On-the-job Search and Job Competition: Relevance and Wage Impact in the UK

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The support of both the Economic and Social Research Council (ESRC) and the University of Essex is gratefully acknowledged. The work reported in this paper is part of the scientific programme of the Institute for Social and Economic Research.

ABSTRACT

In the literature job competition is often measured by the unemployment rate. By neglecting on-the-job search, however, the unemployment rate is likely to be a biased measure of job competition: various studies have suggested that on-the-job search varies over time and across groups of people, and might have a relevant impact on the outflow from unemployment. In the UK on-the-job search is a relevant phenomenon: around half of people who are actively looking for a job are employed.

This paper estimates the direct impact of job competition on individual wages in the UK using data from the quarterly Labour Force Survey over the period 1993-2005. Measures of job competition based only on the unemployment rate are compared to measures that account for on-the-job search as well as inter-regional commuting. The results suggest that failing to correctly measure labour supply and demand leads to biased estimates of the wage impact of job competition, and that estimations focusing on certain sub-groups of the population (e.g. graduates or women) might be affected by larges biases.

NON-TECHNICAL SUMMARY

In the literature job competition is often measured by the unemployment rate. The unemployment rate, however, neglects the possibility that a number of workers might be dissatisfied with their job or hold a temporary position which is close to an end, and might therefore look for a (new) job while employed. Various studies have found that on-the-job search varies over time and across groups of people, and might have a relevant impact on the outflow from unemployment. For these reasons the unemployment rate is likely to be a biased measure of job competition; the bias might vary in a complex way over the business cycle and across groups of people.

In the UK on-the-job search is a relevant phenomenon: less than half of people who are actively looking for a job are unemployed; the other half engages in on-the-job search.

This paper estimates the direct impact of job competition on wages using data from the UK Labour Force Survey over the period 1993-2005. Measures of job competition based only on unemployment are compared to measures taking into account on-the-job search as well as inter-regional commuting. The wage impact of job competition is estimated for the whole population and by groups of workers.

The results suggest that job competition has a negative impact on wages, and that failing to correctly measure labour supply and demand might lead to an overestimation of the wage impact of job competition. Measuring job competition by the total unemployment rate often generates an overestimation of the negative impact that job competition has on wages, but the overestimation is reduced when the unemployment rate is computed by skill groups. Including on-the-job search by a 'search rate' – computed by skills by adding on-the-job search to unemployment – generates estimates that are very similar to the ones computed using the skill-specific unemployment rate. When job competition is estimated by measuring both labour supply and demand, however, the impact on wages is consistently smaller.

The estimations of the wage impact of job competition are fairly robust across the different measures only for some sub-groups of the population (e.g. men, workers with no qualification); for the other sub-groups (e.g. women, workers with high education), changes in the way of measuring job competition lead to rather unstable estimated impacts on wages.

The results also seem to suggest that job competition might have a slightly bigger impact on some groups (e.g. married workers) than others (e.g. unmarried workers).

1. INTRODUCTION

A number of empirical studies analyse the relationship between labour market conditions and wages. For example, Beaudry and DiNardo (1991) test different theories relating individual wages to labour market conditions in the US. Their analysis is expanded by Grant (2003), replicated for Canada by McDonald and Worswick (1999), and for the UK by Devereux and Hart (2005). In all these studies labour market conditions are measured by the unemployment rate. Likewise, in the wage curve literature (e.g. Blanchflower and Oswald, 1994) the negative relationship between wages and the regional unemployment rate is explained by efficiency wage and labour turnover costs theories (Card, 1995), which interpret unemployment rate as a measure of job competition.

The unemployment rate is likely to be a biased measure of job competition since it neglects the possibility that a number of workers might be dissatisfied with their job or hold a temporary job which is close to an end, and might therefore engage in on-the-job search. For the US Blau and Robins (1990) find that individuals who look for a job while working receive more job offers than the unemployed. Using British data Burgess (1993) finds that in periods of 'high hiring' on-the-job search tends to increase and to reduce the outflow from unemployment. Similar results have been found, among others, for the Netherlands (Broersma, 1997) and Sweden (Eriksson and Lagerstrom, 2004).

In the UK half of people who are actively looking for a job is already employed and engages in on-the-job search. Using data from the 1984 UK Labour Force Survey, Pissarides and Wadsworth (1994) model the decision process leading to on-the-job – versus unemployment – search. They find that on-the-job search is lower among workers in full-time jobs with long tenure, and that some groups of workers do more on-the-job search than others. This suggests that the unemployment rate is likely to underestimate the level of job competition. Further, this bias might vary in a complex way over the business cycle and across groups of people. Job competition might have different impacts on wages of people with different individual characteristics; for example, workers with similar qualification and experience might be affected in a different way, depending on their degree of geographical mobility. Women, people who own their house, are married and/or have children might face local labour markets that are geographically smaller than people who rent, are not married and/or have no children, and might therefore engage differently in on-the-job search.

