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ABSTRACT

The Employment and Earnings of Migrants in Great Britain*

Using nationally representative, longitudinal data from the first 14 waves of the British Household Panel Survey we examine the labour market returns to inter-regional migration in Great Britain. Controlling for endogeneity, heterogeneity and self-selection, we find substantial long-run wage premiums associated with migration for both males and females who move for job-related reasons. There is, however, no evidence that moving across regions increases the probability of employment for males and females; in fact, some female movers experience a long-run employment penalty.

JEL Classification: C33, J31, J61, J64, R23

Keywords: migration, wages, employment, sample selection

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I. Introduction

The migration of workers from one local labour market to another has important implications both for the welfare of workers themselves, and for economic adjustment more widely. Migration has traditionally been explained using a human capital framework whereby individuals move region if there is an expected net gain to lifetime utility from doing so. The costs of moving can be extensive, from the non-financial costs of breaking down and rebuilding social networks, to the financial costs of moving house and undertaking job search. Migrants, however, will have the benefit of a 'new' labour market with potentially enhanced job opportunities and remuneration (Sjaastad, 1962) and the flow of rent-seeking migrants between regions, can potentially act as an equilibrating force, bidding away disparities in employment and wage distributions. It is therefore important to estimate the potential labour market benefits of migration.

Much of the current literature on within-country migration (hereafter, simply 'migration') analyses the factors which affect the migration decision (e.g. Jackman and Savouri, 1992; McCormick, 1997). Many personal characteristics such as employment status, education and housing tenure have consistently been found to be important. Fewer studies investigate what happens to those who migrate: do they, in fact, experience an improvement in their labour market outcomes? If not, then a basic assumption of the human capital approach to migration is challenged.

Good research on migration needs individual- or household- level panel data and the majority of research into migration has focused on the US, much of it using the seven cohorts of the National Longitudinal Survey of Youth. Most US studies estimate the

wage returns to migration: for example, Bartel (1979) and Yankow (2003) find positive returns to wages for migrant males, whilst Hunt and Kau (1985) detect no immediate effect on wages for first-time movers but substantial wage growth for multiple movers. For females, there is evidence of a decrease in wages following a move (Lichter, 1983; Maxwell, 1988). Fewer studies estimate the employment effects of migration in the US. However, Cooke and Bailey (1996) find no effect on the male employment probability, but a nine percentage point increase for females.

For the UK, there have been three key studies, each of which uses data from the British Household Panel Survey (BHPS). Boheim and Taylor (2005) focus on males and define a migrant as someone who moves between two of 278 local authority districts (LADs). They find an immediate wage return to migration of around 3% that tails off two years after migration. Restricting their sample to those only moving for job-related reasons, Boheim and Taylor find a larger immediate gain to wages of 6% with a positive but insignificant wage premium of 4.1% after three years. UK research on the employment effects of migration has focused on couples. Rabe (2006) finds that migration had little impact on employment status for males in dual-earner couples but women were disadvantaged after having moved while Taylor (2006) found that employment was reduced for both genders post-migration for anyone who had changed address.

Like previous studies of migration in the UK, we use the BHPS as it is the only source of individual-level panel data which enables researchers to track migrants through time. Unlike most the previous literature which has focused on youths in the US and either males or couples in the UK, our sample includes males and females of working

age. Furthermore, in contrast to previous British studies we focus on migration across the boundaries of the eleven standard statistical regions of Great Britain.[1] This is because, compared to potentially short-distance movements between local authority districts, an inter-regional migrant is much more likely to be changing labour market and will incur more substantial costs of migration. In this scenario, the existence of small or insignificant labour market returns to migration challenges a pure human capital approach to explaining migration decisions. Migration across regional boundaries is also of importance from a policy perspective. As part of its strategy to improve national productivity, the UK government has considered the potential of labour mobility to narrow productivity gaps between different regions of the country (HM Treasury, 2001). The existence of enhanced employment opportunities for inter-regional migrants would tend to support policies which encourage migration.

Previous studies have also emphasised the potential differences in the returns to migration according to characteristics and motivations of migrants themselves. Labour market outcomes frequently differ between men and women for reasons of human capital, fertility and tastes and preferences hence we model men and women separately. Women are also frequently 'tied' movers, whose migration reflects the labour market status of their husbands or partners; such movers can be identified in the BHPS and we estimate returns to migrations separately for tied and non-tied female migrants. We also have some information about the motivations of non-tied migrants, in particular whether they moved locations for job-related reasons or not. Differences in the returns to migration according to whether the move was job-related

[1] These are London, South East, South West, East Anglia, East Midlands, West Midlands, Yorkshire & Humberside, North East, North West, Wales and Scotland.

or not are also discussed. It is worth emphasising that we investigate the effects of migration on employment outcomes as well as earnings.

Using panel data means that we can focus on the long-run as well as short-run impact of migration on labour market outcomes. The idea that migrants take time to adjust to a new destination labour market (assimilate) is well-established in the literature on international migration (see, e.g. Borjas, 1985) and this is usually explained as a process whereby the migrant acquires destination-specific labour market information and human capital. It seems likely that such factors are also important in the case of internal migration. For example, migration may be immediately followed by a period of job search, or migrants may initially take a lower-paid job before finding a better job match in the new labour market.

Finally, our empirical approach addresses three specific reasons why migration might be endogenous. First, individuals who are unobservably well-motivated might be more likely to migrate, and will have higher wages, other things being equal. Second, there is potential reverse causality because those individuals/households with higher wages are more likely to be able to afford to migrate. We assume that there is a time-invariant component that can be removed using standard fixed-effects methods; we can also deal with the correlation between the idiosyncratic component and migration using some potentially valid instruments that explain why people migrate, but are not directly related to higher wages. Finally, when analysing wages, there are standard selection issues that need addressing: the employed are unlikely to be a random sub-sample of working-age adults. Semykina and Wooldridge (2005) provide an econometric framework that allows us to address all these issues simultaneously.

The structure of the paper is as follows. Section II describes the dataset used and provides summary migration statistics for both wage and employment models. The methodology used to estimate the returns from migration is discussed in section III. Section IV presents the results while section V concludes.

