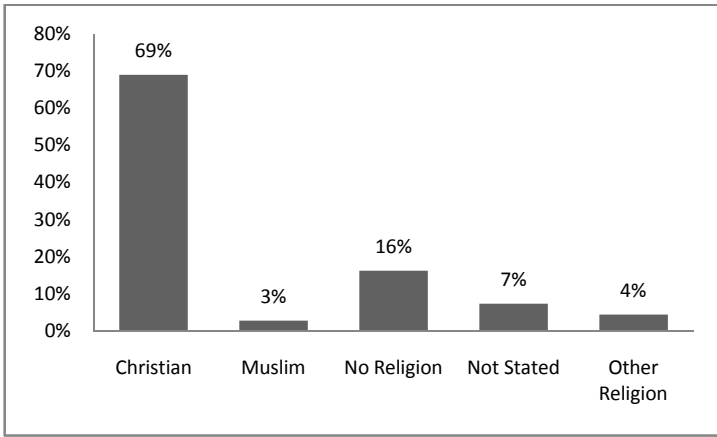


Figure 3 - Religion (male)

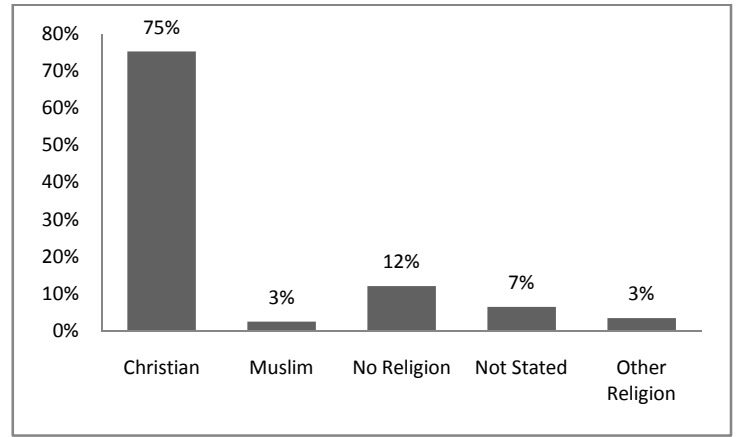


Figure 4 - Religion (female)

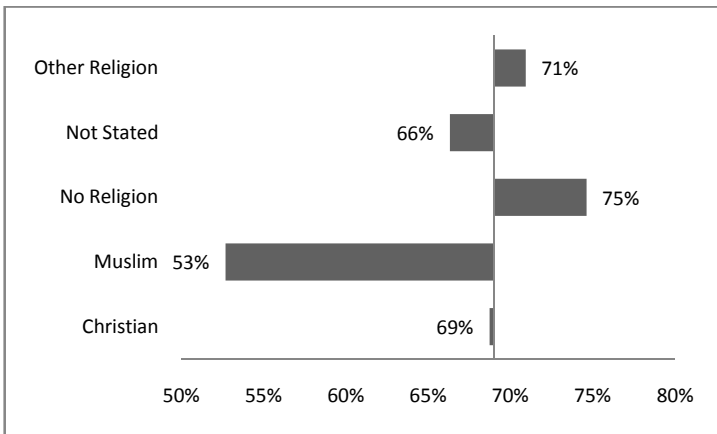


Figure 5 – Employed by Religion (male)

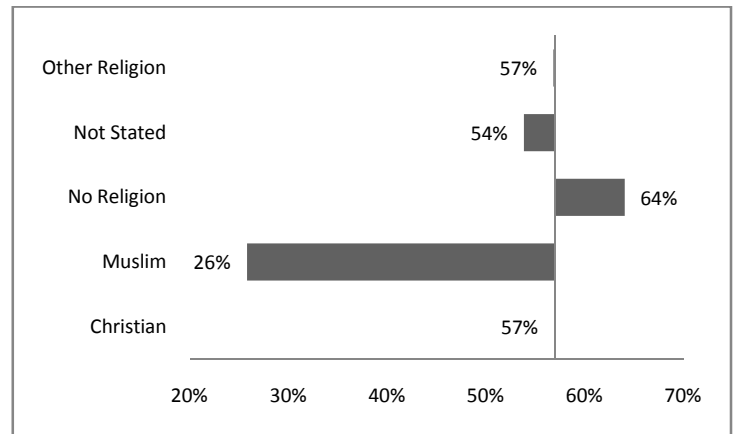


Figure 6 – Employed by Religion (female)

*Age*

Age is a key determinant of employment, younger people are more likely to be studying and have less experience, as people get older they have obtained their qualifications and gain experience hence becoming more employable, after a point their skills become less relevant and they also start retiring. Theory suggests that employment will first rise and then fall with age.

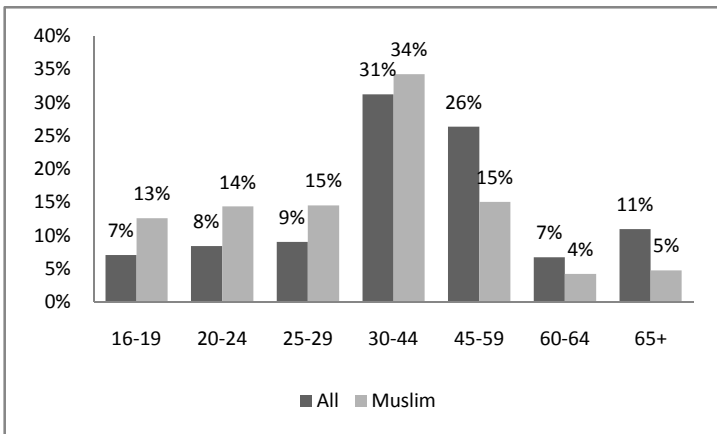


Figure 7 - Age (male)

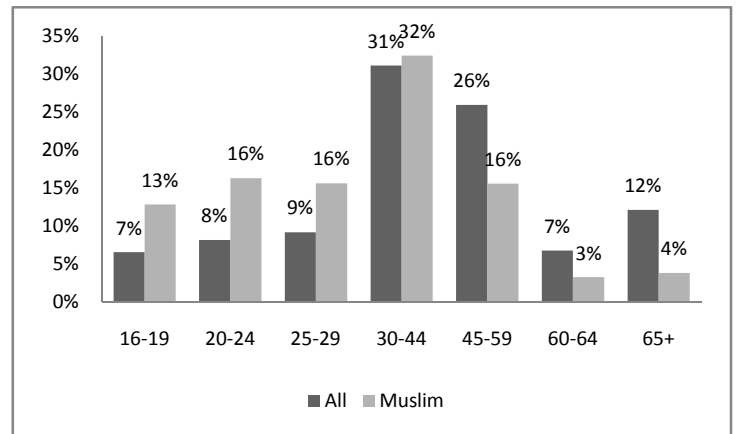


Figure 8 - Age (female)

Figures 7 and 8 show age distribution for men and women. We can see that for both men and women Muslims are over represented in the younger age groups 16-29 and under represented in the older age groups 45-74.

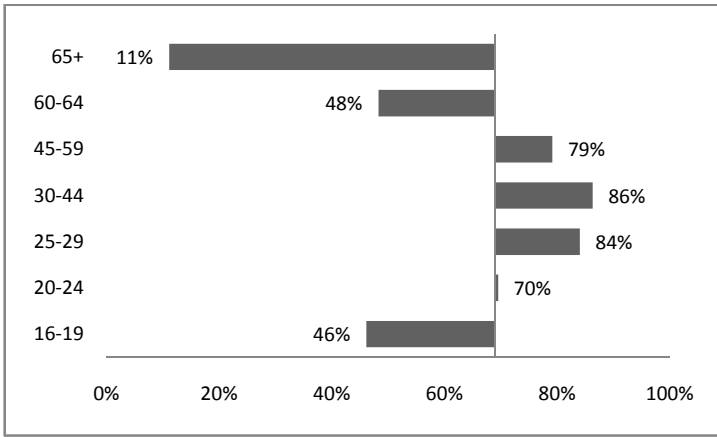


Figure 9 – Employed by Age (male)

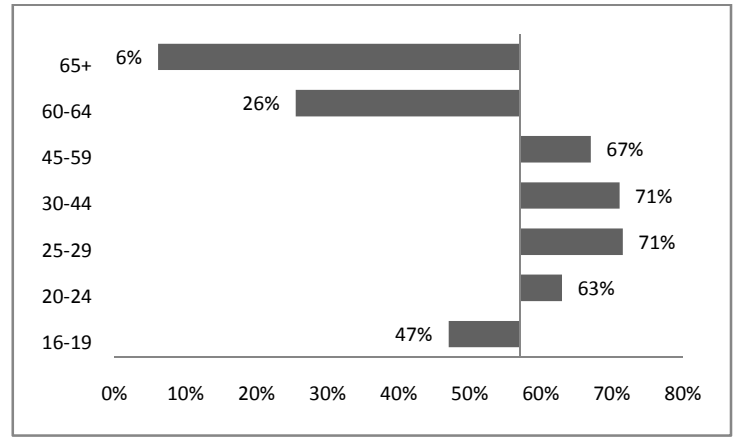


Figure 10 – Employed by Age (female)

Figures 9 and 10 show that younger and older people in our sample have a lower than average employment rate, with employment rates peaking for those between 25 and 59 years of age. Given the age distribution of Muslims as compared to the whole population we expect them to do worse due to the over representation in the 16-19 age group, but do better from the under representation in the 60-74 age group.