Because it neglects such different propensities for on-the-job search, the bias of the unemployment rate might be larger for certain sub-groups of the population.

This paper estimates the direct impact of job competition on individual wages in the UK using data from the quarterly Labour Force Survey for the period 1993-2005. Measures of job competition based only on unemployment are compared to measures taking into account on-the-job search as well as inter-regional commuting. The wage impact of job competition is estimated for the whole population as well as by education, gender, and sub-groups of workers. The findings suggest that the total unemployment rate, which assumes perfect substitutability of people with different skills, often overestimates the impact that job competition has on individual wages; such an overestimation is reduced when the unemployment rate is computed by skill groups. The estimated wage impact of the 'search rate' – computed by skills by adding on-the-job search to unemployment – is rather similar to the one obtained with the skill-specific unemployment rate. When job competition is estimated by measuring both labour supply and demand, the impact on wages is consistently smaller than the estimates obtained with the other measures. The estimated wage impact of job competition seems to be fairly robust across the different measures only for certain sub-groups of the population: men, workers with no qualification. For the other sub-groups (e.g. women, workers with high qualification) changes in the way of measuring job competition might lead to rather unstable estimated wage impacts.

2. MEASURING LABOUR SUPPLY AND DEMAND

The unemployment rate as a measure of job competition is often interpreted in terms of excess supply of labour, and relies on the assumption that there is no on-the-job search or unsatisfied demand. In this paper labour market conditions will be instead computed by measuring both labour supply and demand.

The literature has suggested different ways to measure labour supply and demand. Murphy and Welch (1992) are among the first who explicitly model both. Using data for the US they measure supply by hours worked, and compute demand by multiplying the matrix of second partial derivatives of the production function by the supply matrix. Similarly, Katz and Murphy (1992) measure supply using employment and hours worked in the aggregate economy, and demand by means of the occupation-industry structure of employment. A similar approach is also used to analyse male wage inequalities in the US and other nine

OECD countries by Blau and Kahn (1996) and more recently by Leuven et al. (2004). In these two studies the supply index is computed to be proportional to each skill group in the labour force, while the demand index is a measure of the degree to which the occupation-industry structure favours certain skill groups over the others. Both indices are computed using data on employment and the labour force. Barth and Lucifora (2006) estimate supply by the labour force participation rate and demand by employment rates.

Maybe because of lack of data, these studies make strong assumptions in order to estimate supply and demand. They assume that individuals have complete control over the number of hours that they want to supply; unemployed do not enter the equation since they have decided to supply zero hours. In this paper labour supply is measured by the number of workers who are actively looking for a (new) job;[1] while demand in period t is measured by the number of persons hired in period $t+1$. The wage impact of job competition is then estimated in the framework of a Mincer regression.

3. DATA

The data used in this analysis is the quarterly LFS for the UK from winter 1992/1993 to winter 2005/2006. Individuals are interviewed in five successive quarters. Up to winter 1996/1997, earning questions were asked only in the final interview, while from spring 1997, questions on earnings are also asked in the first interview (Office for National Statistics, 2003), however, only wage data collected from the first interview is used here. This paper focuses on employees aged between 16 and 70, who earn between 2£ and 100£ per hour.

Individuals are grouped into four broad levels of education depending on the highest qualification they have obtained (q). All individuals with first order degrees, higher degrees, and other degrees are included in the "high qualification" group, while all individuals with diplomas in higher education, teaching, nursing and other diplomas are included in the "intermediate/high qualification" group. Individuals with A-levels are in the "intermediate qualification" group, and all individuals who only completed compulsory education are included in the "no qualification" group.

Since workers with similar education but different levels of experience are unlikely to be close substitutes (e.g. Welch, 1979; and Card and Lemieux, 2001), workers are also

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[1] Search intensity might vary across individuals, and might have an influence on the arrival rate of job offers to the individual. It should not, however, have an influence on the aggregate level of job competition.

classified into four groups of potential experience. Potential experience is computed as the difference between age and the age at which full time continuous education has been completed. Years of potential experience are then divided into four groups: 0-5 years; 6-15 years; 16-30 years; and more than 30 years. Such groups should reduce the problem that potential experience might be over-estimated for women, who are more likely than men to have career interruptions (e.g. Fitzenberger and Wunderlich, 2004).

Finally, occupations are defined as the major – one digit – groups of the 1990 Standard Occupations Classification, while industries are defined as the major divisions – one digit – of the 1980 Standard Industrial Classification (see Office for National Statistics, 2003, Vol. 5 for more details).