II. Data

The BHPS was first sampled in 1991 when 10,300 individuals (5,500 households) were interviewed across Great Britain.[2] Households in this nationally representative sample have since been interviewed annually. The BHPS follows individuals who move residence and the extensive questionnaire on labour market and personal characteristics captures individuals' circumstances both pre- and post-migration. The panel nature of the survey thus enables the construction of detailed histories for individuals. We are able to monitor not only changes in region of residence but also earnings and labour market status over time.

To investigate the employment and earnings of migrants, our analysis uses the first 14 waves of the BHPS (1991-2004). We exclude students, the retired, and those in the armed forces, because migration for these groups is unlikely to be for labour market reasons. Our sample consists, therefore, of those aged 17-64, either employed or unemployed/inactive (where those inactive do not include students or the retired). To estimate earnings models, we require a subset of the full sample. Clearly, those unemployed, inactive or otherwise not reporting a wage are omitted.

[2] Those living in Northern Ireland were not sampled until 2001 hence our analysis throughout applies only to Great Britain.

Because we are interested in the labour market effects of migration, our definition of migration excludes those who change region but remain with their existing employer (for example, those moving to be closer to their place of work, or relocations for internal promotion reasons). Thus, where an individual is employed post-migration, we analyse those who change job following migration. There are 232 male migrants in our sample out of 3,560 males, and 332 female migrants from 4,234 women (see Table 1). Thus the migration rate is 7.84% for females and 6.52% for males. For the employed sub-sample, these proportions are 6.40% and 5.88% respectively – the gap is smaller because males have a slightly higher employment rate in our data. These migration rates are considerably lower than those found in previous studies of the UK since we are using movements across the eleven standard statistical regions of Great Britain as the definition of migration rather than relatively smaller movements across local authority boundaries - census data indicate that two-thirds of migrants move less than 10km while only one if fifteen move more than 200km (Champion, 2005).

There is a variety of reasons why migration occurs. In our regressions, we distinguish between migrants who moved for reasons related to their employment and those who moved for other reasons. For females, we further distinguish so-called tied migrants from the rest. To identify job-related migrants, we use the BHPS question: "Did you move for reasons that were wholly or partly to do with your own employment?". Table 2 shows that 24.5% of migrants moved for job reasons (30.6% in the employed sub-sample). Notice that males are more likely to have moved for job-related reasons than women (34.2% and 17.7% respectively, and a similar gap in the employed sub-sample), suggesting males may be so-called lead movers and females so-called tied

movers (Mincer, 1978). Tied females can be identified in the BHPS as those who stated that they moved for reasons related to the employment of their partner and Table 2 shows that 14.0% of female migrants are tied movers (8.4% in the employed sub-sample).

Table 3 reports average real hourly wage rates pre- and post-migration. To capture long-run effects, the third column averages wages for a migrant for two or more years since migration. For both males and females, those who migrate tend to have higher wage rates the year prior to a move than non-migrants. This might reflect the characteristics, including human capital, of (potential) migrants.

In the raw data the average short-run increase in the real hourly wage for male non-migrants is 0.46% increasing to 4.10% in the long-run. The corresponding changes for male migrants are very different. For male migrants who migrate for non-job reasons, the short-run change is -2.54%, but increases to 16.14% in the long-run; in other words migration pays only in the long-run (compared with non-migrants, a raw Differences-in-Differences (DiD) estimate of 12.04%). For those moving for job reasons, the increases are 6.89% in the short-run (DiD=6.43%) and 36.87% in the long-run (DiD=32.77%). Two obvious conclusions emerge. First, the raw data suggest that we should model the returns to migration separately for those who moved for job-reasons and those who moved for other reasons. Second, in the raw data there are very strong wage returns to migration, especially for those who migrated for job-reasons. In the econometric models estimated below, we investigate the extent to which these differentials persist once we control for observable characteristics, unobserved heterogeneity, selection bias, and other causes of endogeneity.

For female migrants, the raw data on real wages are very different. (The increases for the control group, i.e. non-migrants, are the same as for men.) For tied female migrants average real wage rates fall in the short- and long-run. Females moving for job reasons experience a drop in average real wage rates in the short-run and only recover to positive returns in the long-run. For these two groups, moving has an immediate detrimental effect on wages. This is unexpected, though may represent a period of transition for the migrant who subsequently benefits from the new labour market in the long-run. It is only for females who migrate for non-job reasons that there are immediate positive returns, and this group has the highest of all long-run wage returns. One obvious implication of the different patterns by gender in the raw data is that males and females need to be modelled separately.

Employment rates for migrants and non-migrants are shown in table 4. For both males and females, migrants are less likely to be employed in the year prior to migrating. This suggests that those who are unemployed/inactive may be pushed into migration in the pursuit of better employment prospects.

In the short-run only those moving for job reasons experience immediate higher employment rates after moving (DiDs of 6.23 and 15.20 percentage points for males and females respectively); all other groups experience an immediate reduction in their employment probability. As with wages, migration only has a positive effect for non-job related migrants in the long-run (DiDs of 9.87 and 8.73 for males and females respectively). The effect for tied females is rather different: moving for reasons related to the job of another member of the household results in a large drop in the

employment rate of 16.85 percentage points (DiD=-16.82). However, in the long-run tied females are more likely to be in employment (DiD=20.51).

III. Methodology

Estimating the causal effect of migration on labour market outcomes requires that we address three specific reasons why migration might be endogenous. First, individuals who are unobservably well-motivated may be more likely to migrate, and are also likely to have higher wages and better employment prospects, other things equal. Second, if those individuals in employment or with higher wages are more likely to be able to afford to migrate, there is the potential for reverse causality. Finally, the employed may not be a random sub-sample of working-age adults suggesting that selection bias should be accounted for.

Semykina and Wooldridge (2005) (hereafter, SW) provide a framework that allows us to model all these issues simultaneously. Consider the following standard panel-data model of log wages (our notation here is based on SW; see their equation (6)):

$$y_{it1} = x_{it1}\beta_1 + c_{i1} + u_{it1}. \qquad (1)$$

y_{it1} is log real gross hourly wage, x_{it1} is a *1*x*K* vector of covariates comprising dummies that model time since migration (which are potentially endogenous), as well as a range of observable personal characteristics which act as controls, c_{i1} is a time-invariant unobserved effect and u_{it1} is a time-varying, idiosyncratic error term. The subscript 1 indicates that y_{it1} and x_{it1} are observed only if an indicator variable $s_{it2} = 1$, i.e. if the individual is employed. We also assume that there is

available a *1* x *L* (*L* > *K*) vector of instruments z_{it} which is observed whether or not the individual is working.

