# The Impact of Internal Migration on Married Couples' Earnings in Britain, with a Comparison to the United States

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ABSTRACT

Previous studies have often suggested that wives experience a decline in labor-market fortunes after an internal migration of a married couple. This evidence is consistent with wives being "tied movers" on average. I use the British Household Panel Survey to consider the extent to which wives' earnings change systematically following a change in economic location for married couples within Britain. The results provide little evidence that a migration event is associated with increased earnings for husbands. On the other hand, there is some suggestion that wives' earnings fall after a change in location, with most of this fall due to a decline in weeks of work for wives. This evidence is sensitive to the definition of a change in location, with the largest evidence of a negative effect on earnings arising when long-distance moves of more than 50 kilometers are examined. A comparison to evidence from the United States suggests the effects may be similar in the two countries, and do not provide statistical support for the notion that the lower migration rates in Britain are associated with greater benefits to migration than in the United States.

## NON-TECHNICAL SUMMARY

Human-capital theories suggest that one motivation for migration is to increase the earnings ability of individuals. One prediction of this theory is that we should expect to see earnings increase following migration, compared to what earnings would be if migration had not occurred. While this prediction also applies to the joint earnings of a married couple who migrate together, it does not imply that both the husband and the wife would be expected to see an earnings increase following migration. This gives rise to the possibility of "tied movers" whose labor market situation is negatively affected by the move. Previous empirical research that has focused on the association of internal migration (within a country's borders) and annual earnings has suggested that migration is associated with a decline in the average earnings of wives, consistent with the tied mover hypothesis. This research has primarily used data from the U.S. In this paper, I examine earnings changes for married couples in Britain, using the British Household Panel Survey (BHPS). I also compare results with U.S. data from the Panel Study of Income Dynamics, using a similar time period as the coverage of the BHPS.

The theoretical discussion of the paper centers on the comparative aspect of migration between Britain and the U.S., and what that might suggest for expectations about the size of the expected changes between the two countries. Migration rates are considerably lower in Britain, which might be explained by higher average migration costs in Britain (for example, because of housing costs) or by a higher dispersion of earnings in the U.S. The former explanation implies that earnings changes associated with migration should be higher in Britain, as this would be necessary to pass the higher cost threshold that would make migration attractive. The latter explanation suggests that the earnings change is likely to be higher in the U.S., if the more disperse distribution leads to higher earnings changes on average.

The empirical work is based on an examination of how earnings change from the year preceding the year of the migration event to the year following the migration year. The focus is on moves that appear to be associated with a change in labor markets, and three different definitions are used to identify these changes in economic location. My preferred definition of a change in location is based on the distance of the move (one of more than 50 kilometers), and with this definition there is evidence that earnings decline as a result of migration for wives in Britain. Most of this decline is associated with a decline in work hours for wives (though not an increase in unemployment). By contrast, there is little evidence that husband's labor market outcomes are improved by the migration event.

A comparison with results from the U.S. suggests that there is somewhat greater evidence of a negative effect of migration on wives' earnings in the U.S. The economic magnitude of this difference is not large, however. While the comparative results are consistent with migration costs being higher in Britain than in the U.S., the evidence supporting this conclusion is not strong. There is not much evidence from either country that internal migration benefits the joint earnings position of the migrating couple (at least in the first year), suggesting that non-earnings concerns may be a more important factor in migration decisions.

The standard economic model of migration treats the decision to change geographic location as a human capital investment that enhances the decision-maker's prospects in the labor market.   Given that there will in general be costs associated with moving, this model predicts that the level of earnings for migrants should be higher than what it would be if they had not chosen to move.  An interesting implication of this model is that when the decision maker is a married-couple family, it is not necessary that both spouses gain from the move in order for the move to make economic sense.  Indeed, the change in location may tend to have systematic negative effects on earnings on the spouse whose earnings is a less important source of income for the family.  It is generally thought that moves have historically been more likely to be motivated by an improvement in the labor-market situation of the husband than of the wife.  That may predominately leave the wife as a "tied mover," with a tendency to exhibit a decline in labor-market circumstances following a move (see Mincer, 1978).