### Education

Education level is another important determinant of employment and is a key measure of human capital. Higher levels of education are generally correlated with higher levels of employment as more education equips people with more skills to utilise in the labour market.

The census records the highest level of education attained. This is split over 6 categories: None, Level 1 - 1+ GCSE pass, Level 2 - 5+ GCSEs grades A-C, Level 3 – 2+ A levels, Level 4/5 – University Degree, Other.

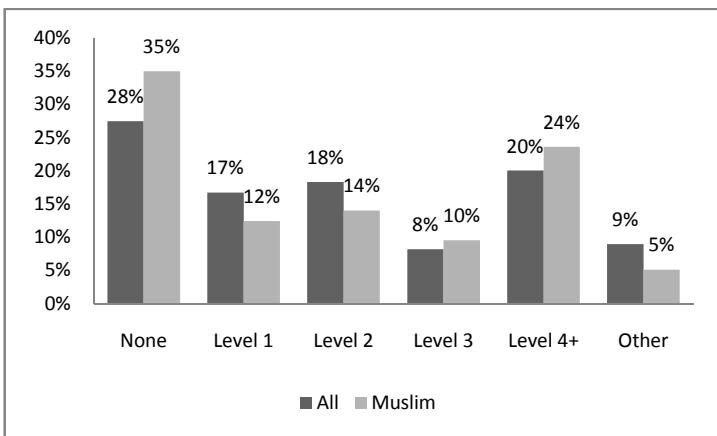


Figure 11 – Highest Qualification (male)

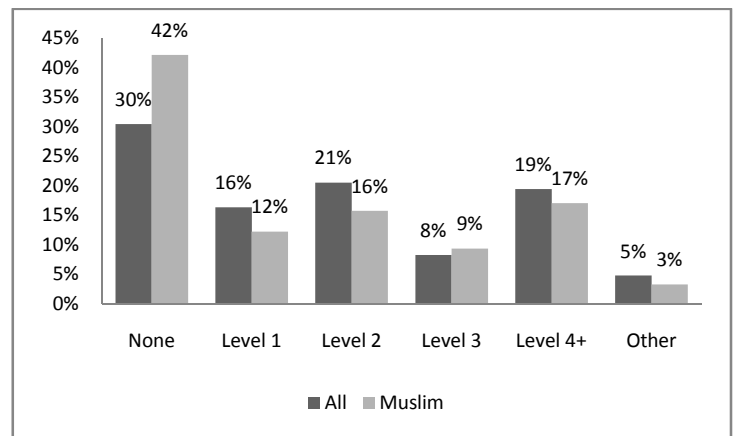


Figure 12 – Highest Qualification (female)

Figures 11 and 12 above show the distribution of qualifications for men and women. Muslims have a much greater proportion of people with no qualifications than the population as a whole (35% as compared to 28% for men and 42% as compared to 30% for women).

Figures 13 and 14 below show that those with no qualifications are much less likely to be employed, interestingly there seems to be very little positive effect on employment (and for men a negative effect) for those with level 2 and 3 qualifications as compared to those with level 1 qualifications.

Given the significantly larger number of Muslims with no qualifications and the significantly lower levels of employment of people with no qualifications, education seems to be an important determinant of the Muslim employment gap.

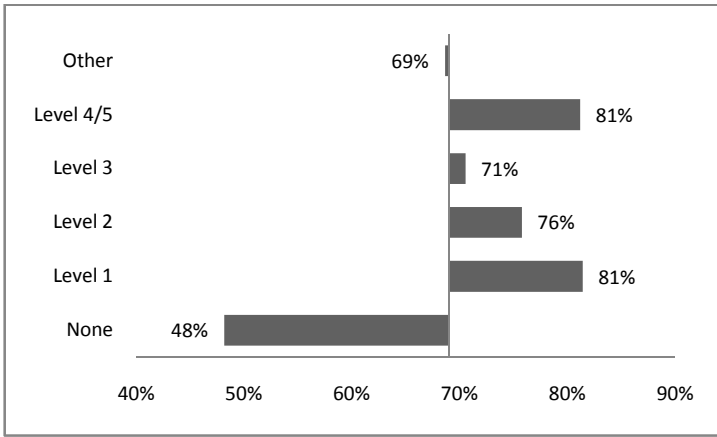


Figure 13 – Employed by Education (male)

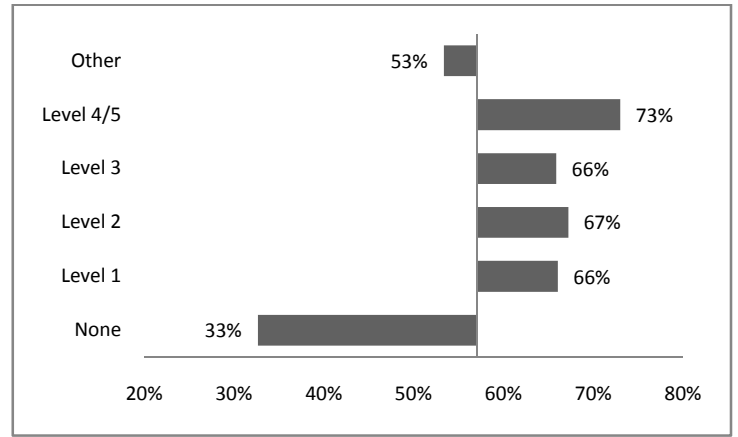


Figure 14 – Employed by Education (female)

*Family Type*

For men we would expect that being married and having dependent children gives them a greater sense of responsibility and so would make them more likely to be employed. For women we would expect that being married and having dependent children would reduce their chances of being employed.

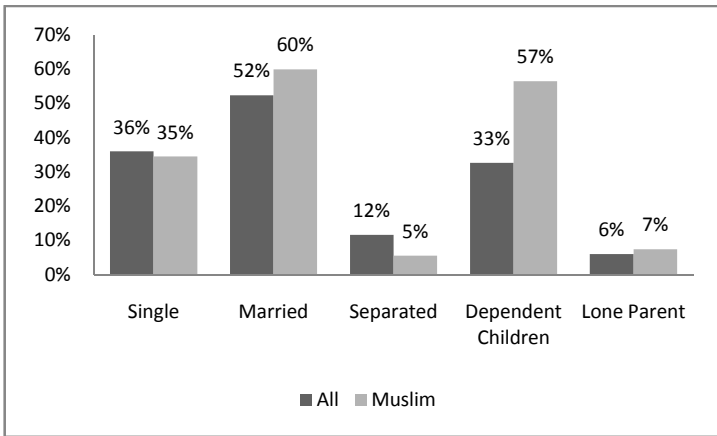


Figure 15 – Family Type (male)

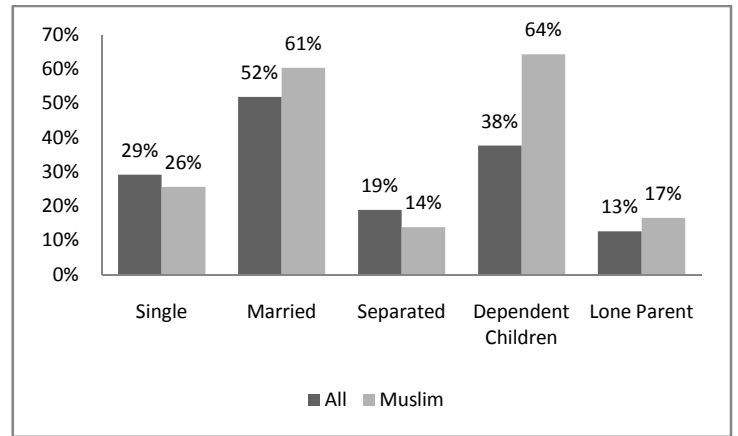


Figure 16 – Family Type (female)

Figures 15 and 16 above show that a much greater proportion of Muslims have dependent children and significantly higher proportion are married as compared to the population in general.