SW make three further assumptions. The first specifies the form of the selection model:

$$s_{it2} = 1[\eta_{t2} + z_{it}\delta_{t2} + \bar{z}_i\xi_{t2} + v_{it2} > 0] \text{ where } \quad v_{it2} \mid z_i \sim N(0,1)\ t = 1,...,T\ . \tag{2}$$

Here the $\bar{z}_i$ are time-averages of the z_{it}, and appear for reasons given below. In general, there is a separate selection equation for each year. The selection issue arises because the idiosyncratic error in the wage equation u_{it1} is correlated with the error term in the selection equation v_{it2}. SW specify this as follows:

$$E(u_{it1} \mid z_i, v_{it2}) = E(u_{it1} \mid v_{it2}) = \rho_{t1}v_{it2}.$$

Note that the instruments are uncorrelated with both v_{it2} and u_{it1}. Finally, the correlation between the unobserved effect c_{i1} and the observables is assumed to be a linear function of the time-averages of the instruments:

$$c_{i1} = \eta_1 + \bar{z}_i\xi_1 + a_{i1} \text{ where } E(a_{it1} \mid z_i, v_{it2}) = E(a_{it1} \mid v_{it2}) = \phi_{t1}v_{it2}.$$

Notice that the idiocyncratic component of this equation is also correlated with v_{it2}. Effectively, SW employ a Mundlak-type procedure to control for time-invariant heterogeneity: the correlation of the explanatory variables x_{it1} with c_{i1} acts linearly through the time averages of the exogenous variables $\bar{z}_i$ (Mundlak, 1978). Moreover, these time-averaged exogenous variables $\bar{z}_i$ act as controls for unobserved heterogeneity in the probit model for selection; this means that $\bar{z}_i$ has more variables than x_{it1}. In other words, these extra variables in z_{it} affect the decision to work but not the wage received.

The final estimating model (SW's equation (26)) is:

$$y_{it1} = x_{it1}\beta_1 + \eta_1 + \bar{z}_i\varepsilon_1 + \gamma_t\lambda_{it2} + e_{it1}. \qquad (3)$$

Compared with Equation (1), effectively there are two extra terms in the estimating model, $\bar{z}_i$ and λ_{it2}. These arise because of the heterogeneity and selection issues discussed above. λ_{it2} is a time-varying inverse Mills ratio, computed from a probit regression of s_{it2}, a dummy for being employed, on all exogenous control variables *and* at least one instrument influencing the decision to work but not the wage received (equation (2) above). A test of the joint significance of the *T* Mills ratios in (3) is a test for selection bias in the model. The second set of extra variables in Equation (2) is $\bar{z}_i$. As noted, these arise because of the unobserved heterogeneity term c_{i1} in Equation (1).

Finally, migration might also be correlated with the idiosyncratic component of the error term u_{it1}. In this case, the model should be estimated using pooled 2SLS, with some additional instruments that are thought to influence the migration choice but not wage rates. As already noted, the vector z_{it} is assumed to be uncorrelated with u_{it1}.[3]

One nice feature of SW's estimating equation is that variables 'correcting' for selection and time-invariant heterogeneity can be added independently of each other.

[3] In the implicit first stage equation, the dependent variable is a dummy for migration. Angrist and Kreuger (2001) show the consistency of two stage least squares does not rely on having the correct functional form, which is linear here rather than being a logit or probit.

First suppose Equation (3) is estimated by pooled OLS: this generates four models labelled OLS (neither λ_{it2} or $\bar{z}_i$ included), OLS with selection (only λ_{it2} included), fixed-effects (only $\bar{z}_i$ included) and fixed-effects with selection (both included). Another four models arise when Equation (2) is estimated by pooled 2SLS rather than pooled OLS. Note that an extended set of instruments is used here to capture variables which affect migration in addition to those which reflect the employment decision. We estimate all eight models of wages, however since selection is not an issue for the employment models there are four equations (Equation 2) that match the eight wage equations when analysing this labour market outcome.

As an initial, baseline attempt to capture the effects of migration we define a dummy variable which takes the value 1 if the individual has ever migrated and zero otherwise. This, however, imposes the restriction that the effect of migration does not vary with the time elapsed since the migration event took place, a restriction which is not supported by the data. Rather, as we might expect, time in the new labour market affects labour market outcomes and to capture this effect we have included three dummy variables representing one year since migration, two years since migration and three or more years since migration. This relatively parsimonious specification was arrived at after testing a number of specifications based on up to 14 dummy variables reflecting 1 to 14 years since migration. It turned out that the null hypothesis that the effect of migration is constant after the third year since migrating was not rejected for both wage and employment (pooled OLS) models with p-values of 0.06 for males (0.23 for females) and 0.66 (0.47) respectively. Finally, to separate the effects of migration into those for job-related migrants and non-job-related

migrants, we split our migration dummies into these two mutually exclusive categories while for females we also treat tied migrants as a separate category.

The vector of covariates, x_{it1}, also contains age and its square and months of job tenure as well as dummies for region of residence (11), occupation (6), , firm size (3), marital status, trade union membership, part-time employment and year interviewed (14). In addition to these exogenous covariates in x_{it1}, z_{it} in the probit regression for selection into work contains the instruments non-labour household income, age of the youngest child, and dummies for the presence of a working spouse, children, and housing tenure. The instruments used when estimating by pooled 2SLS include (in addition to the lags of those used in the selection specification), spouse age and its square, spouse wage rate and experience with its square, and dummies for whether the individual liked their current neighbourhood and whether they would like to move. These are all lagged one period since this is when the decision to migrate is made.

The employment model is given by Equation (2). Although it is estimated as a probit when generating the inverse Mills ratios, in the results reported below, it is re-estimated using pooled OLS and pooled 2SLS because the linear probability model is more convenient when using SW's method to take account of endogeneity.