Empirical evidence in support of the tied mover hypothesis has been reported in a number of analyses.  Many studies have focused on the employment or unemployment experience of wives following a change in location within a country.  Some of these studies have examined whether a recent migration event is associated with lower employment rates or higher unemployment, with the comparison group being individuals who have not recently migrated.  This type of cross-sectional analysis often finds that migration is associated with worse labor-market outcomes for wives.  Longitudinal analyses that allow for the possibility that migrants may be a select group of the population have also been performed – primarily with U.S. data – coming to a similar conclusion about the effect of migration on the wives' employment situation. Taylor (2005) has used longitudinal data from Britain to consider employment impacts, again coming to a similar conclusion about the negative impact on wives.

A smaller number of studies have examined the impact of internal migration on the earnings of husbands and wives. Sandell (1977) studied longitudinal data from the U.S. and found that the annual earnings of wives did tend to fall after a move. However, this was more than made up for by a gain in earnings for the husband. Later studies (using alternative data) tended to corroborate his findings about wives' earnings, but many have not found evidence that husbands gained as a result of the move. Rabe (2006) has used the British Household Panel Survey to study migration impacts on the wage rates of husbands and wives, concluding that migration increases wages for both husbands and wives in Britain. In this study, I use the British Household Panel Study to examine the impact of migration on the annual earnings of husbands and wives.

In the following analysis, I will attempt to generate results that can be compared to the results of Blackburn (2005) using the U.S. Panel Study of Income Dynamics. The comparison of results between Britain and the U.S. allows an additional test of the implications of the human-capital model of migration. As has been noted previously, rates of internal migration tend to be considerably lower in Britain than in the U.S. If this is due to higher costs of migration in Britain, then we should also expect a higher earnings gain for the married couple before a move takes place. This should be reflected in relatively higher gains to migration in Britain relative to the U.S. This idea is discussed more fully in the next section.

**I. Internal Migration in Britain**

In the economic model of migration, an individual considering a move from year 1 to year 2 will choose to move if the benefits from that move are larger than the costs. For the individual *i*, a move (from S to M) will make sense if

$$\mathrm{Y}_{2i}^{M} - \mathrm{Y}_{2i}^{S} > \mathrm{C}_i$$

where $\mathrm{Y}_{2i}^{M}$ is the earnings in the new location if the move is made, $\mathrm{Y}_{2i}^{S}$ is the earnings if the individual stays in their initial location, and $\mathrm{C}_i$ is the cost of moving (both pecuniary and psychic).[1] Given positive costs of migration, the implication is that an examination of the benefits of actual migration should reveal that migrants' earnings are higher than they would be if they had not migrated.

[1] The earnings measures are best thought of as the present value of the future earnings streams in the two locations. Given that there are several possible new locations, $Y_{2i}^{M}$ should be thought as the earnings associated with the best choice. If the costs of moving also vary across the choice of location, this would be the choice for which $Y_{2i}^{M} - Y_{2i}^{S} - C_i$ is the largest.

The empirical assessment of this implication is complicated by the fact that $Y^S_{2i}$ is not observed for migrants. A simple alternative is to predict $Y^S_{2i}$ for migrants using data on nonmigrants (individuals who have not recently migrated) in the same year. One approach would be to estimate a standard cross-sectional earnings equation that includes a dummy variable for recent migration. A concern with this approach is that migrants and nonmigrants may systematically differ in unobserved determinants of earnings, and the migration dummy may reflect these differences. Another alternative is to predict $Y^S_{2i}$ using the earnings of the individual migrant before migration occurs ($Y^S_{1i}$) plus an earnings growth component predicted from the earnings of nonmigrants ($\hat{Y}^S_{2i} - \hat{Y}^S_{1i}$). This difference-in-difference analysis can be accomplished by estimating an earnings-change equation in which a migrant dummy is included, with the dummy coefficient measuring the earnings change for migrants minus what would be predicted for their earnings change if they had not migrated.[2]

