Travel-to-work. Which factors matter? An analysis on regional labor markets in the UK

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Abstract

The study focuses on the role of positive and negative monetary incentives in stimulating infra and inter-regional mobility (through commuting behaviors) in the UK using data from LFS 2004-2011. In particular, we estimate the predicted wage in the region of current residence through OLS and then we verify the increase in the probability of moving to other UK regions due to greater hourly wages w.r.t. that predicted for the region of current residence through a Multinomial Logit model. We find that earnings play an important role in explaining commuting behavior, as well as length of the employment. We find that – on average – wages 20% greater than those for the region of residence lead to an increase in probability of 2-2.9% (according to gender differences) to move to other regions commuting more than 45 minutes. Moreover, we find support also for the "household responsibility hypothesis" and for the attractiveness of the Greater London Region.

JEL Classification: R23; R40;

Keywords: commuting, travel-to-work, gender, household responsibility, multinomial logit.

1 Introduction

The aim of this study is to estimate which factors matter in the job searching, focusing mainly on commuting aspects and on the role of monetary incentives for stimulating geographical mobility among regional labor markets. This approach can be related to the idea of different local labor markets, which are in competition and are demarked by geographical and occupational criteria (Button, 1976) and, within this framework, earnings may play an important role in allowing workers to obtain a "better" job in other places and compensate losses due to the commuting time and moving costs.

According to the relevant literature and theoretical models, people should be able to respond to

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monetary incentives and opportunities moving freely from a place to another through migration. However, there are some rigidities which do not allow the labor market to be considered as a traditional one. One of these rigidities is related to the homeownership, intensively analyzed from a micro and macro point of view with different results. While Rohe and Steward (1996), among the others, argue that residence stability is more likely to produce greater social capital, for Oswald (1997) homeownership produces inferior labor market outcomes due to greater transaction costs from moving among places in response to asymmetric shocks or opportunities.

A theoretical model developed by Oswald (1997) established, as a consequence of individual homeownership, an increase in the likelihood to be unemployed whereas it predicted full-employment for renters due to the absence of transaction costs (searching, buying and selling the house). In particular, according to the Oswald hypothesis, in presence of asymmetric shocks in the labor market, only the renters would be flexible enough to migrate to the region with greater opportunities and to produce adjustments, while homeowner would be more likely to be unemployed or to commute. However, there is not too much evidence on these results: while Coulson and Fisher (2009) analyze the relationship between unemployment and homeownership finding that they have lower wages compared to renters, Van Leuvensteijn and Koning (2004) find that, in The Netherlands, higher wages are associated with homeownership and a smaller likelihood of being unemployed. Gardner et al. (2000), using UK data, show that homeowners are less mobile in the labor market. Hence, renters should be more likely to change their residence than homeowners when the workplace changes. For Munch et al (2006), homeowners set their reservation wage higher than renter, since they have moving costs, while renters do not experience these costs, or, if they do, not in the same amount. Munch et al. (2008) also argue that homeowners have greater probability to stay longer within their jobs and are subject to greater investments in human capital by their employers with the consequence that their wage are 5% greater than renters. They estimate also that, for the job-to-job mobility in Denmark, homeowners are 14% less likely to move to another local labor market and 5% less likely to move to another job within the same local labor market.

However, migration is not always possible not only because of transaction costs but also because of the presence of psychological barriers related to changes in the environment, habits or familiar relationships. Therefore, commuting behaviors may represent a valid alternative to migration. In this regard, other authors have previously considered the travel-to-work behavior taking into account the commuting time and the commuting distance. Van Ommeren and Fosgerau (2009) focused on the

marginal commuting costs while Ma and Banister (2006) provided a critical review of the literature on excess commuting, as such commuting representing the difference between the actual travel time and the minimum possible time to be spent for the route workplace-residence.

Particular attention has been devoted to testing the "household responsibility hypothesis" (HRH), that is a situation for which "employed women tend to have greater household and child-care responsibilities and, as a result, face greater time constraints and ultimately choose shorter commutes than employed men" (Turner and Niemeier, 1997 p. 398-399). This result is confirmed by Sandow (2008), Praskher et al. (2008) and McQuaid and Chen (2012).

Clark et al. (2003) investigate the relationships between residential changes and employment locations. In particular, they argue that individuals in a dual-earner household are more likely to have greater commuting before and after a moving than individuals in single earner households because of spatial constraints. Plaut (2006) finds that both for renters and homeowners jointly choose commute trips, meaning that commuting time for men is highly correlated with that of women. He also observes that salaries (log individual salaries) do not have impact on commuting time but only on the distance. So et al. (2001) observe that a change in the household location is associated with a wage offer greater than that for the case of commuting, as a consequence of the fixed costs of relocation. Cassel et al. (2013) find that highly educated workers have a greater probability to accept jobs travelling more than 40 minutes. Additionally, Sandow (2008) explores the Swedish case finding that longer commuting is associated with low populated residence areas. He also finds that workers in public sectors are less likely to commute compared to that of the private sector while male workers commute longer distance than women. Also younger workers commute more than others because of the need to acquire experience and become more competitive.

Justifications for this study are found in the "2011 Census Analysis - Distance Travelled to Work", which states that the average distance commuted to work in England and Wales increased by 12% in 10 years (from 13.4 km in 2001 to 15 km in 2011); full-time workers travelled more in 2011 than part-time workers and by 2011, the rates of commuting raised by 42% for men and 30% for women.

Starting from the previous literature and the data provided by the 2011 Census, this study wants to focus more on the regional labor markets, considering mainly the regional differences and the role of the monetary incentive for stimulating such commuting behavior and geographical mobility among regions, once having controlled for homeownership, regional heterogeneity and socio-economic conditions. Our purpose is to investigate which factor matters in the travel-to-work behavior and provide

support for a non-linear response to monetary grants. In particular, workers who commute from one labor market to another should require earning grants able – at least – to compensate monetary and non-monetary moving costs and this may differ across gender as a consequence of differences in the evaluation of trade-off between higher wages and monetary and non-monetary moving costs.

For doing it, we estimate the hourly wage for each worker for the region of residence and we compare them and then we use a multinomial logit model for investigating the propensity to move out of regions commuting more than 30 and 45 minutes. This represents the main novelty of this study since the previous literature does not provide any comparison among wages (even if unobserved) in different regions as we do with this study. In particular, McQuaid and Chen (2012) consider only the role of gross monthly wages on the propensity to commute more than a certain threshold (30 minutes, 45 minutes) whereas Sandow and Westin (2010) take into account the role of earnings introducing only different thresholds of annual gross income (High, Middle, Low) and change in income during the period of observation. They find that women with long-distance commute have a better income development compared to non-commuter. And in general, long-distance commuting is a strong economic incentive.

The outline of the study is follows: Section 1 illustrates the simple theoretical model; Section 2 provides some descriptive statistics; Section 3 describes the econometric strategy; Section 4 presents comments to the empirical results; Section 5 involves robustness check; Section 6 presents further tests; Section 7 presents the conclusion and suggestions for further improvements.