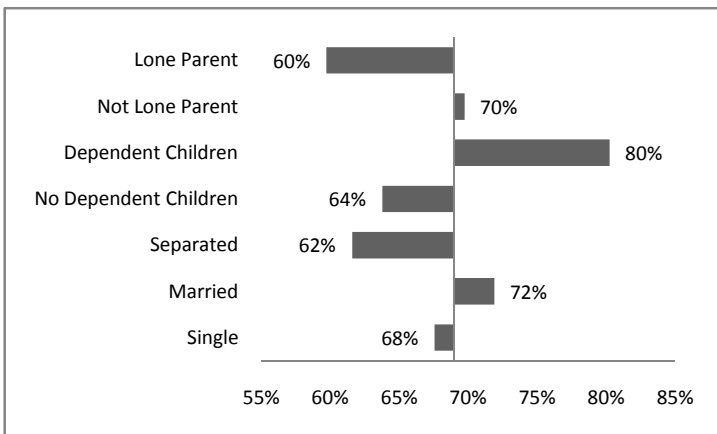


Figure 17 – Employed by Family Type (male)

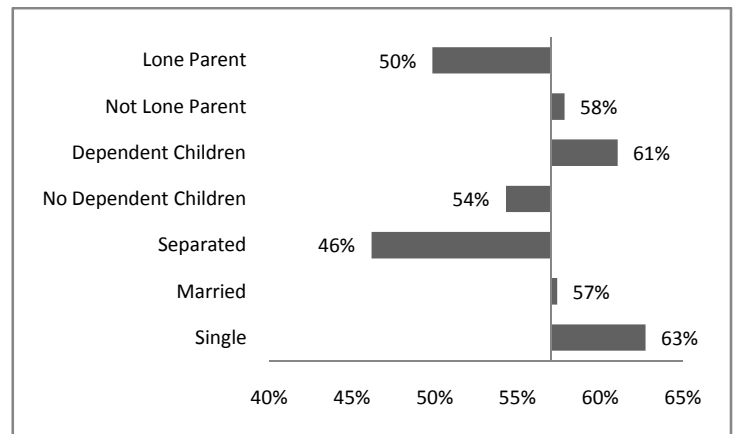


Figure 18 – Employed by Family Type (female)

Figures 17 and 18 are largely in line with the theory with the only surprising result being the higher employment level of women with dependent children than that of women with no dependent children. Given the results we see that Muslims are more likely to have dependent children and people with dependent children are more likely to be employed so on this basis we expect Muslims to have higher levels of employment than the population in general. Muslims are more likely to be lone parents and Muslim women are less likely to be single. With these

characteristics we would expect them to have lower levels of employment. It is not clear that there is any overall impact of family type that we can use to explain the Muslim employment gap.

**Health**

Poor health will make it harder to work and disabilities may rule individuals out of some types of work.

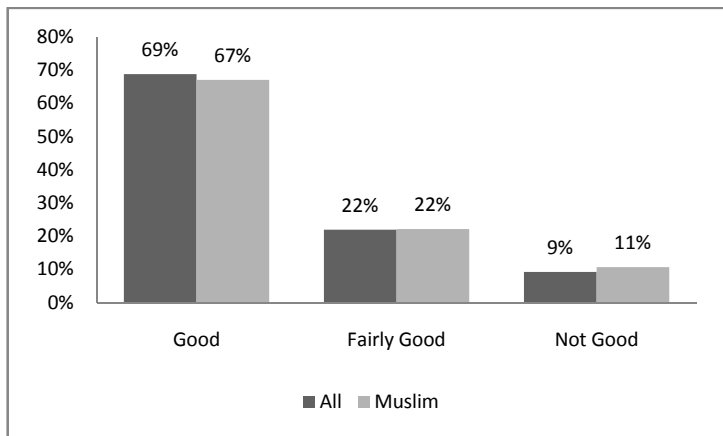


Figure 19 - Health (male)

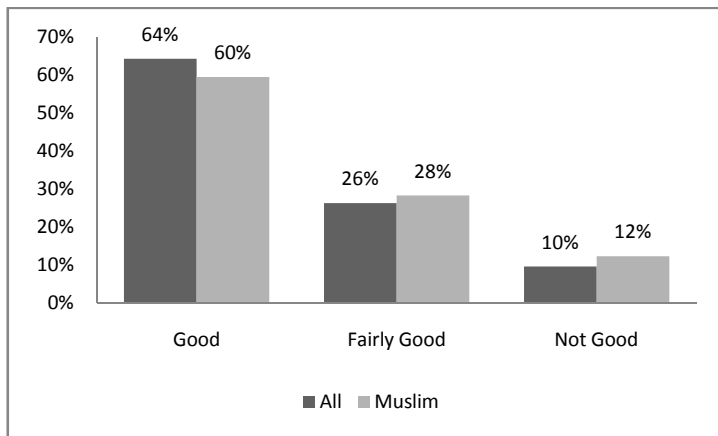


Figure 20 - Health (female)

Figures 19 and 20 above show that Muslims have a slightly worse health distribution than the population in general. Figures 21 and 22 below show the dramatic effect that ill health has on employment. Seen together this could explain a small part of the Muslim employment gap.

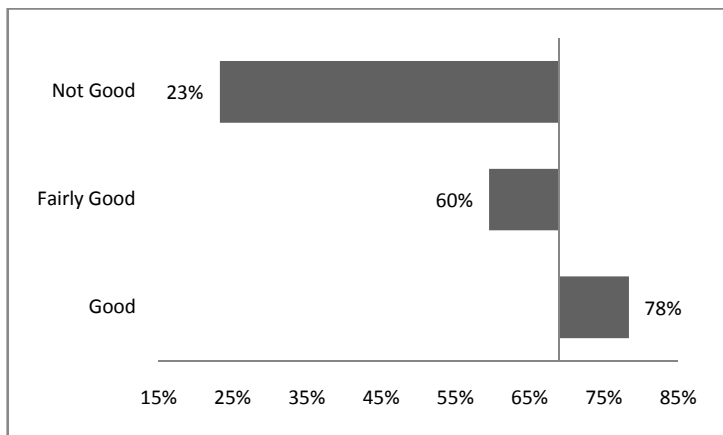


Figure 21 – Employed by Health (male)

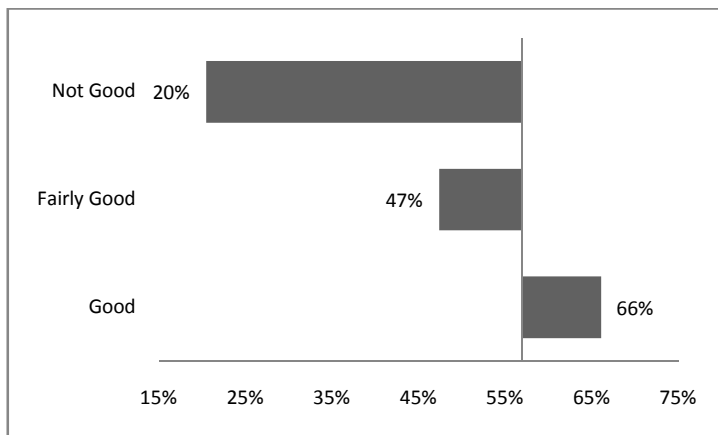


Figure 22 - Employed by Health (female)

**Geographical Region of Residence**

The place where you live can have an impact on employment levels as industries based in certain parts of the country rise or decline.

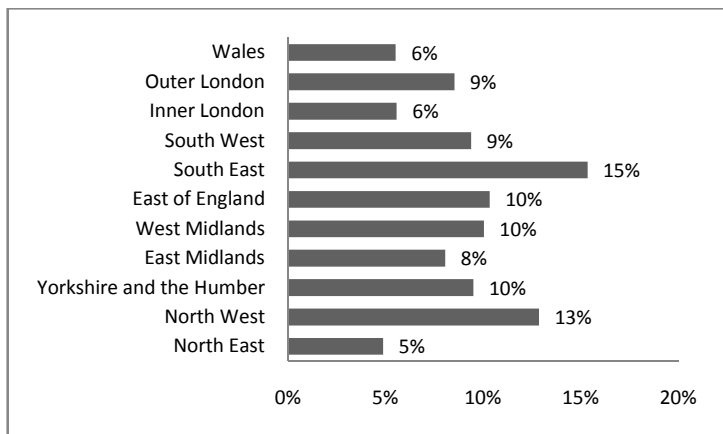


Figure 23 - Region (All)

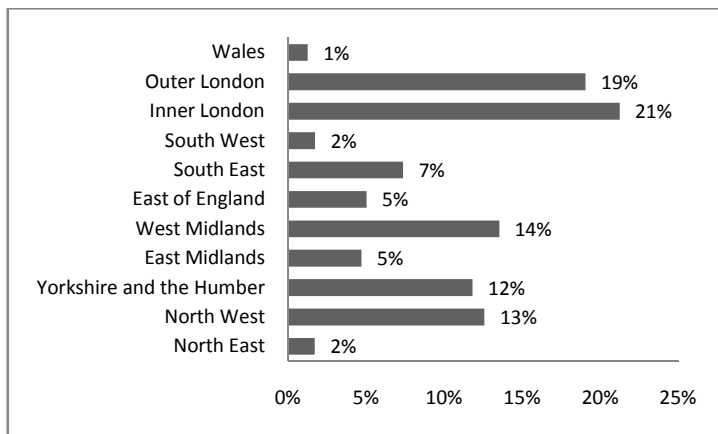


Figure 24 - Region (Muslim)

Figure 23 shows that the largest proportion of people live in the South East with among the smallest proportion living in Inner London. Figure 24 shows that the largest proportion of Muslims live in Inner London. Muslims are most underrepresented in the South East, East of England and South West. Looking to Figures 25 and 26 below we see that employment is below average in Inner London where Muslims are most over represented and is highest in South West, South East and East of England where Muslims are most under represented.