4. MEASURING JOB COMPETITION

4.1. Unemployment Rate

The most common measure of job competition is the unemployment rate, which assumes that all – and only – unemployed people look for a job (see e.g. Beaudry and DiNardo, 1991; Bell et al., 2002). The first measure of job competition is therefore the total unemployment rate, which is computed here by dividing the number of unemployed by the number of individuals in the active population.[2] Descriptive statistics for the total unemployment rate are shown in Table 1. The total unemployment rate ranges from a minimum of 4.76 percent in 2001, to a maximum of 10.49 percent in 1993, with a mean of 6.39 and a standard deviation of 1.53.

TABLE 1 ABOUT HERE

The total unemployment rate as a measure of job competition relies on the assumption of a non-segmented labour market in which individuals with different qualifications and labour market experience might all compete for the same jobs. However, although individuals with high qualifications might have the option of working in jobs requiring qualifications lower than what they have achieved; individuals with low qualification might not be allowed to apply for jobs requiring higher qualifications. Furthermore, there is a low degree of substitutability across different levels of experience (e.g. Welch, 1979; Card and

Lemieux, 2001). The second way to measure job competition, therefore, assumes a segmented labour market and computes the unemployment rate separately by qualifications q and experience groups e:

$$Ur_{eqt} = \frac{U_{eqt}}{AP_{eqt}} \tag{1}$$

where U_{eqt} is the number of individuals in experience group e and with qualification q who are unemployed at time t. AP_{eqt} is the number of individuals in experience group e and with qualification q in the active population at time t.

As might be expected, the unemployment rate computed by skill levels shows a larger variability than the total unemployment rate, ranging from a minimum of 1.25 percent to a maximum of 21.64 percent (see Table 1).

4.2. On-the-job Search

By neglecting on-the-job search, a measure that is computed only on the unemployed might systematically underestimate the level of job competition in the local labour market. Furthermore, if the proportion of employed who search a job varies by skills or over time (e.g. Burgess, 1993; Pissarides and Wadsworth, 1994; Broersma and van Ours, 1999), the amount of underestimation will vary over time and across groups of people.

The LFS collects information on whether the respondent is (actively) looking for a job; the question is asked of both the unemployed and of workers who already have a job. In this analysis labour supply is computed as the number of persons, either classified in the active population or who are only temporarily inactive, who are actively looking for a job. This variable is used as a proxy for the number of individuals who might be in competition for the same jobs. According to the LFS, in 2005 in the UK almost 10 percent of the active population is actively looking for a job; 45 percent of these are unemployed, while 50 percent are already employed. The remaining 5 percent are either self-employed, individuals in government training programs or unpaid family workers.

The easiest way to account for on-the-job search is by computing a 'search rate' (e.g. Pannenberg and Schwarze, 1998) in which the number of people looking for a job is divided by the active population:

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[2] The active population is measured here as the sum of the number of employees, self-employed, workers participating in government training programs, unpaid family workers, and unemployed. All measures of job competition are computed taking into account 'person-weights' (see Office for National Statistics, 2003).

$$Sr_{eqt} = \frac{S_{eqt}}{AP_{eqt}} \tag{2}$$

where S_{eqt} measures supply of workers with qualification q and potential experience e at time t, and AP_{eqt} is the active population. The search rate ranges from 4.19 percent to 32.07 percent and is systematically higher than the unemployment rate; its mean is 12.01 and its standard deviation 5.42. The search rate accounts for the fact that in booming periods the number of people engaging in on-the-job search might increase (Burgess, 1993), but neglects that also labour demand increases in booming periods, and that job-to-job transitions have an impact on the number of vacancies. A correct measure of job competition should therefore also take into account labour demand.

Since the LFS provides data on the month and year in which each worker started his/her current job, the number of vacancies (demand) can be estimated by the number of workers hired in the successive quarter. Since unemployment is often interpreted as the difference between labour supply and demand, a further measure of job competition can then be computed by skill levels as the difference between labour supply and demand divided by the active population:

$$C_{eqt} = \frac{S_{eqt} - D_{eqt}}{AP_{eqt}} \tag{3}$$

where D_{eqt} measures demand for workers with potential experience e and qualification q at time t; S_{eqt} measures supply; and AP_{eqt} is the active population. An increase in C_{eqt} indicates an increase in job competition among workers in a specific local labour market and vice versa. The index ranges between minus 1 and plus 1, increases following an increase in the supply, and decreases following an increase in the demand. Positive values indicate excess supply, while negative values indicate excess demand. As shown in Table 1, C_{eqt} ranges from minus 9.31 percent to 19.42 percent, with a mean of 5.28 and a standard deviation of 3.20.