Comparisons of migration probabilities in Britain and the United States generally suggest that internal migration is considerably less common in Britain. Long, Tucker, and Urton (1988) compare migration probabilities in the 1970-1980s period and find that the annual probability of a change in residence is almost twice as large in the United States as Britain. The difference is particularly striking when examining long-distance moves (of at least 50 kilometers), where the United States migration rate is more than three times that of Britain. As Long (1992) notes, low rates of mobility are characteristic of European countries, while high rates (similar to that of the United States) are found in the major British ex-colonies (Australia, New Zealand, and Canada).[3] In their study of migration in Britain during the 1930s, Makower, Marschak, and Robinson (1939) found that, while there was evidence that mobility responded to economic conditions, the magnitude of the response was small. In Makower, Marschak, and Robinson (1940, p. 59), they noted that “distance is a powerful force acting against the redistribution of labour” in Britain.

In the framework of the human capital model, one possible explanation for the lower rates of migration in Britain than the United States is that the costs of moving are on average higher in Britain. This may reside in the greater psychic costs associated with moving in a longer-established society such as Britain, in which there are greater family ties to local areas.

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[2] The earnings change differences out any systematic differences between migrants and nonmigrants in fixed unobserved characteristics in an earnings equation. There is still the possibility that migrants and nonmigrants might differ in unobserved components of earnings growth.

[3] These comparisons are based on any change in residence, as data on distance of move was available only for Britain and the United States

By comparison, newer countries such as the United States (and the other examples noted above) have a substantial component of individuals who have immigrated to the new country, or have immigration as a prominent part of their family history.

Long (1991) notes that there is also an explanation for mobility differences that relates to pecuniary cost differences. The argument is based on housing markets being more strictly controlled in Britain (and other European countries), compared to the United States, Australia, New Zealand, and Canada. Böheim and Taylor (1999) show that, in Britain, migration rates are substantially lower for homeowners and public housing tenants relative to renters in the private market. Homeownership rates are similar in Britain and the United States (see Chiuri and Japelli, 2000), but public sector housing is generally much less important in the United States. To the extent that housing-cost changes would have similar influences in short- and long-distance moves, however, it's not clear how this explanation can account for the fact that mobility rates are particularly smaller in Britain (compared to the United States) for long-distance moves.

One implication of potentially higher costs of moving in Britain is that, for a given distribution of benefits to moving, the expected earnings changes for observed movers should be higher. Denoting benefits as $B_i = Y_{2i}^M - Y_{2i}^S$, benefits for those observed to move should have average value equal to $E(B \mid B > C)$, the mean of the truncated distribution of benefits. Increases in C will both decrease the probability of moving and increase the expected benefits of those who choose to move. As is shown in the appendix, allowing costs to vary across potential migrants leads to the conclusion that an increase in average costs decreases mobility but increases the expected return to moving. The prediction, then, is that cost differences should lead to the average earnings change for migrants being greater in Britain than in the United States.

Differences in mobility between Britain and the United States might also be explained by differences on the benefit side as well. It is well known that earnings inequality is higher in the United States than in other industrialized countries. Higher inequality in earnings could lead to more variation in potential benefits from migration. The appendix shows that a higher variation in benefits is likely to increase the probability of migration in the United States relative to Britain. The impact on the average benefit among observed migrants is not as clear, and may depend on the particular nature of the distribution benefits. The most likely case is that increases in the variation of benefits will tend to increase the average observed earnings change following migration. If so, we should then expect to see smaller earnings changes associated with migration in Britain than in the United States. A comparison of earnings changes between Britain and the United States should help to assess the extent to which differences in the distribution of costs or benefits are behind the lower mobility rates in Britain