IV. Results

Table 5 presents the results for our migration variables in the wage model while Table 6 does the same for the employment model.[4] Table 5, column 1 (labelled 'pooled OLS') contains estimates from a pooled OLS model in which no attempt is made to

[4] Estimates of the parameters associated with the full range of covariates are in the appendix.

control for the various sources of endogeneity or selection. Column 2 (labelled `OLS with selection') controls for selection into work, while column 3 (labelled 'fixed-effects') controls for a time-invariant unobserved heterogeneity term. Column 4 (labelled 'fixed-effects with selection') combines the corrections for selection and heterogeneity and, finally, column 5 (labelled '2SLS with selection and fixed-effects') controls for all three possible sources of endogeneity. The three other possible specifications discussed in the previous section have been omitted, as the results were qualitatively similar to those in column 5.

The first panel of Table 5 presents estimates of the impact on wages of the having-ever-migrated dummy, for male workers. The results from the pooled OLS model suggest that migrants receive a statistically significant wage premium relative to those who have never migrated, irrespective of whether the migration was for job reasons or not. However, the magnitude of this premium depends on the reasons for migration with those who moved for job reasons receiving a wage boost more than three times that of those who moved for non-job reasons, namely 0.136 and 0.039 log-points respectively. Controlling for selection into employment makes little difference to these results, however controlling for unobserved heterogeneity attenuates the wage advantage associated with migration such that, for those moving for non-job reasons, the wage premium is close to zero and statistically insignificant. For those males moving for job-related reasons, a substantial, statistically significant, premium of 0.088 log-points remains. Roughly speaking, controlling for fixed-effects lowers the estimate by approximately 0.04 log-points, suggesting that the more 'able' or 'motivated' males are more likely to migrate.

For all our models in Table 5, correcting for selection had little impact on the estimates, whereas controlling for heterogeneity using the Mundlak-type procedure lowered the estimates by between 0 and 0.06 log-points. A joint test of the significance of the *T* inverse Mills ratios terms – λ_{it2} in Equation (3) – rejected the null of no selection bias in the OLS models but did not reject in the fixed effects models. In all cases, however, for both males and females, the inclusion of the Mills ratios made very little difference to the values of the estimates. On the other hand, the $\bar{z}_i$ terms in Equation (3) are always jointly significant. Therefore, of the first four columns in Table 5, it is the fixed-effects model that is the preferred model for both males and females.

The second panel of Table 5 reveals how male wage premiums associated with migration vary with time since migration. Again, these are estimated separately by reason for moving. The results suggest that the wage benefits for male migrants grow through time in the destination labour market. This is true both for job-related and non-job migration. However, controlling for unobserved heterogeneity and selection, it is only for job-related migrants where statistically significant effects are found, and, here, only in the long run where men who migrated 3 years ago or longer enjoy a 0.142 log-point premium relative to those who have never migrated.

The results for female workers are contained in the third and fourth panels of Table 5. To estimate the impact of migration on the wages of females we use a different specification. This is motivated by the fact that a substantial proportion of female migrants in our sample are tied movers and past studies have found these females have significant differences in migration outcomes, compared with both other female

migrants and males. Thus, in the third panel of the table the effect on the wage of having ever migrated is interacted with three alternative reasons for migration. These are (i) job-related migration; (ii) being a tied mover and (iii) other reasons.

In the fixed-effects model (column 3 of the table) the only significant wage effect is around 0.080 for females who moved for job reasons. The effect for tied female migrants is a reduction in the wage of 0.027 log-points, and a wage increase of 0.028 log-points for other female migrants, but both these effects are insignificant.

In the fourth panel of Table 5 we consider the effects of time since migration for females who have moved for job-related reasons only; this is because it is only for this group of movers that there were any statistically significant effects and reporting the coefficient estimates for the full set of interactions between time since migration and reason for migration would unnecessarily complicate the table. These estimates should therefore be interpreted as the wage premium to job-related migrants relative to other migrants *and* non-migrants. As in the case of male job-related migrants, the migration wage premium is a long run effect of 0.10-0.12 log-points, depending on specification, accruing after 2 years in the destination region. More precisely, for the fixed-effects specification, the returns are 0.042 log-points a year after migrating, 0.052 two years after migrating, and 0.111 log-points thereafter. Recall that the corresponding estimates for males are similar: 0.028, 0.078 and 0.142 log-points. Overall, the results so far suggest that males and females who move for job-related reasons do experience a sizeable wage premium and that this is stronger in the long-run.

The third source of endogeneity which could affect the consistency of our estimators is the possible correlation between the idiosyncratic error and migration. To control for this, we used 2SLS to estimate the model. The results from this procedure (also controlling for selection and fixed effects) are contained in the fifth column of Table 5.[5] It is clear that the resulting estimates are substantially out of line with the other estimates in the table and, whilst often significant, are implausibly large in absolute value. This 'problem' persists when we change the instruments, when we add them one at a time, and in other specifications of the models not reported. This is very typical when there are so-called weak instruments: weak instruments can cause bias in the estimates and standard errors of 2SLS (Bound, Jaeger and Baker, 1995). Basically, our instruments have low explanatory power in the reduced-form equation for the ever-migrated dummy: Shea's (1997) partial R-squared are below 1% for the majority of our instruments across our models. Stock and Yogo (2005) propose a formal test for weak instruments using a Cragg-Donald (1993) lowest eigenvalue F-statistic. For all models we easily reject the null of strong instruments.

The bias due to weak instruments is exacerbated if our instruments are correlated with the structural equation error. Our models reject the null of valid instruments in an overidentification test at the 1% significance level, suggesting we have the possibility of serious bias in our 2SLS estimates, consistent with the large estimates found in the 2SLS wage equations. The bias caused by our weak and invalid instruments may be greater than that of OLS. We therefore acknowledge the potential presence of bias due to the simultaneity of wages and migration, but note that we have been unsuccessful in controlling for it. We therefore have to assume that the correlation of the error term

[5] Results from 2SLS models in which selection effects and individual heterogeneity were ignored were

with the migration variables works only through the time-invariant individual effect, which we have controlled for by using fixed-effect techniques.

The results for the employment model are given in Table 6. Fewer specifications are reported in this table since selection into employment is not an issue here. Column 1 gives the results from pooled OLS (linear probability model) whilst column 2 controls for unobserved heterogeneity. Column 3 additionally accounts for migration being endogenous in the model, however these estimates suffer from the same issues as the 2SLS wage equation estimates and are presented for completeness only; our discussion is restricted to the OLS and fixed-effects models. Note that the coefficient estimates can be interpreted as the *ceteris paribus* change in the probability of being employed associated with the relevant migration dummy variable(s). In all four fixed-effects specifications in column 2, the Mundlak-type $\bar{z}_i$ variables are always jointly significant, making this our preferred model.