4.3. Migration and Commuting

The measure in equation (3) considers the whole country as one single labour market. However, workers are unlikely to commute very long distances to work, since a job located too far from the place of residence would require inter-regional migration. High migration costs are likely to decrease the attractiveness of a job located far from the place of residence, ceteris paribus. Since workers are likely to give lower weight to jobs that are far away, competition in a regional labour market where the worker is unlikely to commute to work

should be given a lower weight than competition in a region where the worker is likely to commute. The measure of job competition should therefore also take into account inter-regional commuting: the national labour market should be segmented into local labour markets in which a high weight is given to close labour markets, while distant local labour markets are given a lower weight.

The LFS collects information on both the place of residence and of work; it allows the identification of 19 regions[3] and of commuting flows across them. Job competition can therefore be measured in the following way:

$$^{W}C_{eqrt} = \frac{\sum_{j} {}^{I}w_{rj}S_{eqrt} - \sum_{j} {}^{o}w_{rj}D_{eqrt}}{AP_{eqt}} \tag{4}$$

where S_{eqrt} measures supply of workers with qualification q and potential experience e living in region r at time t; and D_{eqrt} measures demand in region r at time t for workers with experience e and qualification q. While in the measure of supply the index r refers to the region where the person lives, in the measure of demand it refers to the region where the job is. The supply is weighted by the flow of incoming commuters (${}^{I}w_{rj}$) to capture the number of workers who might compete for jobs available in the region: the supply in the neighbouring regions increases supply in region r proportionally to the flow of workers commuting to the region. Similarly, the demand is weighted by the flow of outgoing commuters (${}^{o}w_{rj}$) to capture the number of vacancies that might be available for residents: the demand in the neighbouring regions increases the possibility of residents of a certain region to find a suitable job within a reasonable commuting distance.

Since the flows of commuters seem to be rather stable over time, the weights are computed as the average number of commuters over the whole period. Supply and demand in the region of residence are given weights equal to one; the remaining weights are computed as the number of commuters rescaled by the number of workers who live and work in the region. The maximum inter-regional incoming-commuters weight is equal to 0.291 for commuters from the Rest of the South East to London; while the maximum inter-regional outgoing-commuters weight is equal to 0.197 for commuters from the Rest of West Midlands to West Midlands Metropolitan.

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[3] These are: Tyne & Wear; Rest of Northern Region; South Yorkshire; West Yorkshire; Rest of Yorks & Humberside; East Midlands; East Anglia; London; Rest of South East; South West; West Midlands Metropolitan; Rest of West Midlands; Greater Manchester; Merseyside; Rest of North West; Wales; Strathclyde; Rest of Scotland; and Northern Ireland. Data on the region of work is not available in all quarters,

By definition, the weighted measure of competition $^WC_{eqrt}$ has a lower variability than the unweighted measure C_{eqt}: $^WC_{eqrt}$ ranges from a minimum of minus 2.95 percent to a maximum of 4.55 percent, with a mean of only 0.47 percent, which might suggest equilibrium of labour supply and demand across regional labour markets.

5. WAGE IMPACT OF JOB COMPETITION

5.1. Empirical Estimations

The impact of job competition on wages is estimated by a modified Mincer equation on individual data:

$$\ln w_{it} = \alpha + \beta_1 \, JobCompetition_{(t-1)} + \beta_2 \, JobCompetition^2_{(t-1)} +$$

$$\mathbf{X}_{it}\, \gamma + \mathbf{Q}_{it} + \mathbf{E}_{it} + \mathbf{O}_{it} + \mathbf{I}_{it} + \mathbf{W}_{it} + \mathbf{T} + \varepsilon_{it} \tag{5}$$

where the dependent variable is the natural log of hourly wages of individual i at time t (w_{it}); and $JobCompetition_{(t-1)}$ is one of the measures discussed in the previous section. Equation (5) assumes that wages are affected by contemporaneous job competition consistently with a spot market model. Although this would be inconsistent with the findings by Beaudry and DiNardo (1991), it is nevertheless in line with the findings by Grant (2003) for the US, and by Devereux and Hart (2005) for the UK. Both Grant (2003) and Devereux and Hart (2005) suggest that labour market conditions affect wages in a way which is more consistent with a standard spot market model than with a contract model.

The job competition index is lagged one quarter to avoid problems of endogeneity that might arise if employment decisions of firms depend on job competition itself, and the square of the job competition measure is added to partly capture non-linearity. The vector $\mathbf{X}_{it}$ contains individual characteristics such as gender, age, years of education, years of tenure on the job, a dummy for part-timers, and a dummy for whether married. $\mathbf{E}_{it}$ contains dummies for potential experience of individual i; $\mathbf{Q}_{it}$ dummies for qualification; $\mathbf{O}_{it}$ dummies for occupation; and $\mathbf{I}_{it}$ dummies for the industry in which individual i is employed at time t. $\mathbf{W}_{it}$ are dummies for the region where the job is located and $\mathbf{T}$ are dummies for year and quarter of the interview.