While there are a number of empirical studies that have examined the factors associated with individual's choices to migrate in Britain, few have tried to assess the direct impact of the migration event on individual's outcomes in the labor market. Boyle, Cooke, Halfacree, and Smith (2001) used data on married couples in Britain and the United States to examine whether or not a recent long-distance migration event affected the probability of being employed. Using data from the British Sample of Anonymised Records and the U.S. Census Public Use Microdata Samples, there were limited to examining employment differences between migrants and nonmigrants without any information on employment before the migration event occurred (and with the additional limitation that many of the controls themselves may have been affected by the migration decision). Their results suggest that long-distance migration is associated with a decline in employment probabilities for husbands, with some suggestion that the effect is larger in Britain than in the United States.[4] Migration also appears to reduce the probability of employment for wives in both countries, with the effect estimated to be considerably larger in Britain than in the United States. The comparison of the impacts of migration between the two countries is not ideal, as the U.S. data identify a migrant as anyone who has moved in the last five years while the British data identify only migrants in the previous year. But the suggestion is that the benefits of migration may be lower in Britain.

Taylor (2005) examined the impact of migration on employment probabilities for husband and wives using longitudinal data from the British Household Panel Survey (BHPS). The BHPS includes reports on the reasons for migration, allowing for the identification of moves that were job-related (including whether or not the motivation was related to the husband's job situation or the wives). The results suggest that, on average, husband's employment was not affected by migration, even if the move was motivated by job reasons for the husband. His estimates do suggest that migration has a negative effect on employment probabilities for wives, at least for long-distance moves. The reasons for the move did not have an obvious influence on employment, with the exception that employment probabilities fall for wives who were previously employed and moved for reasons associated

[4] The larger probabilities for employment in Britain are isolated to those husbands who migrate to join a wife who has already moved – a small proportion of migrants in both countries.

with the job of the husband. The nature of the findings is consistent with those using longitudinal data from the United States, though comparing the magnitude of the impact between studies is difficult.

Böheim and Taylor (2006) and Rabe (2006) have studied the impact of migration on wage rates in Britain using the BHPS. Böheim and Taylor consider men only, including both married and unmarried individuals. Their results suggest a positive estimated impact of migration on wage rates for men, with a larger benefit for those who migrated for job-related reasons. Rabe analyzes wages rates for married individuals, and reports evidence consistent with earnings increasing for both spouses following a migration event. Her analysis assumes a fully interactive effect of migration with other job-related characteristics, but finds that for the migrants in her sample the predicted return to migration is generally positive.

Both of these earlier studies have focused on migration impacts conditional on the individual being employed at the time of the survey, both before and after the migration event.[5] In what follows, I make use of the BHPS to consider the relationship between migration and actual earnings of married couples. Several studies have examined this issue using U.S. data, and I plan to analyze the BHPS with an eye to comparing my results with results obtained for the the U.S. using the Panel Study of Income Dynamics.

## II. Data and Sample Construction

The purpose of the empirical work in this paper is to consider the change in earnings for an individual associated with a migration event. The most appropriate data source for this purpose is a longitudinal survey that follows individuals as they change location over time. The British Household Panel Survey (BHPS) serves this need nicely for Britain. The BHPS is a household-based survey that follows all initially-surveyed individuals (and offspring of those individuals) over time, including as new families are formed or old ones dissolved. Re-interviews have been conducted on an annual basis since the initial survey in 1991. In what follows, I use data from the 1992-2002 surveys. This period was one of gradually falling unemployment in Britain, and so the estimated effects of migration reflect impacts during a gradual recovery period.