The first panel of Table 6 suggests that migration for job reasons has a negative effect on male employment probabilities of -8.7 percentage points, while those who have ever migrated for job reasons experience no significant effect. However, in the preferred fixed-effects model, both effects are small and insignificant. Clearly, the reason some males become unemployed after migrating for non-job reasons is because they have an unobserved propensity to worklessness that is correlated with migration. Given that they moved for non-job reasons, this is perhaps not surprising. Once the fixed effect is controlled for, migration has no effect on job prospects.

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similar to those presented here and are available on request from the authors.

Panel two suggests that this negative effect for non-job-related migration is particularly pronounced in the immediate period post migration and tails off thereafter. In both specifications (job-related and non-job-related migration) however, none of the estimated parameters are significantly different from zero once fixed effects have been controlled for.

For females, the impact of controlling for unobserved heterogeneity is to move the estimates in the opposite direction. In other words, there is a positive correlation between women's unobserved propensity to work and the likelihood of migration. The fact that this is different for men and women could reflect intra-household substitution of labour supply post-migration. In the fixed-effects model, lower employment prospects are found for women who are tied movers or move for non-job reasons: both experience large losses in employment of 13.6 and 7.4 percentage points respectively, but there is no effect for women who move for job-reasons.

The final panel of Table 6 investigates the effect of time since migration on employment probabilities for those who were tied movers and those who moved for non-job reasons. The effect for job related migrants were insignificant and so for reasons of brevity these estimates compare to non-migrants *and* job related migrants. Those moving for non-job reasons experience large losses in employment in the immediate year since migration, these losses are reduced over time yet settle at a 5.6 percentage point loss in the long-run. Tied females follow a similar pattern to non-job migrants albeit the employment losses are roughly twice the size at 28.5 and 11.6 after one year, falling to 9.1 and 5.6 percentage point losses after three years respectively.

V. Conclusions

The standard human capital theory of migration suggests that movements across regions are a response to labour market opportunities and, using panel data from Great Britain, we have investigated whether individuals do indeed secure higher wages and improved employment opportunities when they move from one region of the country to another. Our wage results suggest that there is evidence of higher real wage rates for both male and female migrants who moved for reasons related to employment compared to those who do not move. However, our results also highlight the need to analyse the returns to migration in a dynamic context: wage returns are only apparent in the long-run, perhaps due to a settling in period within the new region. The estimated long-run wage premiums of around 14% for males and 11% for females suggest there exists a sizeable return to employment-related inter-regional migration in Great Britain.

Comparing our estimated wage returns with those in the (relatively sparse) wider literature is complicated by the fact that there is no consistent view across researchers on how best to define the returns to migration. Yankow (2003), however, in a sample of young, highly educated, US males found no immediate wage increase following migration, but increases of 7% after 1-2 years, and 11% after five years or more. This pattern of little immediate wage effect but relatively larger long-run effects is similar to our results.

Boheim and Taylor (2005) found, in the UK, that males received a 3% immediate increase in wages but that, over time, the wages of migrants are not significantly different to those of non-migrants. Restricting their sample to those moving for job

reasons increased the immediate rewards; again, however, these were not significant in the long-run. Our results contrast sharply, with no immediate effect but significant long-run increases for job-related migrants. It should be emphasised that our definition of migration is different to that used by Boheim and Taylor: migration in their study was a move across Local Authority Districts rather than regions. Our definition of migration not only captures a higher proportion of job-related moves (38% compared to Boheim and Taylor's 28%), but also reflects moves which are likely to be more costly in pecuniary and non-pecuniary terms than movements between local authorities. For example, inter-regional migration will almost certainly involve the individual changing labour markets, as well as more severe losses of family and friendship ties and higher costs of relocation. In a human capital framework these higher costs should be matched by higher returns to migration and our wage results would appear to support this.

The results on employment are somewhat different and suggest that job-related migrants, whether male or female, experience no change in employment rates compared to non-migrants. Previous studies have found being unemployed increases the likelihood of migration (Pissarides and Wadsworth, 1989), however the results presented here suggest that those unemployed individuals who move for job reasons are likely to struggle to find employment in the new region. Migration may therefore have limited potential to reduce disparities in regional unemployment rates in Great Britain and hence impact on the national unemployment rate Furthermore, the negative employment effects for female migrants who moved for non-job related reasons, particularly tied females, highlight the potentially adverse consequences of migration on female unemployment differentials between regions.

Taylor (2006) found that employment probabilities were reduced following a move for men and women. His analysis focused on tied and lead migrants; individuals with no partner were omitted. By estimating the impact of time since migration on employment we find that the immediate negative employment effect for females is reduced substantially after three years although it does persist in the long-run. For males, the employment probability, in contrast to Taylor is not affected by migration in either the short- or long-run. Again, however, Taylor (2006) uses a different definition of migration, focusing on anyone who moves address between different waves of the BHPS.

The wage premiums associated with job-related migration reported here support policies aimed at encouraging migration. For those actively seeking better job prospects moving region could have a substantial effect in improving job matching and encouraging a more balanced GDP per capita level across regions. Our results do not, however, suggest that increased inter-regional migration in Great Britain will have much impact on the goal of reducing regional and national unemployment rates.