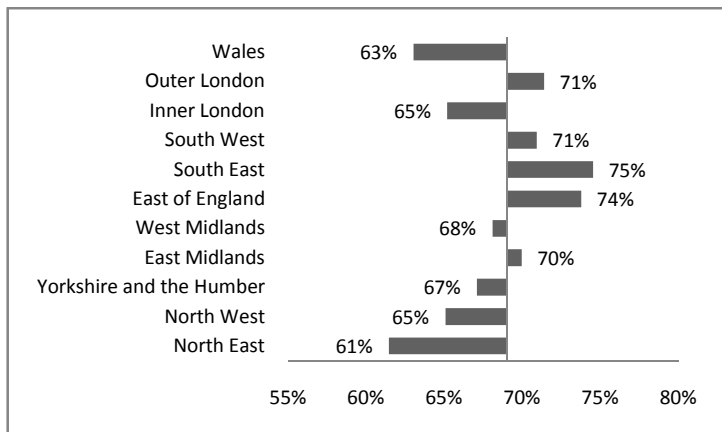


Figure 25 – Employed by Region (male)

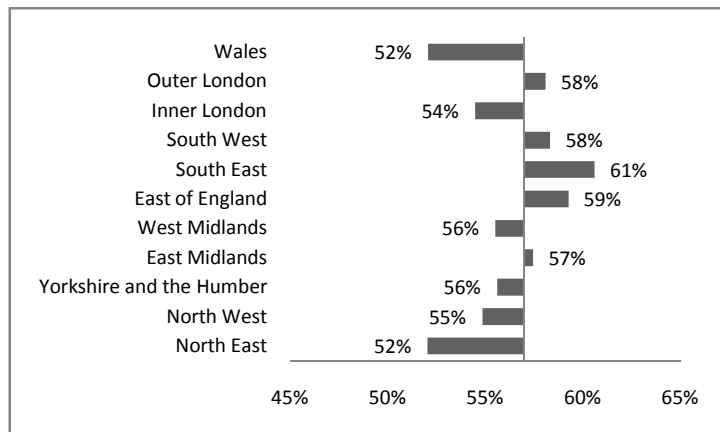


Figure 26 – Employed by Region (female)

### Ethnicity

Ethnicity can impact employment in several ways, first it may be a proxy for English language fluency with certain ethnic groups originating from non-English speaking countries expected to do worse in the Labour market. Secondly ethnicity has a cultural influence which can have significant impacts on an individual’s self selection out of the labour market for various reasons. Finally ethnicity can have an impact on employment outcomes due to discrimination against or in favour of certain ethnic groups.

Ethnicity in the census is recorded at two levels, at the top level there are five categories: White, Mixed, Asian, Black and Other. These are then further broken down into the following sub-categories: White – White Briton, Irish, Other White; Mixed – White and Black Caribbean, White and Black African, White and Asian, Other Mixed; Asian – Indian, Pakistani, Bangladeshi, Other Asian; Black – Black Caribbean, Black African, Other Black; Other – Chinese, Other Ethnic Group.

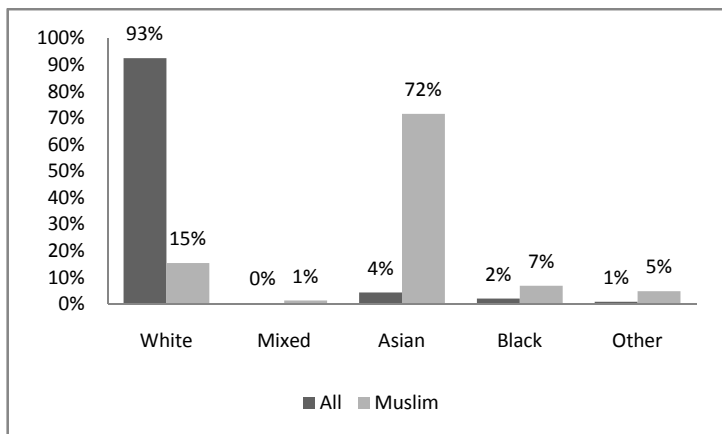


Figure 27 – Ethnic Group (male)

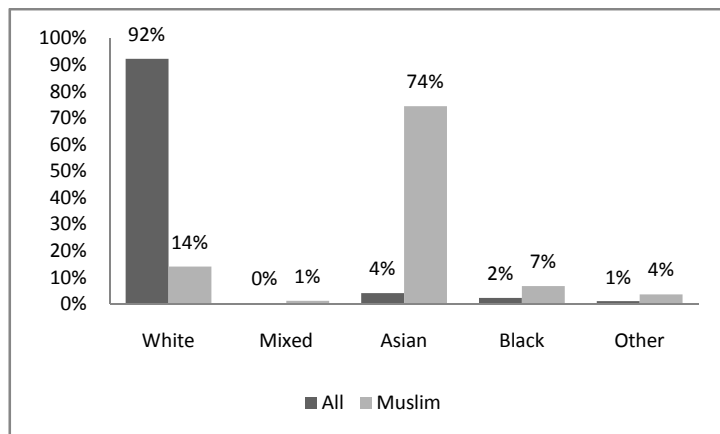


Figure 28 – Ethnic Group (female)

Figures 27 and 28 show that the UK population is very ethnically homogenous with over 90% of both men and women being White. The Muslim population is more heterogeneous though it is majority Asian (over 70%).

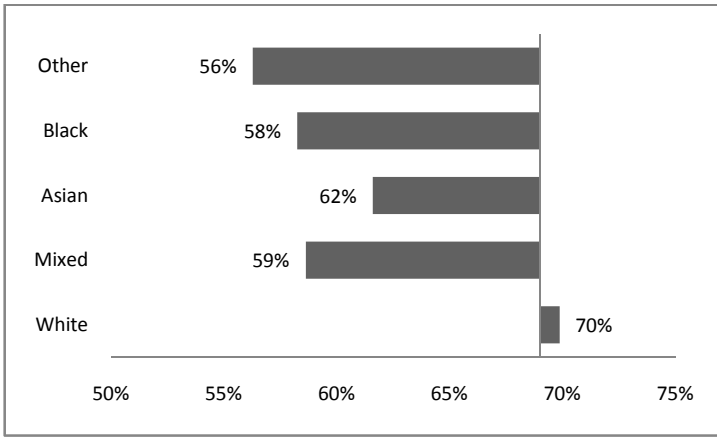


Figure 29 – Employed by Ethnic Group (male)

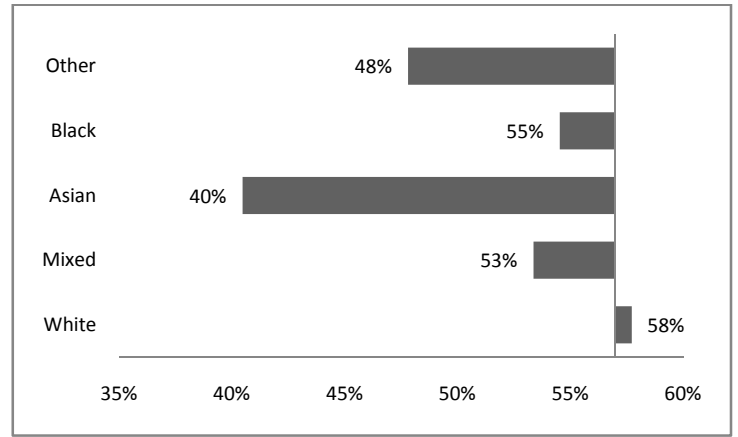


Figure 30 - Employed by Ethnic Group (female)

Figures 29 and 30 show that every other ethnic group has a lower employment level than Whites and that the difference is particularly noticeable for Asian women. This combined with the large proportion of Muslims who are ethnically Asian goes some way to accounting for the Muslim employment gap.

Ethnicity	Male		Female	
	All	Muslim	All	Muslim
White Briton	87.8%	3.2%	87.1%	3.9%
Irish	1.4%	0.0%	1.5%	0.1%
Other White*	3.3%	12.1%	3.7%	10.0%
Mixed	0.2%	1.3%	0.2%	1.2%
Indian*	2.1%	8.6%	2.1%	9.2%
Pakistani*	1.3%	40.6%	1.2%	43.7%
Bangladeshi*	0.5%	15.5%	0.4%	16.1%
Other Asian*	0.6%	6.9%	0.4%	5.5%
Caribbean	1.1%	0.5%	1.3%	0.2%
African*	0.9%	6.0%	0.9%	6.1%
Other Black	0.1%	0.4%	0.2%	0.4%
Chinese	0.5%	0.0%	0.5%	0.1%
Other	0.4%	4.8%	0.5%	3.5%

Table 1 - Ethnicity (\* indicates > 5% of Muslims in sample)

Table 1 above shows ethnicity broken down further, from this we can see that over 40% of Muslims are Pakistani and approximately 15% are Bangladeshi.