Equation (5) is estimated by OLS after pooling all observations, and the standard errors account for within group correlations (e.g. Moulton, 1990); the results are shown in

the results below refer to the period 1993-2006, with the exclusion of the winter quarters from 1993 to 1997, the spring quarter of 1993, the summer quarters from 1993 to 1996, and the summer quarter of 1999.

Table 2. The model in column (1) measures job competition by the total unemployment rate; the model in column (2) measures it by the unemployment rate segmented by experience and qualification groups. Job competition is measured in column (3) by the search rate, in column (4) by the unweighted competition measure of equation (3), and in column (5) by the weighted competition measure of equation (4).[4]

<center>TABLE 2 ABOUT HERE</center>

All measures of job competition have a negative impact on individual wages, thus suggesting that on average similar individuals are paid differently depending on the level of job competition in the labour market. The coefficient of the total unemployment rate in the first column of Table 2 is -7.588 although it is not statistically significant. When the unemployment rate is segmented by skills, its regression coefficient is statistically significant but is only -2.464, suggesting that a measure that assumes a non-segmented labour market might overestimate the overall impact that job competition has on wages. These coefficients are in line with what has been found for the US by Beaudry and DiNardo (1991) and Grant (2003), and only slightly larger than what has been found in the UK by Devereux and Hart (2005). Accounting for on-the-job search by means of the search rate leads to a regression coefficient which is slightly higher than the one estimated with the skill-specific unemployment rate; while the measure of job competition that combines labour supply and demand has a much smaller regression coefficient than the search rate. The measure that takes into account inter-regional commuting (column (5)) suggests a wage impact which is higher than the one estimated by the unweighted measure (column (4)), but it is still consistently smaller than the one computed by the unemployment rate. In summary, Table 2 suggests that failing to correctly measure labour supply and demand in the local labour market might lead to an overestimation of the wage impact of job competition.

The aggregated nature of the analysis in Table 2 might conceal differences in the impact that job competition has on wages of different groups of the population. The next sub-sections estimate the impact of the different measures of job competition on wages of workers with different qualification, gender and household characteristics.

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[4] The regressions are computed here only on workers employed in the private sector (both full-time and part-time). Including workers employed in the public sector – or using only full-time workers – does not affect the conclusions of this paper. As a sensitivity analysis the wage equations have also been estimated by giving

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5.2. Qualifications

In the UK on-the-job search seems to be lower among workers with lower qualifications. Among people with high qualification who are looking for a job, 28.7 percent are unemployed, while 64.5 percent are employed. The proportion of on-the-job search among people with intermediate/high qualification is 61.7; 51.0 among those with intermediate qualification; and only 36.4 percent among those with no qualification.[5] This clearly suggests that neglecting on-the-job search is likely to generate a bias in the estimation of the wage impact of job competition, but the bias should be larger for workers with high than for workers with no qualification.

Table 3 shows estimates of the impact of job competition computed separately for workers with a degree (high qualifications) and for those who only completed compulsory schooling (no qualifications). The analysis focusing on workers with high qualifications shows that the estimated wage impact varies widely depending on the way job competition is measured. The regression coefficient of the total unemployment rate in column (1) is -7.658; but when the labour market is segmented by skills the estimated wage impact is much lower. The regression coefficient of the search rate is very similar to the regression coefficient of the skill-specific unemployment rate (-5.347 and -5.145 respectively), but appears to be estimated more precisely. The two measures that include both labour supply and demand estimate a much smaller wage impact of job competition. Analyses focusing on workers with no qualifications would instead be more robust to changes in the way job competition is measured. Among the skill-specific measures, the estimated coefficient would range from -5.265 of the unemployment rate, to -3.992 of the weighted competition measure. These results suggest that failing to correctly measure labour supply and demand might generate a bias in the estimation of the wage impact of job competition, and that this bias is much bigger for workers with high qualifications.

Although the comparison of the wage impact of job competition across groups is not the focus of this paper, it is worthwhile to mention that the skill-specific unemployment rate in column (2) would suggest that the wage impact of job competition is very similar for the two groups. The search rate would instead suggest that a bigger impact on workers with high

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lower weight to part-time jobs and to people who declare that they are looking for a part-time job. Again, the results are qualitatively similar and do not affect the conclusions of this paper.