2 Theoretical Model

The worker's utility function is defined according to the following functional form $V(Y, L, qh, R)$, where Y represents the level of income, L the leisure time, q a dummy variable which is equal to 1 when there are household responsibilities h (otherwise the value is equal to 0) and R represents the region of residence. Assuming an utility-maximizing worker, each worker maximizes his utility function $V(.)$ given two constraints i) the budget constraint $Y = wH - c(d)$ where $c(d)$ is the commuting cost, increasing in the distance d, and wH represents the hourly pay times the number of hours worked; ii) the lifetime constraint $L = 24 - H - t$ where L is the leisure time as the day time net of the hours worked H and the commuting time t.

As aforementioned, in our model we are interested in verifying for which values of the hourly pay –

given all other conditions – a worker is willing to work in a region different from that of his residence, incurring in greater transportation costs and commuting time as well as in additional costs due to household responsibilities. Therefore, given the worker $i = 1 \ldots ..I$, the region of residence r and the region of workplace l, an utility-maximizing worker will choose to work in a different region l from that of residence r if and only if $V_l(Y_l, L_l, qh_l, R_l) > V_r(Y_r, L_r, qh_r, R_r)$. The situation of indifference has been ruled out, assuming that in case of equality between both utility functions, the worker would choose randomly. Substituting both constraints within the functional form we obtain

$$V_l(w_l H - c_l, 24 - H - t_l, qh_l, R_l) > V_r(w_r H - c_r, 24 - H - t_r, qh_r, R_r)$$

Assuming additive separability, hence the independence between Income and Leisure time, the expression may be re-stated as the following:

$$w_l H - c_l + (24 - H - t_l) + qh_l + R_l > w_r H - c_r + (24 - H - t_r) + q_r h_r + R_r$$

Simplifying, it is possible to say that

$$H(w_l - w_r) > (c_l - c_r) + (t_l - t_r) + q(h_l - h_r) + (R_r - R_l)$$

which means that a worker i – given the same amount of working hours - will choose in a different local labor market from that of residence if and only if the difference in the hourly wage will be such to compensate the greater transportation costs and the reduction in the leisure time as well as a change in household responsibilities (if any, that is for $q = 1$). Indeed, we expect an increase in the wage as a consequence of an increase in the commuting cost and time.

3 Data and Descriptive Statistics

Our model is implemented using data from the Labour Force Survey - 4th quarter (LFS – UK) for the period 2004-2011 in order to have a greater number of observations and to consider such variables that are not significant in a single period. After dropping for missing values in our variables, the whole dataset has been manipulated keeping only employed with age 23-65 and with an average gross hourly pay and a predicted hourly wage greater than 2 pounds and lower than 100 pounds so as to reduce the impact of outliers. In order to have homogeneous representations of local labour markets, we consider the GORs (Government Office Regions) as defined within the LFS, which consider more homogeneous territorial agglomerations (19), which in many cases coincide with the administrative

regions. For instance, our data consider two territorial agglomerations for Scotland, which is divided in Strathclyde and Rest of Scotland; the region of Greater London as divided in Central/Inner London and Outer London; the region of the Yorkshire in South, West and Rest Yorkshire and Humberside. Disaggregation of regions are also considered for the case of the West Midlands, as well as for the Greater Manchester, which represents a case apart. This means that – instead of having eleven different regions – we have nineteen territorial areas, as presented in Table 1.

(Tab. 1)

Table 2 provides some descriptive statistics and indicates that - on average - men commute longer than women (30 minutes vs. 23 minutes), public transports are used more when workers move to other regions commuting more than 30 minutes and the average hourly wage rate is greater for workers who do longer commuting (18.53 ï¿œ and 15.34 ï¿œ respectively for the case of working at distance greater than 45 minutes and 30-45 minutes vs. 10.80 ï¿œ for the case of working within the same region). Quite interesting is what happens for people who choose to move to other regions but with an average commuting time lower than 30 minutes. This case captures situations in which people move to closer city located in different GORs, near the administrative boundaries. In this case, they still earn a greater hourly wage but commute slightly less than those workers living and working in the same own region (the average hourly wage is 12.26 ï¿œ vs. 10.80 ï¿œ while the average commuting time is 21.39 minutes vs. 22.04 minutes respectively for the case of working outside the region and for that of living and working within the same region).

(Tab. 2)

4 The Econometric Strategy

The econometric strategy is based on two-steps. In the first step, since the choice of another regional labor market can be associated with higher wages and only the current wage is observed, a measure of the latent wage ($wage*$) in the region of residence has been derived for all workers. This represents an innovation to previous analysis and - in this way - it is possible to analyze the differences between unobserved and observed wages and their role on the propensity to move. In the second step, the probability to work outside the region of residence is estimated using the multinomial logit model.

To estimate the potential wage in the region of usual residence, we first use the OLS for obtaining an estimate of the determinants of the wage and then we make a prediction of the region of the current residence ($wage*$). Indeed, we create an index ($\frac{wage}{wage*}$), which takes into account whether the current wage is lower/greater – and by what extent - than the predicted. The benchmark threshold is defined as the situation for which the current wage is at most 10% greater or lower than the predicted (thr_index=0), so as to reduce the role of prediction errors. With respect to the benchmark threshold, we define three other threshold indexes: the first (thr_index=1), which captures the negative monetary incentive for all values of the index ($\frac{wage}{wage*}$) < 0.90; the second for all positive monetary incentive between 10 and 20%; the third which considers hourly pay 20% greater than the predicted. Thus, the threshold index is defined as follows:

$$\text{thr\_index=0 if } 0.90 \leq \frac{wage}{wage*} < 1.10$$
$$\text{thr\_index=1 if } \frac{wage}{wage*} < 0.90$$
$$\text{thr\_index=2 if } 1.10 \leq \frac{wage}{wage*} < 1.20$$
$$\text{thr\_index=3 if } \frac{wage}{wage*} \geq 1.20$$

For estimating the predicted wage for the region of usual residence, we include several variables according to the literature. In particular, the model for the unobserved wage is defined as follows

$$wage = \alpha + \beta X + \gamma Z + \varepsilon$$

where X is the vector of labor market characteristics, as the length of the contract within the same firm, the size of the firm, the type of contract (whether part-time), the sector, the role within the workplace and whether the worker is also looking for another job; Z includes all the unknown coefficients of individual socio-economic characteristics, as the age, the age of completed education, being a couple and the presence of children, health problems that limit the work activity, whether the worker owns his house or has a mortgage and the region of residence. Moreover, in order to control for the effect of the business cycle, annual dummies are additionally included.

In order to have a good prediction of the wage, which accounts for the gender differences, OLS is estimated separately for men and women and, as robustness check, results have been compared with the estimate of the all sample. Using the separate estimation, we make the prediction of the wage for the region of residence for each worker.

(Tab.3)

Results are coherent with the labor economic theory and the strong majority of the variables are highly significant (1%). Sex differences are evident, according to the main literature (Oaxaca, 1973). The unobserved wage increases with the age in a non-linear way but more for men (the turning point is approximately 52 for men against 49 for women), while women benefit slightly more for the education level, considering the age of completed education as a proxy of the number of years spent in the education system.