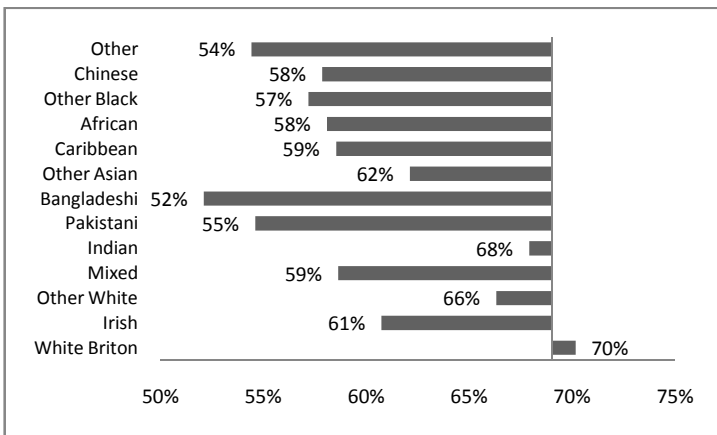


Figure 31 – Employed by Ethnicity (male)

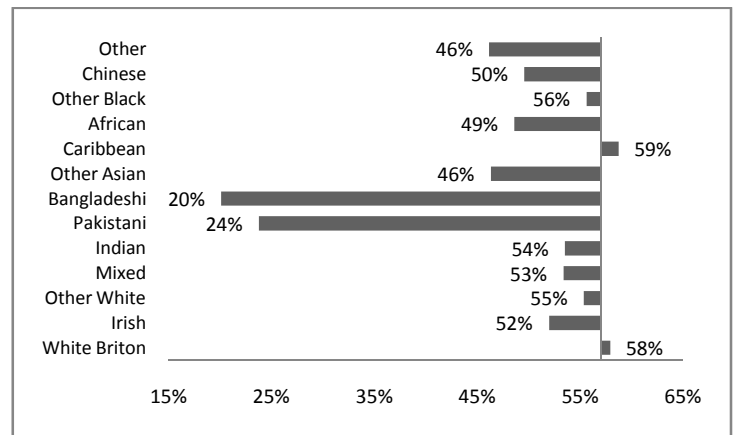


Figure 32 - Employed by Ethnicity (female)

Figures 31 and 32 show that Pakistanis and Bangladeshis stand out as having dramatically low levels of employment and this is particularly evident among women (24% Pakistani, 20% Bangladeshi versus an average of 57%). Given the large proportion of Muslims who belong to these two ethnic groups (50-60%) and these groups' poor performance in the labour market, this would appear to account for a large part of the Muslim employment gap.



The census also contains two other related variables migrant status which measures whether a person has changed address in the past year and a country of birth variable which I have used to determine whether a person was born in the UK.

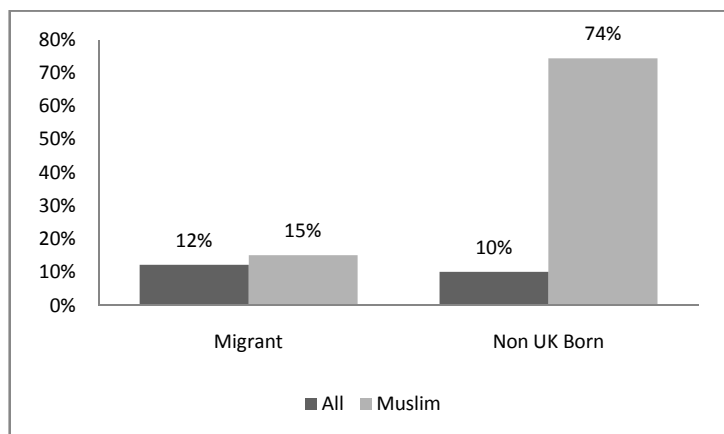


Figure 33 – Migrant Status (male)

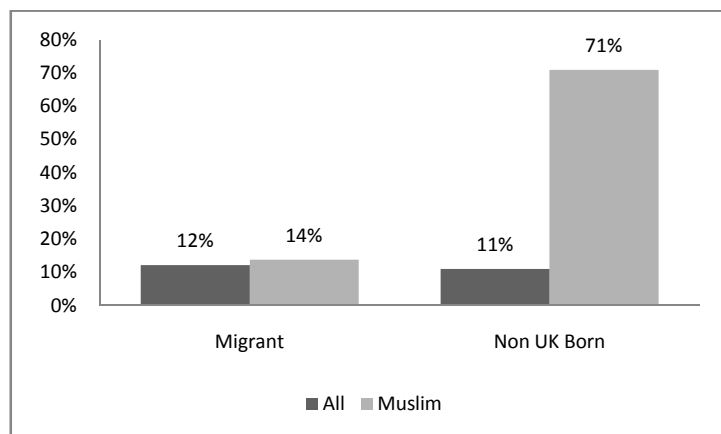


Figure 34 – Migrant Status (female)

Figures 33 and 34 above show that the vast majority of the working age Muslim population is born outside the UK (over 70%). Figures 35 and 36 below show that being born outside the UK is correlated with significantly lower levels of employment.

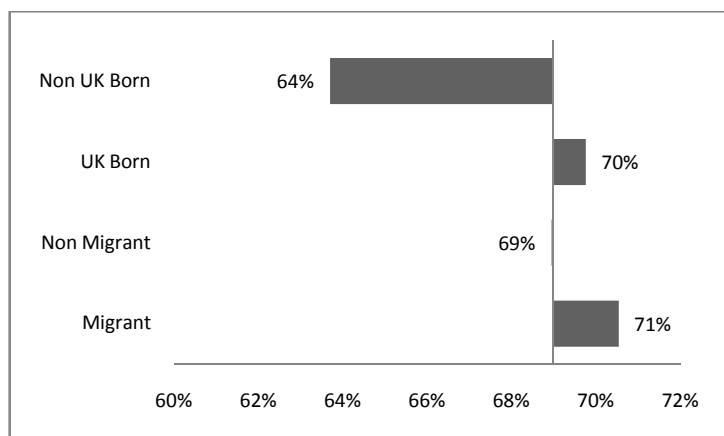


Figure 35 – Employed by Migrant Status (male)

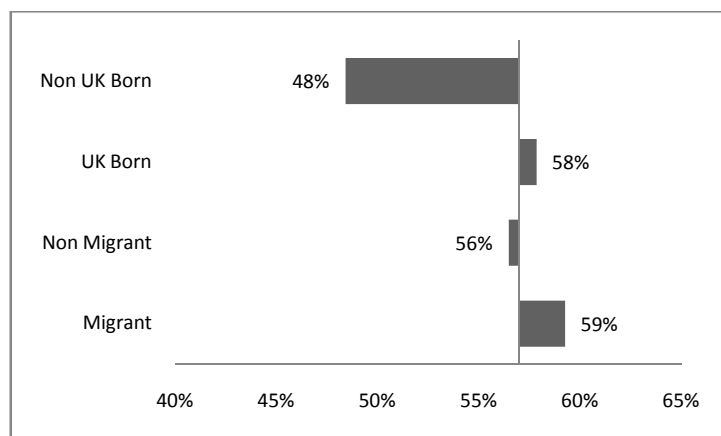


Figure 36 - Employed by Migrant Status (female)

## Methods

The framework I use for my analysis is human capital theory, I estimate the probability of being employed based on age, educational qualifications, marital status, dependent children, health status, geographic region of residence, country of birth, ethnicity and religion. I analyse this equation under a logistic<sup>2</sup> modelling framework and do the analysis separately for men and women<sup>3</sup>. Under the logistic model we can derive the probability of being employed as:

$$\hat{p}_i = \frac{\exp(x_i' \hat{\beta})}{1 + \exp(x_i' \hat{\beta})}$$

From this formulation we can say that employment rates for Muslims may be different to those for non-Muslims for three reasons:

<sup>2</sup> I ran my analysis through both probit and logit models and found that they produced almost identical results. I chose to report my results under the logit model as it produces a more intuitive odds ratio interpretation. I justify my use of the model by appealing to asymptotic theory and the large size of my sample.

<sup>3</sup> Men and women have very different approaches to the labour market and react to changes in determinants in the employment equation in different ways e.g. being married tends to reduce the likelihood of a women working whilst it increases the likelihood of a man working.

A - Muslim in the sample have different characteristics which act as determinants in the employment equation i.e.  $x$  's are different.

B - Coefficients of these determinants are different for Muslims i.e.  $\beta$  's are different.

C - There is some residual unobservable source of difference beyond these two factors associated with being Muslim.

All three of these sources of difference are important and have policy implications, however it is valuable and interesting to be able to see the contribution of each aspect so as to identify and prioritise courses of action to remedy any disadvantage.

In the analysis that follows I will use the following abbreviations:

$X = (X_M, X_{NM})'$  characteristics for the combined sample, for Muslim and for non-Muslims respectively

$\hat{\beta}, \hat{\beta}_M, \hat{\beta}_{NM}$  coefficients estimates for the combined sample, for Muslim and for non-Muslims respectively

$P(X_A' \beta_B)$  average predicted probability of being employed for characteristics  $X_A$  and coefficients  $\beta_B$

#### *Investigating A: differences in characteristics*

As we have already seen from examining the data Muslims have significantly lower than average employment levels and some of this Muslim employment gap seems to be due to a less favourable distribution of characteristics. I further investigate the effect of differing characteristics by running a logit model on the employment equation (leaving out religion as a determinant) and estimating the predicted probabilities of being employed. From this I take average predicted probabilities of employment for Muslims and for non-Muslims in the sample and test whether the difference in these two averages is statistically significant.

Hypothesis 1: Muslims and non-Muslims have equal average predicted probabilities of being employed based on their non religion characteristics.

$$H_0: P(X_{NM}' \hat{\beta}) = P(X_M' \hat{\beta})$$

$$H_1: P(X_{NM}' \hat{\beta}) > P(X_M' \hat{\beta})$$

#### *Investigating B: differences in coefficients*

I then investigate differences in the coefficients by estimating the same logit model twice, once for the Muslims in the sample (to give  $\hat{\beta}_M$ ) and once for the non-Muslims in the sample (to give  $\hat{\beta}_{NM}$ ). I test to see if these two sets of coefficients are equal.