[5] The data also suggests relevant changes in the proportion of on-the-job search over time by qualification groups. A detailed analysis of such differences and trends is left for future researches.

qualifications, while the two competition measures would lead to the conclusion that job competition has a bigger impact on wages of workers who only completed compulsory schooling.

<div align="center">TABLE 3 ABOUT HERE</div>

Restricting the measure of job competition to the regional – rather than the national – level might be inappropriate for highly qualified workers, who are generally more mobile than workers with lower qualifications (e.g. Ritsila and Ovaskainen, 2001; Wozniak, 2006). The unweighted competition measure might be better for highly qualified/highly mobile workers; while the weighted measure might be a better indicator of job competition for workers with lower qualification. Also the combined interpretation of columns (4) and (5) suggests that workers with no qualifications are more affected by job competition than workers with higher qualifications. This result might be interpreted in terms of efficiency wages theories (e.g. Campbell and Orszag, 1998): if the cost of hiring highly qualified workers is high, by avoiding an excessive drop in their wages in periods of labour market slackness, firms might discourage highly qualified workers from engaging in on-the-job search and eventually quit. These mechanisms might be less important for workers with no qualifications, who are cheaper to hire, and less likely to engage in on-the-job search. Further research is however needed to test the robustness of these findings to the inclusion of cross-group effects.

Finally, if a higher proportion of highly educated workers corresponds to a lower proportion of workers with no education, an increase in the number of graduates would reduce their wages and increase wages of workers with no qualification (but same experience), thus contributing to a reduction of wage disparities.

5.3. Gender
Although the measures of job competition are computed using both men and women, job competition might have a different impact on men and women. On average, among men who are looking for a job 40.9 percent are already employed. For women the proportion of on-the-job search is 48.8 percent. Although gender differences are lower than differences across qualification groups, also in this case we might expect the unemployment rate to be a biased measure of job competition; the bias being bigger for women than for men.

Table 4 estimates the impact of job competition by gender. As before, the total unemployment rate tends to overestimate the wage impact of job competition; such bias reduces when the unemployment rate is computed by skill groups. Including on-the-job search by means of the search rate increases the regression coefficient slightly (more for women than for men), but when both labour supply and demand are accounted for, the estimated wage impact of job competition is somewhat reduced. Failing to correctly measure job competition seem to lead to a biased estimate of its impact on wages; analyses focusing on women are likely to be affected by a larger bias than analyses focusing on men only.

The first three columns of Table 4 suggest that the negative wage impact of job competition is much bigger for women than for men, while the competition measures show only small differences between men and women (although the coefficients for men seem to be estimated more precisely than the coefficients for women).

TABLE 4 ABOUT HERE

If women are more likely than men to be tied migrants (or tied stayers), the unweighted measure of job competition is probably more appropriate for men, while the weighted measure is more appropriate for women. The combined interpretation of columns (4) and (5) might suggest a bigger negative impact of job competition on wages of women, who in some cases might be forced to move to regions offering sub-optimal labour market conditions for their skills. A different impact on women might suggests that men and women might react differently to job competition, and that job competition in a certain skill group might have an impact on gender wage disparities.

5.4. More versus Less Mobile Workers

Because of different migration costs, some workers might face local labour markets that are geographically smaller than those of other workers. For example, people who own the house where they live are likely to have substantially higher moving costs than those who rent (e.g. Munch et al., 2006b; Nivalainen, 2004). We might expect it to be relatively easy for renters to migrate to different areas if they fear that too much competition from other workers will reduce their wages.[6] In a similar way, married workers as well as workers with dependent

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[6] Since the data does not allow a clear identification of who is living in council houses, the hypothesis that owners are less mobile than renters relies on the assumption that people living in council houses – who

children are likely to have higher moving costs than singles or workers with no dependent children. Compared to more mobile individuals, those with higher moving costs might have lower reservation wages for jobs in the local labour market but higher reservation wages for jobs located in distant labour market which would require a change of residence. Because of the size – and therefore the amount of opportunities – in their local labour market, more and less mobile workers might engage differently in on-the-job search.

Consistently with the theoretical model of Munch et al. (2006a), the data suggests that home owners engage in on-the-job search more than renters. On average, among home owners who are looking for a job 53.9 percent already has a job; among those who rent their house on-the-job search is only 29.8 percent. This might either suggest that in the UK owning a house might not significantly reduce workers' mobility, or that, because of the mobility constraints, owners are forced into more on-the-job search than renters. Similarly, while married people seem to engage in on-the-job search more than non married people do, there seem to be no difference between people with and without dependent children. On-the-job search is 51.4 percent among married people, and only 39.8 percent among those who are not married; 43.4 percent among those with, and 44.7 percent among those without dependent children.