The predicted wage is also greater in London, East Anglia, Southern East, East Midlands and Scotland, suggesting that regional characteristics matter (the coefficients are available upon request). Working for longer in the same place leads to increased wages for both genders but also an increase in the gender pay gap. Manning and Swaffield (2008) found that this increasing gap w.r.t the early career wage may be explained by psychological differences. However, this is not the case of workers working for more than twenty years, for which women can have a greater predicted wage (1.781 for female vs. 1.372 for male). The gender pay gap is also confirmed when we look at the type of occupation. Table 3 indicates also that wages change according to the size of the firm and differences appear to be deeper as the company becomes bigger. Also in this case, male workers are likely to benefit more than their female counterparts in presence of bigger companies. Looking for another job during the current employment has also a strong impact on the wage determination, mainly for men. This negative relation can be associated to lower productivity and then lower wages.

According to the theory (Antonovics and Town, 2004), the household composition lead to asymmetries, with men paid 0.935 more when married or have children (0.576) while women experience a motherhood wage penalty of 0.26, which may be due to conflicts between family and job (Waldfogel, 1995). This means a reallocation of time and role between husband and wife (Lundberg and Rose, 2000). As expected, health problems that reduce the working activity significantly and negatively affect the hourly wage, with a greater reduction for men (-0.653).

Since data consider the period 2004-2011, the dependent variable has been previously deflated using the Consumer Price Index (CPI) provided by the ONS (Office for National Statistics) and the model has been controlled for the business cycle, confirming that wages suffered the economic crisis of 2008. Moreover, in order to have a homogeneous sample, all $wages^*$ less than 2 pounds per hour and greater than 100 pounds/hour have been dropped, meaning that the dataset for the second step contains 76.899 out of 77.029 initial observations. Quite interestingly, Table 2 shows that - on average - the current wage and the predicted wages are exactly the same for the case of male and female workers

but they slightly differ when the region of the workplace is considered. This difference is also coherent with our hypothesis for which longer commuting time (and costs) is compensated by greater wages w.r.t to that of the region of residence.

The second step is to calculate the propensity to move to other regions. Since we use the discrete response model, we define as dependent variable:

$$\text{y=0 if region\_working=region\_living}$$
$$\text{y=1 if region\_working} \neq \text{region\_living and commuting\_time} < 30 \text{ minutes}$$
$$\text{y=2 if region\_working} \neq \text{region\_living and } 30 < \text{commuting\_time} < 45$$
$$\text{y=3 if region\_working} \neq \text{region\_living and commuting\_time} > 45 \text{ minutes}$$

We estimate the propensity to move to other regions, considering different thresholds of commuting time, through a Multinomial Logit. However, there are some drawbacks related to the use of this model, since it assumes IIA (Independence of Irrelevant Alternatives), meaning that the propensity of moving to another regions commuting more than 30 minutes is independent to the propensity to move to another region travelling more than 45 minutes or less than 30.

To produce estimates we use the multinomial logit model and we consider the situation for which the worker lives and works in the same territorial area ($Y = 0$) as the base outcome. Therefore, the probability of each alternative is defined as follows:

$$\text{Pr(Y=j)}=\frac{exp(\alpha_i j + X_i t\beta'_j)}{(1+\sum_{k=1,k\neq 0}^{y} exp(\alpha_i j + X_i t\beta'_j)} \text{ for } j \neq 0 \text{ and } j = 1,2,3 \text{ ;}$$
$$\text{Pr(Y=0)}= \frac{1}{(1+\sum_{k=1,k\neq 0}^{y} exp(\alpha_i j + X_i t\beta'_j)}.$$

According to McQuaid & Chen (2012), we consider four factors, contained in X, that explain differences in the travel-to-work: 1) individual factors; 2) job characteristics; 3) household responsibilities; 4) external factors, as public transport and housing/mortgages availability. We also add the thr_index, which is the index that measures different thresholds in the ratio between the current and the predicted wage. In order to deal with potential heteroskedasticity, robust standard errors are provided.

5 Empirical Results

(Tab. 4)

Table 4 shows results from the multinomial logit model for the whole sample and by gender. Table 5 provides a sensitivity analysis dropping the region of the Greater London. Since the coefficients of the Multinomial Logit do not provide a direct interpretation, Table 6-7 present a better understanding of results using the Average Marginal Effect (AME) for the variables of interest with respect to the baseline outcome.

(Tab. 6)

The greater majority of variables are not significant for the case of workers moving out of their region but at a distance lower than 30 minutes. This may be interpreted by the fact that the situation within the boundaries of the region/agglomeration area is quite the same as that in the neighborhood and, hence, there are no statistical differences from the baseline model. If we look at the descriptive statistics, we also note that the average commuting time is similar to that of workers living and working in the same region, meaning that for this case there is no role played by the monetary incentive.

Looking at the cases with commuting distance greater than 30 minutes (Out 30-45 and Out >45), age is represented using different age bands, in order to better capture the non-linearity. Results from Table 5 show how the willingness to move to other regions change according to the distance and to the gender. All coefficients for women are not significant at any level. By contrast, male workers are increasing in the probability to travel to other regions for more than 45 minutes as long as the age increases but only until 60 y.o..

Being married or living as a couple positively affect the probability of working in other regions, even commuting more than 45 minutes, for which the variable is significant at 5%. However, the presence of children affects gender differently, with a stronger impact on women, who are less likely to commute more than 30 minutes when they move to other local labour markets in presence of children with age less than 15 y.o. (-0.334 and -0.269 respectively for the case of commuting time of 30-45 minutes and more than 45 minutes). This result is coherent with that of McQuaid and Chen (2012) who found that women travel less in presence of dependent children. The economic explanation of these results is quite intuitive since women need more flexibility in order to solve conflicts between the family and the job and this may be also related to a household utility maximization problem that results in reduced

commuting distances for women. At this regard, Sandow (2008) argue that shorter commuting may be a strategy to combine wage and deal with emergencies due to the presence of children and their possibility to be ill or to be picked up at school.

Quite interesting is what happens considering the regions (the coefficients are not reported), giving a map of the state of regional labor markets and their attractiveness, with places of migration and emigration. Keeping Tyne & Wear as the reference region, the North of England, Scotland and also Wales are regions with a quite local labor market or wit high levels of out-commuting, since their coefficients are negative. Conversely, people working in London are more likely to come from other regions. This is quite intuitive because of more opportunities, as well as the housing cost that can lead people to locate in other regions or in rural area in order to have better trade-off between housing and commuting costs. This confirms Cameron and Muellbauer (1998), who found that lower unemployment rates and higher relative house prices encourage in-commuting.