Hypothesis 2: The coefficients for Muslims and non-Muslims are the same.

$$H_0: \hat{\beta}_M = \hat{\beta}_{NM}$$

$$H_1: \hat{\beta}_M \neq \hat{\beta}_{NM}$$

Assuming the null hypothesis of equal coefficients is rejected I go on to investigate the effect of the coefficient differences. I look at the effect of the different coefficients on the Muslims - differences in the averages of  $P(X_M' \hat{\beta}_M)$  and  $P(X_M' \hat{\beta}_{NM})$  - and non-Muslims - differences in the averages of  $P(X_{NM}' \hat{\beta}_M)$  and  $P(X_{NM}' \hat{\beta}_{NM})$ .

Hypothesis 3: Muslims have equal predicted probabilities of being employed regardless of whether they are calculated with Muslim or non-Muslim coefficients.

$$H_0: P(X_M' \hat{\beta}_M) = P(X_M' \hat{\beta}_{NM})$$

$$H_1: P(X_M' \hat{\beta}_M) < P(X_M' \hat{\beta}_{NM})$$

Hypothesis 4: Non-Muslims have equal predicted probabilities of being employed regardless of whether they are calculated with Muslim or non-Muslim coefficients.

$$H_0: P(X_{NM}' \hat{\beta}_M) = P(X_{NM}' \hat{\beta}_{NM})$$

$$H_1: P(X_{NM}' \hat{\beta}_M) < P(X_{NM}' \hat{\beta}_{NM})$$

Given that I now assume different coefficients for Muslims and non-Muslims I return to my investigation of the role of differing characteristics and add the following two tests.

Hypothesis 5: Muslims and non-Muslims have equal predicted probabilities of being employed based on the coefficients determined from the Muslim subsample.

$$H_0: P(X_{NM}' \hat{\beta}_M) = P(X_M' \hat{\beta}_M)$$

$$H_1: P(X_{NM}' \hat{\beta}_M) > P(X_M' \hat{\beta}_M)$$

Hypothesis 6: Muslims and non-Muslims have equal predicted probabilities of being employed based on the coefficients determined from the non-Muslim subsample.

$$H_0: P(X_{NM}'\hat{\beta}_{NM}) = P(X_M'\hat{\beta}_{NM})$$

$$H_1: P(X_{NM}'\hat{\beta}_{NM}) > P(X_M'\hat{\beta}_{NM})$$

#### *Investigating C: unexplained Muslim penalty*

Having looked at the effect of differing coefficients I augment my equation with Muslim interaction terms for any variable where the differences in coefficients are statistically significant. In addition to these I include a Muslim dummy variable to pick up any residual Muslim effect. I run my augmented model and test the coefficient on this Muslim dummy variable ( $\hat{\beta}_{Muslim}$ ) to ascertain whether there exists a “Muslim Penalty” unexplained by differences in characteristics and coefficients.

Hypothesis 7: There is no unexplained difference in employment probability that we can attribute to being Muslim once differences in characteristics and coefficients for Muslims have been taken into account.

$$H_0: \hat{\beta}_{Muslim} = 0$$

$$H_1: \hat{\beta}_{Muslim} < 0$$

## Results

	Male	Female
Mean predicted probabilities:		
$P(X_M'\hat{\beta})$	0.570	0.320
$P(X_{NM}'\hat{\beta})$	0.695	0.575
$P(X_M'\hat{\beta}_M)$	0.527	0.258
$P(X_M'\hat{\beta}_{NM})$	0.582	0.351
$P(X_{NM}'\hat{\beta}_M)$	0.569	0.439
$P(X_{NM}'\hat{\beta}_{NM})$	0.696	0.576
Total Difference:		
$P(X_{NM}'\hat{\beta}_{NM}) - P(X_M'\hat{\beta}_M)$	0.170 (73.76)**	0.318 (140.89)**
Differences in Characteristics:		
$P(X_{NM}'\hat{\beta}) - P(X_M'\hat{\beta})$	0.125 (54.14)**	0.255 (112.58)**
$P(X_{NM}'\hat{\beta}_{NM}) - P(X_M'\hat{\beta}_{NM})$	0.115 (49.77)**	0.226 (99.63)**
$P(X_{NM}'\hat{\beta}_M) - P(X_M'\hat{\beta}_M)$	0.042 (19.86)**	0.181 (90.83)**
Differences in Coefficients:		
$P(X_M'\hat{\beta}_{NM}) - P(X_M'\hat{\beta}_M)$	0.055 (72.57)**	0.093 (95.50)**
$P(X_{NM}'\hat{\beta}_{NM}) - P(X_{NM}'\hat{\beta}_M)$	0.127 (1000.00)**	0.137 (860.00)**

**Table 2 – Results (t-values in parentheses where relevant), \*\* indicates  $p < 0.01$**

Table 2 above shows average predicted probabilities for being employed calculated with different combinations of characteristics and coefficients. We can see that under every measure women have lower probabilities of being employed than men. The total difference  $P(X_{NM}'\hat{\beta}_{NM}) - P(X_M'\hat{\beta}_M)$  shows the difference in probabilities of being employed between Muslims and non-Muslims calculated with their own respective characteristics and coefficients. This is consistent with our earlier findings in showing that Muslims are less likely to be employed than non-Muslims and that this effect is greater for women than for men.

This total difference can be deconstructed into differences in characteristics and differences in coefficients. This deconstruction can be done either around those with Muslim characteristics using  $P(X_{NM}'\hat{\beta}_{NM}) - P(X_M'\hat{\beta}_{NM})$  and  $P(X_M'\hat{\beta}_{NM}) - P(X_M'\hat{\beta}_M)$  or around those with non-Muslim characteristics using  $P(X_{NM}'\hat{\beta}_M) - P(X_M'\hat{\beta}_M)$  and  $P(X_{NM}'\hat{\beta}_{NM}) - P(X_{NM}'\hat{\beta}_M)$ . Looking at the differences in characteristics section of the table we can clearly reject hypotheses 1, 5 and 6 that suggest no differences in characteristics. We conclude from these results that Muslims and non-Muslims have different characteristics and that these differences in characteristics reduce the probability of Muslims being employed relative to non-Muslims. This result holds whether common or group specific coefficients are used to do the analysis and in all cases the difference for females is greater than that for males.

Hypothesis 2 that the coefficient for Muslims and non-Muslims are equal is rejected<sup>4</sup>. Looking at the differences in coefficients section of the table we can also reject hypotheses 3 and 4 that suggest equal coefficients. We conclude that Muslim coefficients reduce predicted probability of employment regardless of whether those with Muslim or non-Muslim characteristics are used to do the comparison. Again we find the effect is greater for females than for males. Differences in coefficients imply that Muslims and non-Muslims respond differently to having the same characteristics. This can be partly attributed to cultural effects and partly to discrimination. We next turn to exploring these two factors.

We augment the model with Muslim interaction terms to account for coefficient differences and additionally include a Muslim dummy variable to pick up any residual unexplained difference associated with being Muslim. Table 3 below highlights the key results from the model<sup>5</sup>. The table displays odds ratios of being employed. Coefficients greater than one indicate that the variable has a positive impact on the odds of being employed while coefficients less than one indicate a negative impact<sup>6</sup>. Interaction terms should be multiplied by their non-interacted counterparts to get their combined impact.

	Males	Females
<b>Marital Status (Ref: Married)</b>		
Single	0.441 (-65.19)**	0.997 (-0.32)
Separated	0.623 (-36.46)**	1.144 (13.23)**
<b>Dependent Children (Ref: None)</b>		
Dependent Children	1.012 (1.20)	0.498 (-83.92)**
<b>Qualifications (Ref: None)</b>		
Level 1	2.209 (63.82)**	2.084 (72.79)**
Level 2	2.130 (64.53)**	2.633 (99.26)**
Level 3	1.676 (33.79)**	2.421 (66.08)**
Level 4/5	2.381 (71.05)**	3.329 (115.93)**
Other	1.771 (39.74)**	1.813 (37.99)**
<b>Country of Birth (ref: UK Born)</b>		
Non UK Born	1.024 (1.23)	0.903 (-6.25)**
<b>Muslim (ref: Non Muslim)</b>		
Muslim	0.505 (-9.54)**	0.266 (-16.98)**
<b>Muslim and Marital Status Interaction</b>		
Single Muslim	0.970 (-0.53)	1.466 (5.92)**
Separated Muslim	1.245 (2.47)*	0.929 (-0.89)
<b>Muslim and Qualification Interaction</b>		
Level 1 Muslim	0.860 (-2.31)*	1.920 (8.82)**
Level 2 Muslim	0.942 (-0.92)	2.025 (10.05)**
Level 3 Muslim	1.024 (0.33)	2.238 (9.96)**
Level 4/5 Muslim	1.117 (2.04)*	2.265 (12.51)**
Other Muslim	0.858 (-1.72)	1.686 (4.37)**
<b>Muslim and Country of Birth Interaction</b>		
Non UK Born Muslim	0.924 (-1.44)	0.710 (-6.37)**

**Table 3 - odds ratios of being employed, t-values shown in parentheses, \* indicates p<0.05, \*\* indicates p<0.01**

<sup>4</sup> This is tested by a likelihood ratio test comparing the log likelihood of the restricted model where coefficients are equal across the sample against the sum of the log likelihoods of the Muslim and non-Muslim subsamples estimated separately. The resulting chi2 test statistics with 42 degrees of freedom for males and females are: 980.34 and 1473.97 both highly significant with p≈ 0.