Table 5 estimates the impact of job competition on wages of different groups of workers. The first panel compares workers who own their house to those who rent it, while the second compares workers who are married – or live as a couple – to those who are singles, divorced or widowed. The third panel compares workers with dependent children under the age of 16, to those without. The table shows the wage impact of the weighted measure of job competition for those workers who – by definition – are less mobile (workers who own their house, those who are married, and those with dependent children), and the unweighted measure for more mobile workers (those who rent their house, those who are not married, and those without dependent children).

Consistently with the previous results, Table 5 shows that the total unemployment rate tends to overestimate the wage impact of job competition, although the coefficient is not statistically significant. The regression coefficient of the group-specific unemployment rate is often slightly lower than the regression coefficient of the search rate; however, when the

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probably have very low geographical mobility – are only a small proportion of the individual included in the analysis.

measure accounts for both labour supply and demand, the estimated wage impact of job competition reduces even further.

<center>TABLE 5 ABOUT HERE</center>

We would expect job competition to have a bigger negative impact on wages of those workers who are more tied to a certain location, than on wages of workers who can easily move to other locations. The results in Table 5 are broadly in line with the expectation of a bigger impact on wages of workers who own their house than on wages of workers who rent it; on wages of married than non married workers, and on wages with workers with – than without – dependent children. One possible conclusion is that workers who own their house, are married, or have dependent children might be prepared to suffer higher wage losses before moving to regions where competition is lower and wages comparatively higher. Further research would be needed to analyse the relationship between wage inequalities, job competition, and mobility.

6. CONCLUDING REMARKS

In the literature, job competition is often measured by the unemployment rate, thus neglecting on-the-job search (e.g. Beaudry and DiNardo, 1991; Grant, 2003; Devereux and Hart, 2005). In this paper job competition is measured after taking into account on-the-job search as well as inter-regional commuting; the results are compared to more 'traditional' measures including only unemployment. The wage impact of job competition is estimated using data from the Labour Force Survey for the period 1993-2005 for the whole population as well as by education, gender, and sub-groups of more and less mobile workers. The findings suggest that job competition has a negative but unequally distributed impact on wages, and that failing to correctly measure labour supply and demand leads to biased results. While the total unemployment rate tends to overestimate the wage impact of job competition, the overestimation seems to reduce when the labour market is segmented by skills. Including on-the-job search by means of a search rate produces regression coefficients that are very similar to the ones obtained using the skill-specific unemployment rates. The estimated wage impact of job competition is further reduced when the measure of job competition accounts for both labour supply and demand. Finally, the impact that job competition has on wages

<center>14</center>

seems to be robust across the different measures only for certain sub-groups of the population (e.g. men, or workers with no qualification). For the other sub-groups (e.g. women, or workers with high qualification) changes in the way of measuring job competition lead to rather unstable estimated wage impact of job competition.

This paper is also indirectly related to the literature analysing inequalities across skill groups (e.g. Katz and Murphy, 1992; Card and Lemieux, 2001; Autor et al., 2005). Although the focus of this paper is not on group comparisons, the results suggest that job competition has a bigger impact on workers who only completed compulsory schooling than on workers with a degree; on married than on non-married workers; on workers with dependent children than on workers without; and on workers who own – as opposed to – rent the house where they live, thus suggesting that people who are less mobile might suffer more from job competition than people who are more mobile. A bigger impact on women might suggest that job competition in a certain skill group might have an impact on gender wage disparities. Further research is however needed to analyse which groups are more likely to engage in on-the-job search. Furthermore, since more and less mobile individuals might be affected differently by job competition, future research is also needed to analyse the relationship between wage inequalities, job competition, gender and mobility.

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Table 1: Measures of job competition in the local labour market

Observations: 1581736	Mean	Standard Deviation	Min	Max
Unemployment Rate	0.0639	0.0152	0.0476	0.1049
Unemployment Rate by Skill	0.0560	0.0365	0.0125	0.2164
Search Rate	0.1201	0.0542	0.0419	0.3207
Competition (Unweighted)	0.0528	0.0320	-0.0931	0.1942
Competition (Weighted)	0.0047	0.0053	-0.0295	0.0455

Table 2: Impact of job competition on log wages

Dep. Variable: Ln hourly wages	(1) Unemployment Rate	(2) Unemployment Rate by Skill	(3) Search Rate	(4) Competition Unweighted	(5) Competition Weighted
Job Competition	-7.588	-2.464***	-2.744***	-0.407**	-0.922*
	(6.559)	(0.698)	(0.717)	(0.190)	(0.544)
Adjusted R^2	0.549	0.545	0.545	0.544	0.544
Observations: 240747					

OLS; the standard errors, in parenthesis, correct for correlation within groups; *** significant at 1 %; ** significant at 5%; * significant at 10%; other explanatory variables: the square of the job competition index; dummies for gender; age; years of tenure; a dummy for whether married; a dummy for whether working part-time; industry and regional dummies; dummies for experience group and for qualification level; dummies for year and for quarter of the survey.