Moreover, the model defines low-skilled positions as reference, which have a particularly local labor market and also greater wages. Table 4 indicates that managerial workers are more likely to travel-to-work more than 30 minutes and this can be also explained by the fact that white-collars tend to be more informed about alternative jobs (Button, 1976). Also in this case, sex differences are significant and interesting. In particular, an improvement in the worker's position, moving to intermediate and managerial positions, increases more the probability of women to commute w.r.t of that of male workers. Therefore, if we consider the type of job as related to the level of education, then more educated workers are more likely to commute (Cassel et al., 2013) and there are heterogeneity in the women's behaviours according to their position and their ambitions.

Results from housing ownerships and the presence of mortgages, which represent forms of rigidities in the worker's behavior, are consistent with the theory and, hence, workers are more likely to commute because of the high costs of changing location or re-negotiating the mortgage. However, this could not be the case of the long run when, according to the theory, these costs can be relaxed. To strengthen this hypothesis, Clark & Burt (1980) found that workers are likely to minimize the commuting distance when the residence changes.

This interpretation can be also confirmed by looking at the presence of stability in the employment (length of the contract within the same firm) for which the probability of working in other regions falls as the time within the same workplace increases. Hence, it is possible to suppose that workers, in the long run, - facing stability in their job position – reduce their commuting and relocate their residence,

solving in this way the problem of market imperfections due to housing costs (Levinson, 1998; Van Ommeren et al., 1997). However, our data do not allow to assess which form of stability comes first and, hence, to answer the question: "Does the workplace follow the residence or does the residence follow the workplace?". In any case, looking at the residence stability variable, which measures the stability of the household within the same address, we might conclude that – in the long-run (at least 10 years) – living at the same address for longer negatively affects the propensity to move to other regions commuting more than a certain threshold. In contrast, living in the same address for less than 10 years, and interpreting this as the short-run result, does not significantly change the probability outcome w.r.t. living less than 24 months. Our data on the residence stability are only significant for male workers, suggesting that, if there are forms of relocation, these are driven by men.

Furthermore, workers of public firms/administrations are less likely to commute whether male but more likely to work in other regions whether female (with the exception of the case of commuting time greater than 45 minutes). Part-time jobs are less likely to be found in other job-markets because of the higher disutility of commuting. According to Cameron and Muellbauer (1998), who found a strong response of relative wages and relative job prospects, earnings are important in explaining the propensity to move. From Table 4, we can easily see that both male and female workers increase their probability to do longer commuting out of their own region in presence of greater monetary incentives. This happens for all cases with distance greater than 30 minutes (Table 4) whereas for shorter distances there are no significant variations. However, if we look at the disaggregate effect we can see that this is mainly the case for female workers whose coefficients are greater than that of male (0.717 vs. 0.547 in case of commuting more than 45 minutes ad wages greater than 20%), suggesting that women are more likely to move if the hourly pay is higher enough than what expected to have in the region of residence, also for commuting 30-45 minutes. It is also quite interesting to see what happens in case of negative incentives, which means the wratio lower than 0.90. In this case both genders are significantly less likely to commute. Moreover, the greater significance of the threshold indexes for the case of moving to other regions at a distance greater than 45 minutes suggests that the monetary incentive – as a compensation of the time spent commuting, transportation costs and changing in habits - works only for greater distances whereas for shorter distances the situation is similar to that in the region of residence.

However, looking only at the magnitude of the coefficients does not allow to better explain the result. Table 6 provides an analysis of the marginal effects of the different thresholds. In particular,

a salary greater than 20% raises the probability to move to other regions commuting more than 45 minutes by 2.4% on average whereas only by 1.1% for salaries greater 10-19% more. However, when the monetary incentive is negative – as expected – the probability of moving decreases by 0.7% (for 30-45 minutes) and by 1.5% (for more than 45 minutes). Looking at the gender differences, wages 20% higher than the predicted increases by 2.9% the probability of commuting more than 45 minutes for male workers and by 2% for female workers, on average. Hence, on average, the gender gap is around 0.9% for the case of longer commuting. A moderate increase in the wage is significant only for women commuting more than 45 minutes with a marginal increase in probability of 1.3%. Indeed, looking at the difference between thresholds, female workers seem to be more sensitive to increase in their monetary incentives while male workers are not significantly affected by moderate increase in their wages.

Quite interesting is to see what happens when we control for the transportation mode. Both cars and public transports are increasing in the probability of working out of regions but public transports are declining when we consider workers who work out regions doing shorter distances. This confirms the idea that public transport becomes more convenient as long as the distance increases.

6 Robustness check

(Tab. 5)

(Tab. 7)

In order to check for the validity of our analysis, we consider the same model without the inclusion of the region of the Greater London, indicated in our sample by two territorial areas: Inner/Central London and Outer London. This is done modifying the original sample and running firstly a new OLS (not reported here) for the prediction of the expected wage in the region of residence and then the Multinomial Logit model.

In this way we check for peculiar characteristics of the capital, as the role of attractions for many job-seekers, the greater costs of living and transports as well as the greater wages offered to Londoners. In general, all coefficients are slightly lower in the Multinomial Logit without the Greater London Region (Tab. 5). Quite interesting is the comparison of marginal effects between the two models (with and

without London). In the latter case (Tab. 7), a 20% greater wage increases the probability to commute by 0.03% for the case of 30-45 minutes and by 1.9% for distances longer than 45 minutes. However, this result is mainly driven by the gender differences, which are greater than before. In particular, male workers increase their probability to move to other regions and territorial agglomerations commuting more than 45 minutes by 2.6% (while it was 2.9% in the previous case) while women only by 1.3%, that is 0.7% less than the marginal effect considering the full sample. Additionally, excluding the region of Greater London from the sample leads to a raise from 0.9% to 1.3% in the gender gap in the probability of commuting more than 45 minutes, with the consequence that female workers working in London are more willing to commute than their national counterpart. This result may be explained by the greater attractiveness of the capital, especially for women. Finally, these further evidences confirm also the peculiarity of the Region of Greater London (and also the higher hourly pay in that regions) and its influence on the infra and inter-regional geographical mobility in the UK.

7 Further tests

In this section, we provide further controls for the "household responsibility hypothesis" considering also heterogeneity in the household composition in terms of wealth, that is whether couples with a relatively higher wage are more willing to commute longer and what is the pure effect of the monetary incentive once the control for the gross (weekly) wage is provided. It should be noted that weekly wage bands are now used, in order to control for the economic stability, and these are additional to the threshold index which captures the hourly monetary incentive. The new variable wageband assumes values equal to 0 for weekly wages lower than 200 ï¿œ; 1 for 200-500 ï¿œ; 2 for 500-1000 ï¿œ while the interaction term couple*wageband is used to consider the joint effect of being a couple and gross weekly earnings.

(Tab. 8)

Quite interesting are the results coming from the Multinomial Logit (Table 8) after the introduction of these new variables. The direct effect of being in a couple on the probability of moving to other regions commuting more than 45 minutes is positive but, once we control for the weekly wage bands through the interaction term, it decreases substantially such that non-married workers have a greater probability to commute outside their regions when the earning is lower than 200ï¿œ and this happens

for both men and women. However, for weekly wage 500-1000 ï¿œ, the variable is significant at 1% and 5% only for women and combining the effect of couple and the interaction term, lead women to have slightly positive effects on the probability of moving out of regions.