<sup>5</sup> The full regression model with diagnostics, fit and specification can be found in Appendix A.

<sup>6</sup> These odds are defined relative to a reference person who is: 33-44 year old, married, UK born, White Briton, non-Muslim, living in the South East, with good health, no qualifications and no dependent children.

The first thing to note from the table is the coefficient on the Muslim dummy variable. This shows that after controlling for characteristics and accounting for coefficient differences, being Muslim still drastically reduces the odds of being employed. The odds of a non-Muslim male being employed are double the odds of a Muslim male being employed while the odds of a non-Muslim women being employed are four times the odds of a Muslim women being employed. This clearly leads us to reject hypothesis 7 that states there is no residual Muslim effect.

The second thing to note from the table is that the Muslim interaction terms are generally statistically significant for women while they are generally insignificant for men. This suggests that the cultural factors (that we interpret these terms as representing) have a much more significant impact on female Muslim employment than on male Muslim employment.

Looking more closely at these interaction terms we see that single and married non-Muslim women have approximately equal odds of employment, while single Muslim women’s odds of being employed are about one and a half times higher than for their married counterparts. For non-Muslim women born outside the UK the odds of being employed are slightly less than for their UK born counterparts, for Muslim women born outside the UK these odds are further reduced. The impact of holding educational qualifications on the other hand seems to be much more positive for Muslim women than for their non-Muslim equivalents; this is highlighted in figure 37 below.

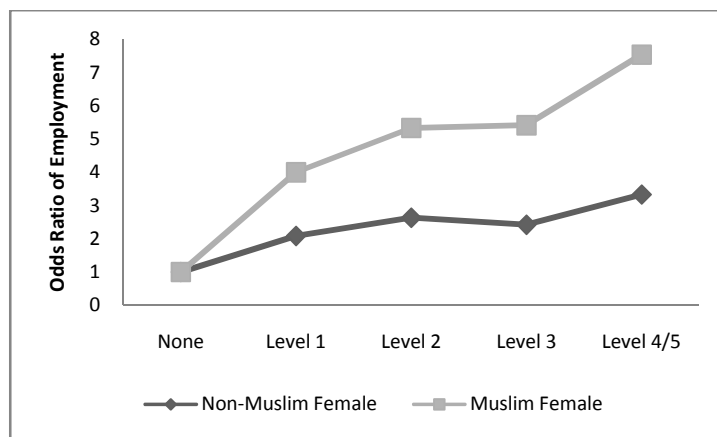


Figure 37 - odds ratio of employment by education ref: no qualifications

We have seen that a much greater proportion of Muslim women are married, born outside the UK and hold no qualifications than their non-Muslim counterparts. The negative employment impact of these factors is exacerbated by the differences in coefficients discussed above. Additionally a much greater proportion of Muslim women have dependent children, from the model results in table 3 above we see that this reduces women’s odds of employment by half.

## Conclusions

The results show that Muslims are less likely to be employed for several reasons, they happen to have characteristics (other than religion) that make them less likely to be employed, they respond to having a given set of characteristics in a way that makes them less likely to be employed than their non-Muslim counterparts and even after accounting for these two effects there is an additional penalty associated with being Muslim which can be attributed to both direct and indirect discrimination.

We now look more closely at the differences in the composition of those not employed for Muslims and non-Muslims. Figure 38 below shows this composition for males, numbers reported are percentages of the working age population. Three things stand out from this deconstruction: a much larger proportion of working age Muslim males are students (14% as compared to 5% of the whole population), a much smaller proportion are retired (4% as compared to 12%) and a much larger proportion are unemployed (11% as compared to 5%). Figure 39 shows the equivalent chart for females, the most striking thing here is the much larger proportion of Muslim women looking after home/family (33% as compared to 12%). There is also a larger Muslim women student

proportion (12% as compared to 3%), a larger proportion unemployed (6% against 3%) and a smaller proportion retired (4% as compared to 15%). For both male and female populations Muslims have a significant proportion of people not employed under the Other category (8% for Muslim men and 14% for Muslim women, against 3% as a population average). The composition of this Other category needs further investigation.

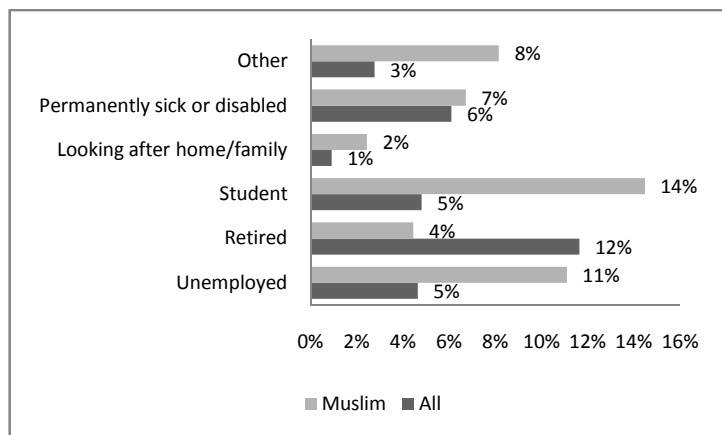


Figure 38 – Not Employed (male)

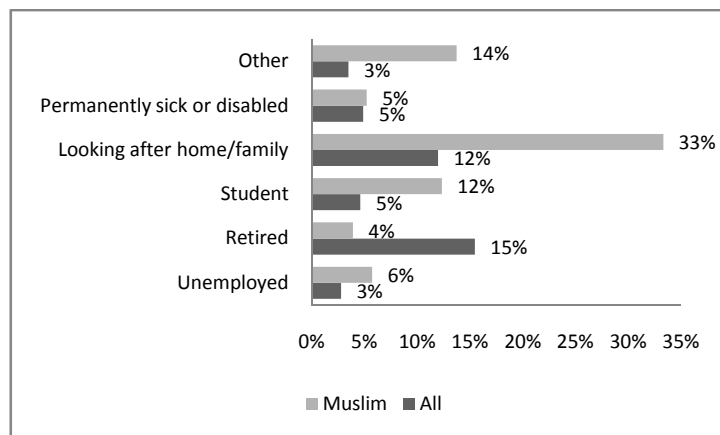


Figure 39 – Not Employed (female)

The largest group of Muslims not employed are women looking after home and family. We have already seen that Muslims are more likely to have dependent children and that having dependent children makes women much less likely to be employed. To address this we need to ensure that there is appropriate child care available to Muslim women to allow even those with dependent children to participate in the labour market.

Another noticeably large group are the Muslim unemployed. Part of this high level of unemployment can be attributed to direct and indirect discrimination. Religious discrimination should be legislated against to a similar extent that race and gender discrimination are currently legislated against. Indirect discrimination should also be tackled, this occurs where Muslims are less likely to take certain jobs due to the fact that employers do not accommodate Muslim prayer and dress requirements. Employers need to be made aware of these requirements and encouraged to cater for them. Employers should also add religion to the factors they consider when defining their diversity policies.

The majority of working age Muslims were born outside the UK, many will face language barriers or find that their foreign qualifications are not accepted by UK employers. Provision of English language training and courses to accredit foreign qualifications can be explored to remedy these effects.

My results suggest that cultural attitudes in the Muslim community, particularly around female employment may be contributing to the high numbers not employed. While it is not the role of policy to change culture it should ensure that those who want to work have adequate opportunities and advice to help them pursue employment.

The final thing to note is that being not employed is not necessarily bad, for both males and females we can see that there are a higher proportion of Muslims who are students than non-Muslims. We have also seen the importance of education in the labour market and hence can conclude this group of people are not really a cause for concern. Efforts should be made however to ensure this upcoming batch of Muslim graduates have positive role models in the workplace and that they receive appropriate career advice to maximise their chances of success in the labour market.

It is clear from this study that being Muslim has a very significant impact on employment. It would be interesting to extend this study to look at other labour market measures such as unemployment, types of employment and salaries of those employed. Another area that needs further investigation is the relationship between religion and ethnicity. These two factors are often very closely intertwined with both impacting labour market outcomes through the mechanisms of discrimination and cultural influence.

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## Appendix A: Employed Full Regression Output

The table below lists the full regression output from my model. Results are reported as odds ratios relative to the reference categories, t-values are given in parenthesis. \* indicates that the coefficient is significant at a 5% significance level, \*\* indicates that the coefficient is significant at a 1% significance level.