Table 3: Impact of job competition on log wages by qualification group

Dep. Variable: Ln hourly wages	(1) Unemployment Rate	(2) Unemployment Rate by Skill	(3) Search Rate	(4) Competition Unweighted	(5) Competition Weighted
	Workers with High Qualification				
Job Competition	-7.658	-5.145*	-5.347**	-1.650**	-1.542*
	(5.428)	(3.074)	(2.602)	(0.688)	(0.922)
Adjusted R^2	0.462	0.456	0.457	0.456	0.455
Observations: 35836					
	Workers with No Qualification				
Job Competition	-7.138	-5.265***	-4.133***	-4.180***	-3.992**
	(7.729)	(1.741)	(1.427)	(1.221)	(2.027)
Adjusted R^2	0.426	0.421	0.420	0.421	0.419
Observations: 121873					

OLS; the standard errors, in parenthesis, correct for correlation within groups; *** significant at 1 %; ** significant at 5%; * significant at 10%; other explanatory variables: the square of the job competition index; dummies for gender; age; years of tenure; a dummy for whether married; a dummy for whether working part-time; industry and regional dummies; dummies for experience group; dummies for year and for quarter of the survey.

Table 4: Impact of job competition on log wages by gender

Dep. Variable: Ln hourly wages	(1) Unemployment Rate	(2) Unemployment Rate by Skill	(3) Search Rate	(4) Competition Unweighted	(5) Competition Weighted
	Men				
Job Competition	-5.954	-2.346***	-2.442***	-0.484**	-1.196**
	(5.445)	(0.630)	(0.653)	(0.193)	(0.501)
Adjusted R^2	0.516	0.512	0.512	0.512	0.511
Observations: 130358					
	Women				
Job Competition	-10.627	-3.278***	-3.793***	-0.419*	-1.148
	(8.113)	(0.839)	(0.845)	(0.244)	(0.732)
Adjusted R^2	0.501	0.496	0.496	0.494	0.494
Observations: 110389					

OLS; the standard errors, in parenthesis, correct for correlation within groups; *** significant at 1 %; ** significant at 5%; * significant at 10%; other explanatory variables: the square of the job competition index; dummies for age; years of tenure; a dummy for whether married; a dummy for whether working part-time; industry and regional dummies; dummies for experience group and for qualification level; dummies for year and for quarter of the survey.

Table 5: Impact of job competition on log wages, more and less mobile workers

Dep. Variable: Ln hourly wages	(1) Unemployment Rate	(2) Unemployment Rate by Skill	(3) Search Rate	(4) Competition a = Unweighted b = Weighted
Home Owners				
Job Competition	-7.651	-2.561***	-2.738***	-0.863 [b]
	(6.315)	(0.727)	(0.746)	(0.203)
Adjusted R^2	0.550	0.546	0.546	0.545
Observations: 192793				
Home Renters				
Job Competition	-8.211	-1.983***	-2.046***	-0.699*** [a]
	(7.216)	(0.659)	(0.706)	(0.190)
Adjusted R^2	0.466	0.461	0.461	0.461
Observations: 47911				
Married				
Job Competition	-10.166	-4.755***	-4.727***	-3.235*** [b]
	(6.907)	(0.909)	(0.943)	(1.143)
Adjusted R^2	0.549	0.545	0.545	0.543
Observations: 135647				
Not Married				
Job Competition	-4.790	-1.406***	-1.818***	-0.154 [a]
	(6.144)	(0.528)	(0.548)	(0.127)
Adjusted R^2	0.536	0.532	0.532	0.531
Observations: 105100				
With Dependent Children				
Job Competition	-3.034	-3.135***	-3.276***	-0.678 [b]
	(4.401)	(1.019)	(1.025)	(0.775)
Adjusted R^2	0.575	0.572	0.572	0.572
Observations: 93479				
Without Dependent Children				
Job Competition	-10.491	-2.206***	-2.520***	-0.343** [a]
	(8.041)	(0.681)	(0.726)	(0.175)
Adjusted R^2	0.531	0.526	0.526	0.526
Observations: 147268				

OLS; the standard errors, in parenthesis, correct for correlation within groups; *** significant at 1 %; ** significant at 5%; * significant at 10%; other explanatory variables: the square of the job competition index; dummies for gender; age; years of tenure; a dummy for whether married (where appropriate); a dummy for whether working part-time; industry and regional dummies; dummies for experience group and for qualification level; dummies for year and for quarter of the survey.