Even under this setting, we find a gender gap, with female workers less likely to move out of the regions, regardless the distance and also support for the childcare responsibility asymmetrically allocated to women, who experience a reduction in probability for all commuting greater than 30 minutes where men experience an increase in the probability for distances greater than 45 minutes.

(Tab. 9)

As expected, the introduction of the weekly earnings partially offsets the direct effect of the threshold index with the quite interesting result that women are more willing than men to commute more than 30 minutes for intermediate hourly monetary incentives (10-20%) since the variable is not significant for men. By contrast, looking at the marginal effect (Table 9), for distances greater than 45 minutes of travel time, men have a greater probability of moving outside their own region with respect to their female counterparts. From Table 9 it is also quite interesting to see that, once the interaction term is introduced, the gender gap decreases to 0.4% for monetary incentives greater than 20% in presence of 45 minutes of travel time. In particular, the marginal effect w.r.t. the threshold index of reference is 1.9% for men and 1.5% for women while in the original model (Tab. 6) the marginal effect only 2.9% and 2% respectively, with a gender gap equal to 0.9%.

To summarize, with the introduction of these further controls (weekly wage band and the interaction term), it becomes clearer the heterogeneity in couples' behaviors according to their economic stability. The monetary incentive variable is partially offsetted by the introduction of the gross weekly wage, which is able to capture the absolute role of earnings. Married female workers with higher weekly wages are more willing to commute longer than those with lower wages, whose probability to move to other regions is even below than that of the average non-married (or not living as a couple) worker.

8 Conclusion

This study confirms the main results defined by the commuting time analysis and provides a new way of interpreting the travel-to-work between regions considering the role of monetary incentives. As suggested by data, people tend to move to other regions for having greater wage and because of

better job opportunities, confirming the presence of differentiated labor markets. However the role of the monetary incentive increases as long as the distance increases. Managerial professions have multi-regional job markets while routine jobs are local. Earning more is a strong incentive for geographical mobility with women who face a peculiar trade-off between higher wage and commuting distance, suggesting that they are more mobile if the effort worth enough.

Moreover, evidences suggest how a certain degree of flexibility matters in the short (mortgage) and in the long run (length of the contract; stable residence) as well as sex differences asymmetrically react when changes in the household structure occur. We also find a gender gap of 0.9% with male more likely to move outside their own territorial area and commuting more than 45 minutes and this gap is strengthen when the analysis does not consider the Region of Greater London. We also provide support for the "household responsibility hypothesis", concluding that women are less willing to commute longer and to move outside their own region compared to their counterparts and this is partly explained by the childcare and the household composition.

Further extensions of the model may consider different level of the workplace choice through a better characterization of the decision to work inside or outside the region of residence before taking into account the maximum time to travel.

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Table 1: Government Office Regions and Agglomeration Areas

Table 1

GORs (Government Office Regions)
Tyne & Wear
North England
South Yorkshire
West Yorkshire
Rest Yorkshire and Humberside
East Midlands
East Anglia
Central and Inner London
Outer London
South East
South West
West Midlands
Rest West Midlands
Greater Manchester
Merseyside
North West
Wales
Strathclyde
Rest Scotland

Table 2: Descriptive Statistics

Table 2 -Descriptive Statistics

	Overall	Female	Male	In Region	Out and <30	Out and 30-45	Out and > 45
Commuting time	26.44 mins	23.31 mins	29.96 mins	22.04 mins	21.39 min	41.75 mins	80.74 mins
Commuting by car_motorbike	72,55	70,28%	75,12%	73,39%	87,35%	76,34%	47,63%
Commuting by public transport	13,13%	13,65%	12,54%	10,33%	6,68%	21,66%	50,83%
Hourly wage	11,52	10,25	12,96	10,8	12,26	15,35	18,53
Predicted hourly wage (wage*)	11,53	10,26	12,96	11,09	12,06	14,18	15,55
wage/wage*	1,02	1,01	1,02	1	1,04	1,08	1,18
N. Observations	76899	40758	36141	65420	4086	2392	5001

Table 3: OLS - Wage Regression

Table 3. OLS - Wage regression

*Dep. Variable: wage**	*Overall*	*Only female*	*Only male*
Age	0.499***	0.396***	0.623***
	(0.014)	(0.019)	(0.022)
Age^2	-0.005***	-0.004***	-0.006***
	(0.000)	(0.000)	(0.000)
Age Completed Education	0.423***	0.456***	0.386***
	(0.010)	(0.013)	(0.016)
Couple	0.535***	0.111*	0.935***
	(0.040)	(0.048)	(0.067)
Children < 15 y.o.	0.210***	-0.265***	0.576***
	(0.057)	(0.063)	(0.101)
Health Problems that limit activity	-0.450***	-0.310***	-0.653***
	(0.055)	(0.061)	(0.097)
Female	-1.633***		
	(0.048)		
Job type (Ref: Routine occupations)			
Semi-routine occupation	0.270***	0.300***	0.054
	(0.049)	(0.075)	(0.070)
Lower supervisory and technician	1.280***	0.946***	1.394***
	(0.056)	(0.099)	(0.069)
Intermediate occupation	1.310***	1.253***	1.617***
	(0.058)	(0.079)	(0.107)
Lower Managerial and professional	4.664***	4.449***	4.858***
	(0.061)	(0.086)	(0.091)
Higher Managerial and professional	8.981***	8.625***	9.041***
	(0.095)	(0.150)	(0.125)
Lenght of employment (Ref: less than two years)			
2 - 5 years	0.276***	0.308***	0.253**
	(0.057)	(0.066)	(0.095)
5 - 10 years	0.594***	0.555***	0.736***
	(0.058)	(0.067)	(0.098)
10 - 20 years	1.187***	1.153***	1.292***
	(0.065)	(0.078)	(0.107)
> 20 years	1.580***	1.781***	1.372***
	(0.079)	(0.101)	(0.121)
Size of firm (Ref. Less than 25)			
25 - 49	0.397***	0.286***	0.572***
	(0.058)	(0.069)	(0.099)
40 - 500	0.866***	0.609***	1.251***
	(0.048)	(0.058)	(0.079)
> 500	1.627***	1.049***	2.390***
	(0.064)	(0.072)	(0.109)
Looking for another job	-0.555***	-0.304**	-0.755***
	(0.073)	(0.095)	(0.111)
Part-time	-0.230***	-0.068	-0.316*
	(0.051)	(0.053)	(0.153)
Homeowner/Mortgage	1.332***	1.016***	1.659***
	(0.044)	(0.051)	(0.071)
Constant	-14.531***	-12.146***	-17.946***
	(0.434)	(0.743)	(0.616)
Industry sector dummies	Yes	Yes	Yes
Regional dummies	Yes	Yes	Yes
Yearly dummies	Yes	Yes	Yes
R-squared	0.439	0.424	0.429
N	77029	40847	36182