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Table 1: Descriptive Statistics

	Whole Sample		Employed Sub-sample	
	Male	Female	Male	Female
Migrations (indiv-year)	281	401	217	251
Sample size (indiv-year)	26,025	33,536	22,189	23,643
Migrations (indivs)	232	332	184	217
Sample size (indivs)	3,560	4,234	3,127	3,391
Migration rate	6.52	7.84	5.88	6.40

The sample includes only those observed for at least two years

Table 2: Reasons for Migration

	Employment Sample		Employed Sub-sample	
	Male	Female	Male	Female
Migrations (indiv-year)	281	401	217	251
Of which:				
For job reasons	96	71	83	60
Tied	4	56	2	21
Other	181	274	132	170

Table 3: Average Real Hourly Wage Rates Pre and Post Migration (£) for the Employed Sub-Sample

	Hourly wage *t-1*	Hourly wage *t*	Long-run hourly wage	Short-run % change	Long-run % change
Male					
Non-migrants	6.58	6.61	6.85	0.46	4.10
All Migrants	6.79	6.88	8.34	1.33	22.83
Of which:					
Migrated job reasons	6.97	7.45	9.54	6.89	36.87
Migrated non-job reasons	6.69	6.52	7.67	-2.54	16.14
Female					
Non-migrants	4.91	4.93	5.09	0.41	3.67
All Migrants	5.97	5.76	6.54	-3.52	9.55
Of which:					
Migrated for job reasons	6.96	6.08	7.17	-12.64	3.02
Migrated non-job reasons	5.69	5.75	6.84	1.05	20.21
Tied migrant	5.80	4.87	5.65	-16.03	-2.59

Table 4: Average Employment Rates Pre and Post Migration

	Empl't rate *t-1*	Empl't rate *t*	Long run empl't rate	Short-run change (col2-col1)	Long-run change (col3-col1)
Male					
Non-migrants	86.48	85.81	86.63	-0.67	0.15
All Migrants	79.34	77.94	90.94	-1.40	11.60
Of which:					
Migrated job reasons	81.94	87.50	96.96	5.56	15.02
Migrated non-job reasons	78.01	72.97	88.03	-5.04	10.02
Female					
Non-migrants	71.65	71.22	71.23	-0.43	-0.42
All Migrants	65.27	63.34	77.63	-1.93	12.36
Of which:					
Migrated job reasons	71.15	85.92	87.97	14.77	16.82
Migrated non-job reasons	66.20	62.77	74.51	-3.43	8.31
Tied migrant	54.35	37.50	74.44	-16.85	20.09

Table 5: Wage Estimates

	Pooled OLS	Pooled OLS with selection^	Fixed-effects	Fixed-effects with selection	2SLS with Selection and fixed-effects
Males ever migrated					
Ever Migrated (Non-Job)	0.039 (0.013)**	0.044 (0.013)**	0.001 (0.029)	0.003 (0.028)	-2.275 (0.443)**
Ever Migrated (Job)	0.136 (0.018)**	0.129 (0.018)**	0.088 (0.047)*	0.090 (0.046)*	6.772 (0.723)**
Sample Size	22,189	22,189	22,189	22,189	22,189
Males time since migration					
1 Year Since Migrated (Non-Job)	0.019 (0.032)	0.034 (0.032)	-0.023 (0.039)	-0.018 (0.038)	1.837 (1.632)
2 Years Since Migrated (Non-Job)	-0.005 (0.032)	-0.004 (0.032)	-0.021 (0.039)	-0.021 (0.039)	2.580 (2.901)
3+ Years Since Migrated (Non-Job)	0.056 (0.016)**	0.058 (0.016)**	0.031 (0.033)	0.030 (0.033)	-5.316 (1.204)**
1 Year Since Migrated (Job)	0.065 (0.049)	0.061 (0.049)	0.028 (0.063)	0.026 (0.061)	6.448 (3.000)**
2 Years Since Migrated (Job)	0.094 (0.041)**	0.086 (0.041)**	0.078 (0.056)	0.077 (0.054)	-4.848 (3.772)
3+ Years Since Migrated (Job)	0.171 (0.022)**	0.163 (0.022)**	0.142 (0.054)**	0.143 (0.052)**	10.641 (1.641)**
Sample Size	22,189	22,189	22,189	22,189	22,189
Females ever migrated					
Ever Migrated (Non-Job)	0.088 (0.014)**	0.092 (0.014)**	0.028 (0.029)	0.028 (0.030)	3.818 (0.511)**
Ever Migrated (Job)	0.084 (0.018)**	0.082 (0.018)**	0.080 (0.045)*	0.080 (0.043)*	-3.677 (0.772)**
Ever Migrated (Tied)	0.003 (0.017)	0.005 (0.017)	-0.027 (0.044)	-0.028 (0.043)	-2.849 (0.496)**
Sample Size	23,643	23,643	23,643	23,643	23,643
Females time since migration (job movers only)					
1 Year Since Migrated (Job)	0.061 (0.045)	0.057 (0.046)	0.042 (0.057)	0.042 (0.056)	-3.316 (1.476)**
2 Years Since Migrated (Job)	0.029 (0.038)	0.028 (0.038)	0.052 (0.053)	0.054 (0.052)	-6.066 (1.678)**
3+ Years Since Migrated (Job)	0.097 (0.022)**	0.097 (0.022)**	0.111 (0.048)**	0.112 (0.047)**	0.515 (0.578)
Sample Size	23,643	23,643	23,643	23,643	23,643

**Sig. at 5%, *Sig. at 10%. Robust standard errors in parenthesis

Table 6: Employment Estimates

	Pooled OLS	Fixed-effects	Fixed-effects 2SLS
Males ever migrated			
Ever Migrated	-0.087	0.002	-0.428
(Non-Job)	(0.011)**	(0.028)	(0.279)
Ever Migrated	-0.019	0.017	-2.388
(Job)	(0.012)	(0.034)	(0.648)**
Sample Size	26,025	26,025	26,025
Males time since migration			
1 Year Since Migrated	-0.178	-0.038	-0.198
(Non-Job)	(0.031)**	(0.038)	(0.765)
2 Years Since Migrated	-0.105	0.006	-2.140
(Non-Job)	(0.028)**	(0.036)	(1.243)*
3+ Years Since Migrated	-0.055	0.029	-1.488
(Non-Job)	(0.013)**	(0.032)	(0.777)*
1 Year Since Migrated	-0.041	0.000	-9.334
(Job)	(0.032)	(0.044)	(3.033)**
2 Years Since Migrated	0.006	0.045	-2.231
(Job)	(0.023)	(0.038)	(2.054)
3+ Years Since Migrated	-0.019	0.012	-1.410
(Job)	(0.014)	(0.038)	(1.734)
Sample Size	26,025	26,025	26,025
Females ever migrated			
Ever Migrated	-0.043	-0.074	-0.547
(Non-Job)	(0.012)**	(0.025)**	(1.059)
Ever Migrated	0.037	0.012	-4.080
(Job)	(0.013)**	(0.034)	(1.269)**
Ever Migrated	-0.070	-0.136	-8.379
(Tied)	(0.019)**	(0.039)**	(1.376)**
Sample Size	33,536	33,536	33,536
Females time since migration (Tied and non-job reasons only)			
1 Year Since Migrated	-0.116	-0.116	-0.835
(Non-Job)	(0.026)**	(0.033)**	(2.566)
2 Years Since Migrated	-0.042	-0.049	-2.078
(Non-Job)	(0.029)	(0.036)	(2.712)
3+ Years Since Migrated	-0.018	-0.056	-0.377
(Non-Job)	(0.015)	(0.028)**	(2.569)
1 Year Since Migrated	-0.294	-0.285	-23.064
(Tied)	(0.056)**	(0.061)**	(7.240)**
2 Years Since Migrated	-0.111	-0.117	-14.490
(Tied)	(0.045)**	(0.052)**	(3.937)**
3+ Years Since Migrated	-0.029	-0.091	-0.566
(Tied)	(0.021)	(0.042)**	(3.098)
Sample Size	33,536	33,536	33,536