The respondents in the 1992 wave of the BHPS form the basis of my sample in this paper. The basic unit of analysis is a married couple, intact at the time of the 1992 interview. The sample is restricted to married couples in which the husband is between the ages of 25 and 54 in 1992, so as to avoid location choices that are associated with completing education

[5] Rabe (2006) does employ a control function for this employment outcome, but the desired effect is to estimate characteristics of this conditional distribution for the population at large.

or entering retirement. The sample of married couples (either formally married or cohabitating) is followed until one of three events occurs: one, the married couple is no longer living together at the time of the survey; two, a change in age that leaves the husband above 54 years of age; or, three, non-response in one of the surveys. The requirement that the married couple maintain a common residence at each survey implies that the focus is on the impact of a shared migration event for the husband and wife.

The basic labor-market outcomes analyzed in the paper are measured on an annual basis, which affects the way I measure pre- and post-move attributes. Annual earnings and hours information is available on a "reference-year" basis, and my intention is to compare earnings in the calendar year before a move occurred to earnings in the year after the migration event.[6] This entails forming three-year intervals for any possible migration event, including a pre-move year, a migration year, and a post-move year. A comparison sample of non-migrants is formed by identifying all three-year intervals in which a move was not reported in any of the years.

The BHPS provides two different indicators of whether or not an individual has recently moved. Respondents are directly queried as to whether or not the individual was in the same residence as of September 1 of the previous year. If the individual reports that they were not at the same residence, information is then obtained on the exact month in which the move occurred. Identification of the month of the move is helpful, as it allows determination of the actual year of the migration event. The BHPS also provides an indicator as to whether or not the address of the respondent at any given interview was the same as at the previous interview, with a negative response interpreted as indicating a move. Both definitions are relevant to the following analysis, and I restrict the analysis to married couples for which both indicators suggest a move.[7]

Annual labor income corresponds to the reference year that ended with the prior August. Interviews are conducted after September 1, so, for example, information from an interview in October of 1992 would pertain to labor income for the period Sept. 1, 1991 through August 31, 1992. For ease of later reference, I refer to this as a "BHPS year." The labor income measure in the BHPS is a measure derived from information on the usual gross wage and salary payments on the individual's main job. In particular, the "annual" labor

[6] Observations with imputed values to the labor income measure are treated as missing.

[7] There are a number of cases in which a self-reported move is not indicated by a change in address. In some of these cases, it may be that the move occurred before the prior year's interview but after Sept. 1, and in those cases supporting indication of a move is obtained from an indication of a change in address in the prior year's interview. If no supporting evidence is available, then the three-year interval is removed from the sample.

income measure is formed as an average, using reported usual monthly pay on the job held at the start of the interval, and the job held at the end of the interval.[8] If a move was verified as occurring between Sept. 1, 1992 and Aug. 31, 1993 waves, then, the pre-move labor income would be obtained from the 1992 interview, and would primarily reflect earnings on the jobs held around Sept. 1, 1991 and Sept. 1, 1992. The post-move income would come from the 1994 interview, reflecting the observed earnings in September of 1993 and 1994.[9]

Additional information about individual characteristics is obtained from the same survey as provides the pre-move labor income. Migration events are restricted to those in which no move was reported as occurring for the pre-move reference year. However, local moves (of less than 50 kilometers) are allowed in the post-move year.[10] Non-migration events are defined by three consecutive surveys in which no move was indicated (by either measure) for the relevant reference years. Three-year intervals with missing data for any of the three years, or intervals that don't meet the restrictions note above (for example, a change in economic location in one year is followed by a change in location in the following year) are removed from the sample. All earnings measures are corrected for average price changes using the all-item Retail Price Index, with all measures expressed in the pound value for the 1994 BHPS year.[11]

Previous research has made use of several different definitions of a migration event that is thought to be associated with a change in labor markets. One definition pertains to whether or not a move involved a change in the official status of the residence, for example a change in county, city, or (in the U.S.) state. The BHPS does provide an indication of the region/metropolitan area of the current residence, so it is possible to identify individuals who changed region from one interview to the next. This "regional change" measure is perhaps somewhat clumsy in identifying a change in economic location, as in some instances it is quite broad (for example, all of Scotland) while in other cases it might be too narrow (for example, different parts of London are in different regions). It does provide some connection to one of the definitions used in Blackburn (2005), where changes in labor markets were measured by changes in the state of residence.