Table 4: Generalized Multinomial Logit

Table 4. - Generalized Multinomial Logit

	Overall			Male Only			Female Only		
	Out < 30	*Out 30-45*	*Out > 45*	*Out < 30*	*Out 30-45*	*Out > 45*	*Out < 30*	*Out 30-45*	*Out > 45*
Age bands (Ref: 20-29)									
30 - 49	0.0302	0.0581	0.210***	0.0419	0.109	0.239**	0.0373	0.0449	0.215*
	(0.55)	(0.85)	(3.66)	(0.55)	(1.20)	(3.14)	(0.47)	(0.43)	(2.41)
50 - 59	0.0307	0.0275	0.249***	0.0474	0.0730	0.352***	0.0357	0.00668	0.0981
	(0.47)	(0.33)	(3.55)	(0.53)	(0.66)	(3.88)	(0.38)	(0.05)	(0.86)
Over 60	0.0373	-0.185	0.192	-0.00928	-0.119	0.309*	0.172	-0.349	-0.0413
	(0.43)	(-1.44)	(1.91)	(-0.08)	(-0.77)	(2.55)	(1.28)	(-1.39)	(-0.22)
child<15 years	-0.0585	-0.0820	0.0623	-0.0189	0.0768	0.216***	-0.103	-0.334**	-0.269**
	(-1.30)	(-1.36)	(1.30)	(-0.30)	(1.04)	(3.72)	(-1.57)	(-3.15)	(-3.07)
Couple	0.0793*	0.110*	0.216***	0.0431	0.0571	0.189***	0.111*	0.156*	0.198**
	(2.13)	(2.28)	(5.42)	(0.82)	(0.89)	(3.63)	(2.08)	(2.07)	(3.13)
Mortage/Homeownership	0.240***	0.505***	0.806***	0.286***	0.486***	0.824***	0.163*	0.502***	0.732***
	(4.92)	(7.74)	(15.00)	(4.25)	(5.81)	(11.91)	(2.29)	(4.79)	(8.57)
Address Stability (Ref. <24 months)									
2- 10 years	-0.0181	0.00805	-0.0504	0.0509	0.0734	-0.0164	-0.0983	-0.0924	-0.118
	(-0.36)	(0.13)	(-1.02)	(0.74)	(0.91)	(-0.26)	(-1.36)	(-0.97)	(-1.46)
>10 years	-0.0541	-0.241***	-0.315***	0.0514	-0.0160	-0.189**	-0.169*	-0.601***	-0.511***
	(-0.99)	(-3.39)	(-5.48)	(0.68)	(-0.18)	(-2.62)	(-2.12)	(-5.21)	(-5.33)
Part-time	-0.117*	-0.609***	-0.545***	-0.233*	-0.457**	-0.843***	-0.0818	-0.582***	-0.394***
	(-2.47)	(-7.84)	(-8.78)	(-2.12)	(-2.95)	(-6.06)	(-1.48)	(-6.35)	(-5.36)
Job type (Ref:low-skilled)									
Intermediate Occupation	0.0885	0.536***	0.855***	0.0999	0.465***	0.796***	0.0702	0.739***	0.932***
	(1.82)	(6.83)	(12.32)	(1.51)	(4.90)	(9.34)	(0.98)	(5.01)	(7.65)
Managerial Professions	0.214***	1.005***	1.405***	0.217***	0.935***	1.403***	0.211**	1.215***	1.417***
	(4.80)	(14.25)	(22.21)	(3.69)	(11.28)	(18.57)	(3.07)	(8.76)	(12.25)
Lenght of employment (Ref: < 2 years)									
2 - 5 years	-0.117*	-0.273***	-0.247***	-0.0691	-0.268**	-0.312***	-0.166*	-0.268**	-0.118
	(-2.32)	(-4.24)	(-4.71)	(-0.98)	(-3.23)	(-4.68)	(-2.31)	(-2.61)	(-1.39)
5 - 10 years	-0.154**	-0.313***	-0.259***	-0.158*	-0.299***	-0.316***	-0.153*	-0.318**	-0.146
	(-3.02)	(-4.78)	(-4.86)	(-2.19)	(-3.58)	(-4.71)	(-2.11)	(-2.99)	(-1.65)
10 - 20 years	-0.153**	-0.330***	-0.410***	-0.0922	-0.362***	-0.474***	-0.232**	-0.258*	-0.298**
	(-2.86)	(-4.78)	(-7.15)	(-1.25)	(-4.13)	(-6.66)	(-2.96)	(-2.28)	(-3.04)
> 20 years	-0.140*	-0.446***	-0.325***	-0.0640	-0.619***	-0.492***	-0.288**	-0.109	-0.0227
	(-2.24)	(-5.38)	(-4.97)	(-0.78)	(-5.95)	(-6.23)	(-2.88)	(-0.79)	(-0.19)
Public firm	-0.310***	-0.253***	-0.413***	-0.348***	-0.231***	-0.355***	-0.256***	-0.243***	-0.405***
	(-8.02)	(-5.09)	(-10.15)	(-5.87)	(-3.40)	(-6.58)	(-4.98)	(-3.29)	(-6.42)
Female	-0.249***	-0.583***	-0.757***						
	(-6.64)	(-12.06)	(-19.20)						
Threshold Index (Ref: 90-110)									
<90	-0.160***	-0.344***	-0.434***	-0.217***	-0.312***	-0.458***	-0.0860	-0.386***	-0.384***
	(-3.76)	(-6.08)	(-9.14)	(-3.67)	(-4.28)	(-7.77)	(-1.40)	(-4.26)	(-4.78)
110-120	0.0479	0.135	0.252***	0.153	0.207	0.170	-0.0825	0.0445	0.421***
	(0.73)	(1.63)	(3.70)	(1.72)	(1.93)	(1.95)	(-0.84)	(0.33)	(3.84)
>119	0.0792	0.219***	0.505***	0.0683	0.227**	0.450***	0.0904	0.215*	0.617***
	(1.68)	(3.69)	(10.56)	(1.04)	(2.93)	(7.44)	(1.31)	(2.31)	(7.79)
Car_Motorbike	1.293***	2.288***	2.152***	1.197***	2.168***	2.034***	1.395***	2.458***	2.393***
	(18.38)	(15.11)	(17.40)	(12.30)	(11.95)	(14.22)	(13.62)	(8.87)	(9.43)
Public Transport	-0.0138	1.964***	2.976***	-0.154	1.693***	2.650***	0.109	2.304***	3.501***
	(-0.15)	(12.62)	(24.08)	(-1.15)	(8.96)	(18.42)	(0.82)	(8.21)	(13.90)
Constant	-3.133***	-5.572***	-6.333***	-3.131***	-5.693***	-6.499***	-3.401***	-6.158***	-7.036***
	(-23.58)	(-25.15)	(-32.33)	(-17.27)	(-20.40)	(-25.95)	(-17.37)	(-16.27)	(-20.46)
Annual Dummies		Yes			Yes			Yes	
Regional Dummies		Yes			Yes			Yes	
Pseudo R-squared		20,96%			19,27%			21,68%	
N		76899			36141			40758	