**Sig. at 5%, *Sig. at 10%.

Appendix

A1 Wage Results for Males

A2 Wage Results for Females

A3 Employment Results for Males

A4 Employment Results for Females

A1 Male Wage Results

	Pooled OLS	Fixed effects	Fixed effects with selection
1 Year Since Migrated (Non-Job)	0.019 (0.032)	-0.023 (0.039)	-0.018 (0.038)
2 Years Since Migrated (Non-Job)	-0.005 (0.032)	-0.021 (0.039)	-0.021 (0.039)
3+ Years Since Migrated (Non-Job)	0.056 (0.016)**	0.031 (0.033)	0.030 (0.033)
1 Year Since Migrated (Job)	0.065 (0.049)	0.028 (0.063)	0.026 (0.061)
2 Years Since Migrated (Job)	0.094 (0.041)**	0.078 (0.056)	0.077 (0.054)
3+ Years Since Migrated (Job)	0.171 (0.022)**	0.142 (0.054)**	0.142 (0.052)**
South East	-0.039 (0.010)**	0.006 (0.049)	0.003 (0.048)
South West	-0.132 (0.012)**	-0.163 (0.076)**	-0.165 (0.072)**
East Anglia	-0.147 (0.015)**	0.021 (0.079)	0.023 (0.077)
East Midlands	-0.200 (0.012)**	-0.099 (0.062)	-0.098 (0.061)
West Midlands	-0.181 (0.012)**	-0.194 (0.074)**	-0.197 (0.075)**
North West	-0.132 (0.011)**	-0.070 (0.070)	-0.067 (0.068)
Yorks. & Humber.	-0.188 (0.012)**	-0.125 (0.093)	-0.125 (0.094)
North east	-0.155 (0.013)**	-0.186 (0.094)**	-0.184 (0.093)*
Wales	-0.215 (0.014)**	-0.215 (0.090)**	-0.211 (0.086)**
Scotland	-0.133 (0.013)**	-0.189 (0.141)	-0.190 (0.141)
Age	0.065 (0.001)**	0.068 (0.014)**	0.067 (0.014)**
Age Squared	-0.001 (0.000)**	-0.001 (0.000)**	-0.001 (0.000)**
Professional	0.673 (0.017)**	0.132 (0.027)**	0.132 (0.026)**
Managerial	0.592 (0.015)**	0.137 (0.023)**	0.137 (0.023)**
Skilled Non-Manual	0.284 (0.015)**	0.040 (0.024)*	0.040 (0.023)*
Skilled Manual	0.236 (0.015)**	0.081 (0.021)**	0.080 (0.021)**
Part Skilled	0.097 (0.015)**	0.045 (0.021)**	0.045 (0.021)**
Married	0.106 (0.006)**	0.032 (0.011)**	0.034 (0.011)*
Union Member	0.097 (0.006)**	0.029 (0.009)**	0.029 (0.009)**
100<Firm Size<500	0.115 (0.006)**	0.043 (0.008)**	0.043 (0.008)**
500<Firm Size	0.173 (0.007)**	0.065 (0.010)**	0.065 (0.010)**
Months in Job	0.000 (0.000)**	0.000 (0.000)**	0.000 (0.000)**
Part-Time	-0.102 (0.023)**	0.024 (0.035)	0.022 (0.035)
Constant	0.044 (0.035)	0.173 (0.066)**	0.324 (0.073)**
N (Person-Year)	22,189	22,189	22,189
R-Squared	0.423	0.470	0.490

Robust standard errors in parenthesis
+Standard errors robust to heteroskedasticity and serial correlation in parenthesis
Significant at 10% ** Significant at 5%
Years and averages not reported
Base Non-migrant, observed in 1992, single and living in London, in unskilled work, a non-union member in a small firm (<100 employees)

A2 Female Wage Results

	Pooled OLS	Fixed effects	Fixed effects with selection
1 Year Since Migrated (Job)	0.055 (0.023)**	0.042 (0.057)	0.042 (0.056)
2 Years Since Migrated (Job)	0.037 (0.023)	0.052 (0.053)	0.054 (0.052)
3+ Years Since Migrated (Job)	0.069 (0.011)**	0.111 (0.048)**	0.112 (0.047)**
South East	-0.148 (0.009)**	-0.095 (0.041)**	-0.095 (0.041)**
South West	-0.262 (0.011)**	-0.258 (0.055)**	-0.260 (0.054)**
East Anglia	-0.274 (0.015)**	-0.124 (0.079)	-0.126 (0.077)
East Midlands	-0.259 (0.011)**	-0.132 (0.058)**	-0.134 (0.058)**
West Midlands	-0.246 (0.011)**	-0.163 (0.058)**	-0.166 (0.055)**
North West	-0.216 (0.010)**	-0.078 (0.061)	-0.082 (0.060)
Yorks. & Humber.	-0.289 (0.011)**	-0.088 (0.056)	-0.089 (0.055)
North east	-0.276 (0.012)**	-0.100 (0.088)	-0.100 (0.088)
Wales	-0.264 (0.013)**	-0.155 (0.095)	-0.154 (0.092)*
Scotland	-0.218 (0.011)**	-0.110 (0.074)	-0.110 (0.074)*
Age	0.044 (0.002)**	0.051 (0.011)**	0.051 (0.011)**
Age Squared	-0.001 (0.000)**	-0.001 (0.000)**	-0.001 (0.000)**
Professional	0.851 (0.019)**	0.144 (0.031)**	0.145 (0.030)**
Managerial	0.613 (0.011)**	0.166 (0.020)**	0.166 (0.020)**
Skilled Non-Manual	0.251 (0.010)**	0.069 (0.019)**	0.069 (0.019)**
Skilled Manual	0.113 (0.012)**	0.051 (0.020)**	0.052 (0.020)**
Part Skilled	0.061 (0.011)**	0.013 (0.017)	0.014 (0.017)
Married	0.021 (0.006)**	0.013 (0.010)	0.013 (0.010)
Union Member	0.153 (0.006)**	0.029 (0.008)**	0.029 (0.008)**
100<Firm Size<500	0.108 (0.006)**	0.057 (0.008)**	0.057 (0.008)**
500<Firm Size	0.095 (0.006)**	0.061 (0.010)**	0.061 (0.010)**
Months in Job	0.000 (0.000)**	0.000 (0.000)*	0.000 (0.000)*
Part-Time	-0.114 (0.005)**	-0.007 (0.009)	-0.009 (0.009)
Constant	0.409 (0.031)**	0.453 (0.055)**	0.618 (0.064)**
N (Person-Year)	23,643	23,643	23,643
R-Squared	0.456	0.518	0.532