	Males	Females
<b>Age (Ref: 30-44)</b>		
16-19	0.157 (-114.94)**	0.354 (-68.24)**
20-24	0.473 (-47.90)**	0.527 (-44.59)**
25-29	1.000 (-0.00)	0.827 (-14.86)**
45-59	0.660 (-34.28)**	0.763 (-27.56)**
60-64	0.147 (-118.93)**	0.105 (-148.24)**
65+	0.016 (-234.31)**	0.020 (-211.12)**
<b>Health (Ref: Good)</b>		
Fairly Good	0.495 (-77.36)**	0.624 (-63.14)**
Not Good	0.074 (-199.22)**	0.146 (-152.74)**
<b>Marital Status (Ref: Married)</b>		
Single	0.441 (-65.19)**	0.997 (-0.32)
Separated	0.623 (-36.46)**	1.144 (13.23)**
<b>Dependent Children (Ref: None)</b>		
Dependent Children	1.012 (1.20)	0.498 (-83.92)**
<b>Lone Parent (Ref: Not Lone Parent)</b>		
Lone Parent	0.719 (-23.09)**	0.644 (-40.99)**
<b>Qualifications (Ref: None)</b>		
Level 1	2.209 (63.82)**	2.084 (72.79)**
Level 2	2.130 (64.53)**	2.633 (99.26)**
Level 3	1.676 (33.79)**	2.421 (66.08)**
Level 4/5	2.381 (71.05)**	3.329 (115.93)**
Other	1.771 (39.74)**	1.813 (37.99)**
<b>Country of Birth (ref: UK Born)</b>		
Non UK Born	1.024 (1.23)	0.903 (-6.25)**
<b>Migrant Status (ref: Non Migrant)</b>		
Migrant	0.740 (-25.46)**	0.687 (-36.88)**
<b>Ethnicity (ref: White Briton)</b>		
Irish	0.801 (-6.41)**	0.986 (-0.46)
Other White	0.571 (-23.23)**	0.666 (-19.82)**
Mixed	0.481 (-10.09)**	0.670 (-6.37)**
Indian	0.585 (-18.96)**	0.792 (-9.47)**
Pakistani	0.603 (-11.64)**	0.459 (-17.47)**
Bangladeshi	0.605 (-8.83)**	0.508 (-10.66)**
Other Asian	0.422 (-17.61)**	0.583 (-10.79)**
Caribbean	0.547 (-17.00)**	1.090 (2.84)**
African	0.289 (-31.72)**	0.520 (-18.90)**
Other Black	0.432 (-9.84)**	0.815 (-2.77)**
Chinese	0.389 (-18.32)**	0.539 (-13.74)**
Other	0.288 (-22.51)**	0.427 (-19.29)**



## Appendix A: Continued

	Males	Females
<b>Region (ref: South East)</b>		
North East	0.506 (-35.63)**	0.763 (-16.39)**
North West	0.635 (-31.46)**	0.900 (-8.62)**
Yorkshire and the Humber	0.696 (-22.99)**	0.935 (-5.01)**
East Midlands	0.819 (-11.87)**	0.959 (-2.95)**
West Midlands	0.783 (-15.72)**	0.948 (-4.08)**
East of England	1.006 (0.35)	0.974 (-1.98)*
South West	0.852 (-9.85)**	0.941 (-4.50)**
Inner London	0.665 (-21.26)**	0.749 (-17.14)**
Outer London	0.888 (-7.07)**	0.926 (-5.45)**
Wales	0.544 (-33.18)**	0.764 (-17.09)**
<b>Muslim (ref: Non Muslim)</b>		
Muslim	0.505 (-9.54)**	0.266 (-16.98)**
<b>Muslim and Age Interaction</b>		
16-19 Muslim	0.816 (-2.33)*	0.675 (-4.25)**
20-24 Muslim	1.143 (1.93)	1.009 (0.12)
25-29 Muslim	0.940 (-0.99)	0.760 (-4.18)**
45-59 Muslim	1.357 (5.17)**	1.447 (5.38)**
60-64 Muslim	1.732 (5.47)**	2.745 (5.31)**
65+ Muslim	3.682 (9.69)**	5.339 (6.39)**
<b>Muslim and Marital Status Interaction</b>		
Single Muslim	0.970 (-0.53)	1.466 (5.92)**
Separated Muslim	1.245 (2.47)*	0.929 (-0.89)
<b>Muslim and Lone Parent Interaction</b>		
Lone Parent Muslim	1.063 (0.81)	1.325 (4.07)**
<b>Muslim and Qualification Interaction</b>		
Level 1 Muslim	0.860 (-2.31)*	1.920 (8.82)**
Level 2 Muslim	0.942 (-0.92)	2.025 (10.05)**
Level 3 Muslim	1.024 (0.33)	2.238 (9.96)**
Level 4/5 Muslim	1.117 (2.04)*	2.265 (12.51)**
Other Muslim	0.858 (-1.72)	1.686 (4.37)**
<b>Muslim and Country of Birth Interaction</b>		
Non UK Born Muslim	0.924 (-1.44)	0.710 (-6.37)**
<hr/>		
<b>Sample Size</b>	562408	583685
<b>McFadden R<sup>2</sup></b>	0.339	0.262
<b>Count R<sup>2</sup></b>	0.827	0.761

Table 4 – odds ratios of being employed, t-values shown in parentheses, \* indicates p<0.05, \*\* indicates p<0.01

The McFadden  $R^2$  value is a measure of fit based on the difference in the log likelihood between a model with just an intercept ( $L_0$ ) and the model as defined above ( $L_1$ ).  $McFadden R^2 = 1 - \log L_1 / \log L_0$ .

The Count  $R^2$  value is a measure of fit based on the proportion of correct predictions based on our predicted probabilities. Predicted probability values less than 0.5 are interpreted as predicting not employed and values above 0.5 are interpreted as predicting employed. This classification of predicted and actual outcomes is shown for the above model in figures 40 and 41 below.

Logistic model for employed

Classified	True		Total
	D	~D	
+	364436	68993	433429
-	28316	100663	128979
Total	392752	169656	562408

Classified + if predicted  $Pr(D) \geq .5$   
True D defined as employed != 0

Sensitivity	$Pr(+ D)$	92.79%
Specificity	$Pr(- \sim D)$	59.33%
Positive predictive value	$Pr(D +)$	84.08%
Negative predictive value	$Pr(\sim D -)$	78.05%

False + rate for true ~D	$Pr(+ \sim D)$	40.67%
False - rate for true D	$Pr(- D)$	7.21%
False + rate for classified +	$Pr(\sim D +)$	15.92%
False - rate for classified -	$Pr(D -)$	21.95%

Correctly classified 82.70%

Figure 40 – Classifications of model predictions (male)

Logistic model for employed

Classified	True		Total
	D	~D	
+	294797	100354	395151
-	39075	149459	188534
Total	333872	249813	583685

Classified + if predicted  $Pr(D) \geq .5$   
True D defined as employed != 0

Sensitivity	$Pr(+ D)$	88.30%
Specificity	$Pr(- \sim D)$	59.83%
Positive predictive value	$Pr(D +)$	74.60%
Negative predictive value	$Pr(\sim D -)$	79.27%

False + rate for true ~D	$Pr(+ \sim D)$	40.17%
False - rate for true D	$Pr(- D)$	11.70%
False + rate for classified +	$Pr(\sim D +)$	25.40%
False - rate for classified -	$Pr(D -)$	20.73%

Correctly classified 76.11%

Figure 41 - Classifications of model predictions (male)

Both measures of fit indicate the model defined in this paper works better for males than for females.

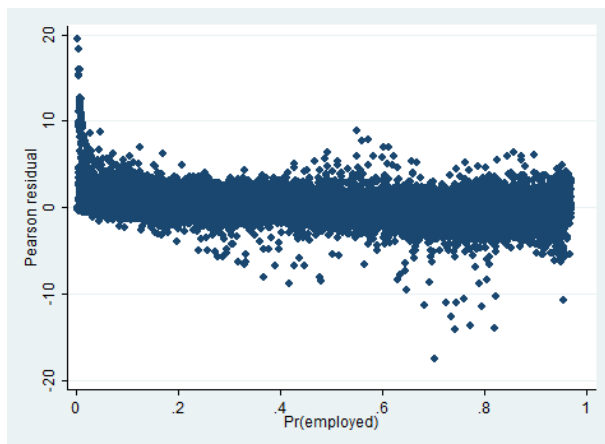


Figure 42 - Plot of residuals against predicted probabilities (male)

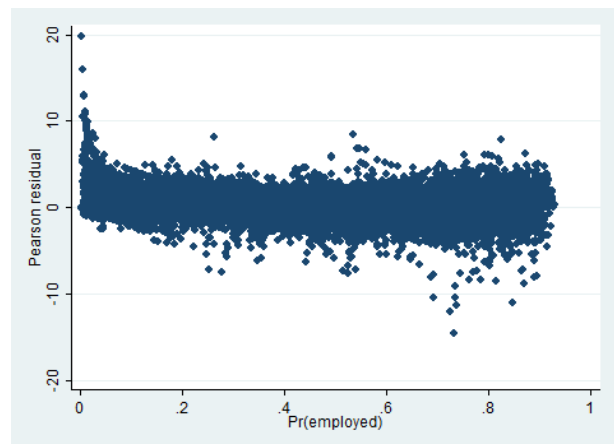


Figure 43 - Plot of residuals against predicted probabilities (female)

Figures 42 and 43 above plot the predicted probabilities and associated residuals produced by the model. Neither graph shows any unexpected pattern in the residuals to suggest that further investigation is required.