Table 5: Generalized Multinomial Logit - Without Greater London

Table 5. MLN Without London

	Overall			Male Only			Female Only		
	Out < 30	*Out 30-45*	*Out > 45*	*Out < 30*	*Out 30-45*	*Out > 45*	*Out < 30*	*Out 30-45*	*Out > 45*
Age bands (Ref: 20-29)									
30 - 49	0.0694	0.0936	0.266***	0.193*	0.227	0.325**	-0.0274	-0.0326	0.219
	(1.07)	(1.03)	(3.36)	(2.09)	(1.86)	(3.23)	(-0.30)	(-0.24)	(1.68)
50 - 59	0.0731	0.0693	0.390***	0.218*	0.253	0.488***	-0.0492	-0.193	0.256
	(0.96)	(0.63)	(4.12)	(2.04)	(1.76)	(4.12)	(-0.45)	(-1.10)	(1.58)
Over 60	0.111	-0.119	0.230	0.206	-0.0120	0.302	0.0948	-0.352	0.188
	(1.10)	(-0.71)	(1.63)	(1.52)	(-0.06)	(1.83)	(0.60)	(-1.04)	(0.65)
child<15 years	-0.115*	0.0344	0.0103	-0.0523	0.181*	0.146	-0.184*	-0.243	-0.375**
	(-2.17)	(0.47)	(0.16)	(-0.72)	(2.02)	(1.93)	(-2.33)	(-1.82)	(-2.86)
Couple	0.0951*	0.162*	0.0904	0.0140	0.160	0.0829	0.166**	0.120	0.0317
	(2.17)	(2.56)	(1.67)	(0.23)	(1.92)	(1.21)	(2.61)	(1.20)	(0.35)
Mortage/Homeownership	0.299***	0.471***	0.553***	0.381***	0.453***	0.628***	0.175*	0.488**	0.375**
	(4.86)	(4.98)	(6.85)	(4.47)	(3.81)	(6.24)	(1.97)	(3.10)	(2.76)
Address Stability (Ref. <24 months)									
2- 10 years	-0.0536	0.0771	0.0173	0.0309	0.106	0.0377	-0.149	0.0371	-0.0370
	(-0.90)	(0.93)	(0.25)	(0.38)	(1.00)	(0.45)	(-1.75)	(0.28)	(-0.31)
>10 years	-0.0960	-0.221*	-0.255**	0.0242	-0.0695	-0.158	-0.225*	-0.480**	-0.465**
	(-1.48)	(-2.33)	(-3.21)	(0.27)	(-0.58)	(-1.64)	(-2.39)	(-3.05)	(-3.25)
Part-time	-0.170**	-0.707***	-0.820***	-0.248	-0.366	-1.206***	-0.142*	-0.726***	-0.593***
	(-3.02)	(-6.82)	(-8.30)	(-1.88)	(-1.87)	(-5.18)	(-2.19)	(-5.89)	(-5.20)
Job type (Ref:low-skilled)									
Intermediate Occupation	0.0917	0.528***	0.970***	0.0950	0.461***	0.907***	0.0938	0.771***	1.244***
	(1.65)	(5.39)	(9.29)	(1.26)	(3.96)	(7.67)	(1.12)	(3.97)	(5.34)
Managerial Professions	0.206***	1.058***	1.925***	0.210**	0.984***	1.783***	0.206*	1.289***	2.384***
	(3.99)	(12.08)	(20.52)	(3.13)	(9.74)	(17.09)	(2.54)	(7.02)	(10.87)
Lenght of employment (Ref: < 2 years)									
2 - 5 years	-0.113	-0.254**	-0.338***	-0.0199	-0.235*	-0.362***	-0.217*	-0.269*	-0.274*
	(-1.90)	(-3.05)	(-4.86)	(-0.24)	(-2.22)	(-4.27)	(-2.53)	(-1.98)	(-2.25)
5 - 10 years	-0.176**	-0.355***	-0.502***	-0.129	-0.284**	-0.522***	-0.227**	-0.445**	-0.444***
	(-2.94)	(-4.26)	(-7.12)	(-1.53)	(-2.74)	(-6.14)	(-2.64)	(-3.15)	(-3.51)
10 - 20 years	-0.157*	-0.471***	-0.711***	-0.0928	-0.501***	-0.732***	-0.240**	-0.366*	-0.670***
	(-2.54)	(-5.34)	(-9.35)	(-1.08)	(-4.52)	(-8.06)	(-2.63)	(-2.48)	(-4.78)
> 20 years	-0.177*	-0.616***	-0.858***	-0.101	-0.753***	-0.923***	-0.304**	-0.277	-0.740***
	(-2.45)	(-5.81)	(-9.49)	(-1.07)	(-5.75)	(-8.78)	(-2.63)	(-1.53)	(-4.16)
Public firm	-0.343***	-0.234***	-0.375***	-0.498***	-0.258**	-0.441***	-0.204***	-0.202*	-0.251**
	(-7.47)	(-3.64)	(-6.74)	(-6.85)	(-2.94)	(-6.04)	(-3.35)	(-2.08)	(-2.80)
Female	-0.237***	-0.605***	-0.853***						
	(-5.37)	(-9.51)	(-15.43)						
Threshold Index (Ref: 90-110)									
<90	-0.177***	-0.408***	-0.391***	-0.248***	-0.426***	-0.451***	-0.0862	-0.377**	-0.252*
	(-3.61)	(-5.62)	(-5.96)	(-3.66)	(-4.71)	(-5.73)	(-1.20)	(-3.10)	(-2.11)
110-120	-0.00880	0.0335	0.205*	0.0730	-0.0386	0.137	-0.117	0.155	0.377*
	(-0.12)	(0.32)	(2.23)	(0.72)	(-0.28)	(1.20)	(-1.04)	(0.95)	(2.38)
>119	0.0584	0.199**	0.597***	0.0507	0.179	0.547***	0.0707	0.255*	0.717***
	(1.07)	(2.69)	(9.32)	(0.68)	(1.91)	(7.09)	(0.88)	(2.08)	(6.14)
Car_Motorbike	1.355***	2.464***	1.525***	1.341***	2.403***	1.324***	1.361***	2.496***	2.135***
	(14.54)	(9.44)	(9.52)	(9.94)	(7.51)	(7.58)	(10.51)	(5.52)	(5.17)
Public Transport	-0.128	1.579***	2.257***	-0.252	1.456***	1.944***	-0.0348	1.693***	3.071***
	(-0.84)	(5.38)	(13.25)	(-1.04)	(3.93)	(10.15)	(-0.17)	(3.45)	(7.29)
Constant	-3.180***	-5.786***	-5.739***	-3.353***	-6.003***	-5.868***	-3.270***	-6.247***	-6.985***
	(-20.49)	(-17.97)	(-23.78)	(-15.47)	(-14.94)	(-20.14)	(-14.56)	(-11.33)	(-13.39)
Annual Dummies		Yes			Yes			Yes	
Regional Dummies		Yes			Yes			Yes	
Pseudo R-squared		12,34%			11,09%			12,21%	
N		67528			31194			36334	