Robust standard errors in parenthesis
+Standard errors robust to heteroskedasticity and serial correlation in parenthesis
Significant at 10% ** Significant at 5%
Years and averages not reported
Base Non-migrant, observed in 1992, single and living in London, in unskilled work, a non-union member in a small firm (<100 employees)

A3 Male Employment Results

	Pooled OLS	Fixed effects
1 Year Since Migrated (Non-Job)	-0.178 (0.031)**	-0.038 (0.038)
2 Years Since Migrated (Non-Job)	-0.105 (0.028)**	0.006 (0.036)
3+ Years Since Migrated (Non-Job)	-0.055 (0.013)**	0.029 (0.032)
1 Year Since Migrated (Job)	-0.041 (0.032)	0.000 (0.044)
2 Years Since Migrated (Job)	0.006 (0.023)	0.045 (0.038)
3+ Years Since Migrated (Job)	-0.019 (0.014)	0.012 (0.038)
South East	0.051 (0.008)**	-0.023 (0.036)
South West	0.048 (0.009)**	0.006 (0.055)
East Anglia	0.027 (0.012)**	-0.092 (0.058)
East Midlands	-0.019 (0.010)*	-0.104 (0.054)*
West Midlands	0.015 (0.010)	-0.118 (0.073)
North West	-0.021 (0.009)**	-0.183 (0.058)**
Yorks. & Humber.	0.004 (0.010)	-0.066 (0.073)
North east	-0.065 (0.011)**	-0.032 (0.062)
Wales	-0.054 (0.012)**	-0.130 (0.067)*
Scotland	-0.051 (0.010)**	-0.193 (0.106)*
Age	0.020 (0.002)**	0.036 (0.011)**
Age Squared	-0.000 (0.000)**	-0.000 (0.000)**
Higher Degree	0.235 (0.009)**	0.169 (0.061)**
Degree	0.232 (0.007)**	0.118 (0.050)**
A Level	0.180 (0.007)**	0.136 (0.052)**
O Level	0.164 (0.007)**	0.091 (0.049)*
Pre-School Kids	-0.071 (0.006)**	-0.021 (0.007)**
School-age kids	-0.057 (0.005)**	-0.013 (0.007)*
Married	0.111 (0.006)**	0.023 (0.010)**
Constant	0.371 (0.029)**	1.328 (0.066)**
N (Person-Year)	26,025	26,025
R-Squared	0.130	0.157

Robust standard errors in parenthesis
+Standard errors robust to heteroskedasticity and serial correlation in parenthesis
Significant at 10% ** Significant at 5%
Years and averages not reported
Base Non-migrant, observed in 1992, single and living in London, in unskilled work, a non-union member in a small firm (<100 employees)

A4 Female Employment Results

	Pooled OLS	Fixed effects
1 Year Since Migrated (Other)	-0.116 (0.026)**	-0.116 (0.033)**
2 Years Since Migrated (Other)	-0.042 (0.029)	-0.049 (0.036)
3+ Years Since Migrated (Other)	-0.018 (0.015)	-0.056 (0.028)**
1 Year Since Migrated (Tied)	-0.294 (0.056)**	-0.285 (0.061)**
2 Years Since Migrated (Tied)	-0.111 (0.045)**	-0.117 (0.052)**
3+ Years Since Migrated (Tied)	-0.029 (0.021)	-0.091 (0.042)**
South East	0.021 (0.009)**	-0.026 (0.032)
South West	-0.030 (0.011)**	-0.034 (0.047)
East Anglia	-0.037 (0.013)**	0.031 (0.057)
East Midlands	-0.028 (0.011)**	-0.015 (0.053)
West Midlands	-0.007 (0.011)	0.015 (0.050)
North West	0.003 (0.010)	-0.009 (0.055)
Yorks. & Humber.	-0.027 (0.010)**	-0.026 (0.054)
North east	-0.012 (0.012)	-0.174 (0.073)**
Wales	-0.052 (0.013)**	0.054 (0.067)
Scotland	0.002 (0.010)	-0.099 (0.078)*
Age	0.019 (0.002)**	0.019 (0.012)
Age Squared	-0.000 (0.000)**	-0.000 (0.000)**
Higher Degree	0.247 (0.016)**	0.185 (0.064)**
Degree	0.247 (0.008)**	0.130 (0.046)**
A Level	0.231 (0.008)**	0.078 (0.043)*
O Level	0.172 (0.007)**	0.033 (0.040)
Pre-School Kids	-0.371 (0.007)**	-0.240 (0.009)**
School-age kids	-0.133 (0.005)**	-0.015 (0.009)*
Married	0.046 (0.005)**	-0.022 (0.010)**
Constant	0.345 (0.030)**	0.839 (0.068)**
N (Person-Year)	33,536	33,536
R-Squared	0.153	0.176

Robust standard errors in parenthesis
+Standard errors robust to heteroskedasticity and serial correlation in parenthesis
Significant at 10% ** Significant at 5%
Years and averages not reported
Base Non-migrant, observed in 1992, single and living in London, in unskilled work, a non-union member in a small firm (<100 employees)