Table 6: Margins - With Greater London

Table 6. - Margins for Multinomial Logit

	Overall			*Male*			*Female*		
Threshold Index (Ref: 90-110)	*Out <30*	*Out 30-45*	*Out > 45*	*Out <30*	*Out 30-45*	*Out > 45*	*Out <30*	*Out 30-45*	*Out > 45*
<90	-0.005**	-0.007***	-0.015***	-0.008**	-0.007***	-0.022***	-0.022	-0.006***	-0.008**
	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)
110-120	-0.001**	0.003	0.011***	0.007	0,007	0.008	-0.004	-0.000	0.013***
	(0.003)	(0.003)	(0.003)	(0.005)	(0.005)	(0.006)	(0.004)	(0.003)	(0.004)
>119	-0.000***	0.004*	0.024***	-0.000	0.005*	0.029***	0.002	0.002	0.020***
	(0.002)	(0.002)	(0.002)	(0.004)	(0.003)	(0.004)	(0.003)	(0.002)	(0.003)

Table 7: Margins - Without Greater London

Table 7. - Margins No London

	Overall			*Male*			*Female*		
Threshold Index (Ref: 90-110)	*Out <30*	*Out 30-45*	*Out > 45*	*Out <30*	*Out 30-45*	*Out > 45*	*Out <30*	*Out 30-45*	*Out > 45*
<90	-0.005**	-0.007***	-0.008***	-0.009***	-0.009***	-0.014***	-0.022	-0.004***	-0.003*
	(0.002)	(0.001)	(0.002)	(0.003)	(0.002)	(0.003)	(0.002)	(0.001)	(0.001)
110-120	-0.001	0.000	0.006**	0.007	-0.002	0.006	-0.004	0.002	0.006**
	(0.003)	(0.002)	(0.003)	(0.005)	(0.004)	(0.005)	(0.004)	(0.002)	(0.003)
>119	-0.001	0.003**	0.019***	-0.000	0.004	0.026***	0.001	0.003*	0.013***
	(0.002)	(0.002)	(0.002)	(0.004)	(0.003)	(0.004)	(0.003)	(0.002)	(0.002)

Table 8: Generalized Multinomial Logit - With additional controls

Table 8. - Generalized Multinomial Logit with interactions

	Overall			**Male Only**			**Female Only**		
	Out < 30	*Out 30-45*	*Out > 45*	*Out < 30*	*Out 30-45*	*Out > 45*	*Out < 30*	*Out 30-45*	*Out > 45*
child<15 years	-0.0532	-0.0884	0.0472	-0.0254	0.0520	0.184**	-0.0925	-0.303**	-0.261**
	(-1.18)	(-1.46)	(0.98)	(-0.40)	(0.70)	(3.15)	(-1.40)	(-2.85)	(-2.96)
Female	-0.212***	-0.487***	-0.633***						
	(-5.46)	(-9.70)	(-15.42)						
Couple	0.0889	0.416**	0.817***	-0.130	0.194	0.487***	0.442	0.915**	1.587***
	(0.55)	(2.66)	(6.80)	(-0.70)	(1.05)	(3.51)	(1.25)	(3.05)	(6.57)
Couple*wageband									
couple*ww<200	0.0150	-0.0553	-1.040***	0.321	0.553	-0.825*	-0.333	-0.722	-1.714***
	(0.08)	(-0.21)	(-4.73)	(1.07)	(1.28)	(-2.22)	(-0.90)	(-1.82)	(-5.24)
couple*ww200-500	-0.00414	-0.485**	-0.761***	0.164	-0.446*	-0.467**	-0.286	-0.795*	-1.497***
	(-0.02)	(-2.83)	(-5.65)	(0.83)	(-2.14)	(-2.86)	(-0.79)	(-2.50)	(-5.83)
couple*ww500-1000	-0.0338	-0.253	-0.621***	0.175	-0.0172	-0.327*	-0.436	-0.801*	-1.441***
	(-0.20)	(-1.50)	(-4.78)	(0.88)	(-0.08)	(-2.16)	(-1.18)	(-2.52)	(-5.59)
couple*ww>1000				*omitted for collinearity*					
wageband(Ref. Grsswk<200)									
ww200-500	0.214*	0.671***	0.486**	0.210	0.701	0.0980	0.219	0.516*	0.546**
	(2.09)	(3.34)	(3.10)	(0.94)	(1.91)	(0.35)	(1.81)	(2.09)	(2.79)
ww500-1000	0.409***	0.944***	0.991***	0.418	0.812*	0.696*	0.397**	0.981***	0.861***
	(3.47)	(4.46)	(6.01)	(1.80)	(2.16)	(2.45)	(2.59)	(3.61)	(3.96)
ww>1000	0.279	0.839**	0.597**	0.499	0.890*	0.540	-0.248	0.560	-0.0839
	(1.52)	(3.27)	(2.97)	(1.75)	(2.15)	(1.72)	(-0.77)	(1.49)	(-0.28)
Threshold Index (Ref: 90-110)									
<90	-0.108*	-0.202***	-0.227***	-0.156*	-0.183*	-0.234***	-0.0411	-0.225*	-0.236**
	(-2.42)	(-3.39)	(-4.53)	(-2.51)	(-2.38)	(-3.75)	(-0.64)	(-2.35)	(-2.80)
110-120	0.0310	0.0873	0.188**	0.138	0.170	0.110	-0.0995	-0.0202	0.368***
	(0.47)	(1.04)	(2.74)	(1.55)	(1.57)	(1.25)	(-1.01)	(-0.15)	(3.34)
>119	0.0504	0.0971	0.355***	0.0369	0.125	0.312***	0.0854	0.0537	0.492***
	(1.00)	(1.50)	(6.77)	(0.52)	(1.47)	(4.64)	(1.18)	(0.53)	(5.73)
Annual Dummies	Yes			Yes			Yes		
Regional Workplace Dummies	Yes			Yes			Yes		
Other controls	Yes			Yes			Yes		
Pseudo R-squared	21,24%			19,48%			21,83%		
N	76.899			36.141			40.758		

Table 9: Margins - With additional controls

Table 9. - Margins for Multinomial Logit with new terms

	Overall			*Male*			*Female*		
Threshold Index (Ref: 90-110)	*Out <30*	*Out 30-45*	*Out > 45*	*Out <30*	*Out 30-45*	*Out > 45*	*Out <30*	*Out 30-45*	*Out > 45*
<90	-0.004*	-0.004**	-0.008***	-0.006**	-0.004	-0.011***	-0.001	-0.004**	-0.005**
	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)
110-120	0.001	0.001	0.008**	0.007	0.005	0.004	-0.005	-0.002	0.012***
	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)	(0.005)	(0.004)	(0.003)	(0.004)
>119	0.001	0.001	0.016***	-0.000	0.002	0.019***	0.002	-0.001	0.015***
	(0.002)	(0.002)	(0.002)	(0.004)	(0.003)	(0.004)	(0.003)	(0.002)	(0.003)