[8] There are also additions to labor income from other jobs and from self-employment.
[9] The migration event itself could have been reported in either the 1993 survey, or the 1992 survey if the move occurred between Sept 1., 1992 and the interview date.
[10] This is one difference with the analysis of Blackburn (2005), in which no moves (even local moves) are allowed in the post-move year. The decision to be less restrictive stems from the much lower prevalence of mobility in the British data.
[11] Observations were excluded if either the husband's or wive's earnings was above £100,000 in either the pre- or post-move year.

The BHPS also provides self-reported information on the reasons for any move, which can be used to identify individuals whose moves were intended as a change in economic location. I define this as a "purposive move," indicated by agreement that the reason for the move was either wholly or partly to do with the respondent's job or employment opportunities.[12] Separate responses for the reason for moving are obtained for both spouses, so a purposive move is defined as a situation in which either spouse reported in the affirmative to this question.

A final definition of a change in economic location is based on the distance of the move. As in previous research, I define a "distant move" as a one of a minimum geographic distance. Following Long, Tucker, and Urton (1988), I define a long-distance move as one in which the two residences at the two surveys surrounding a move are at least 50 kilometers apart.[13] While the cutoff distance is arbitrary, this definition is likely made up only of individuals whose move did involve a change in labor markets.

Several additional characteristics of individuals are used in the analysis as controls in the estimated models. Most of these are relatively standard and don't require comment. One control that is less standard is the measure of human-capital investment in education. Individuals are classified into one of twelve different educational categories in the BHPS. Many of these involve the same number of years of education, however, so that a simple years measure does not capture the differences in educational attainment. As an alternative, I construct a measure of the value of educational human capital by estimating a human-capital earnings function in which the controls are dummies for each educational category, along with regional controls and a quartic function for age. This equation is estimated using data from the 1994 and 2001 rounds of the survey, using a sample of individuals between the ages of 25 and 54 at the time of the survey. The value measure is then based on the predicted earnings increase from the individual's reported education level, relative to an individual with no education (the reference group in the earnings equation). This measure is included in the earnings regressions to allow for the possibility that earnings changes may differ according to the degree of human capital of the individual.

Descriptive statistics for the variables used in the analysis are reported in Table 1. For the sample being studied, roughly thirty percent of married couples' earnings are from the wife, while wives have higher earnings than husbands in sixteen percent of married couples.

[12] Observations were not counted as a purposive move if the move was to be closer to the same job, or because salary increased allowing the respondent to afford a new home.
[13] I thank Nicholas Buck for providing the data on the geographic distances between residences. A similar definition was not used in Blackburn (2005).

These statistics are actually quite similar to those for the U.S. (see Blackburn, 2005), and suggest that the relevance of wives to the overall labor-market situation of the married couple is pretty similar in the two countries. Roughly six percent of married couples experience a residential move in the two-year intervals studied in the paper, which compares to a rate of about eight percent in the U.S. data. Roughly 20% of those moves are measured as "changes in location" by any of the three definitions used for the BHPS, which is roughly equal to the percent of moves that cross state boundaries in the U.S. data.

Overall earnings for married couples were growing at a fairly rapid rate in the U.K. over this period, with the average real joint earnings change equal to just over 5 percent of average earnings. Interestingly, earnings growth was slightly higher for wives (at 6 percent) than for husbands. In the next section, I consider factors associated with the decision to move, and explore whether earnings changes differ systematically for those couples who chose to migrate over this period.

**III. Migration Probability and Earnings-Change Models**

Before examining earnings changes surrounding migration events, I present estimates of logistic models for the probability that a migration event occurs. This probability is modeled as a function of labor-market and other characteristics of the married couple in the year prior to that in which a move could have occurred. These models help to characterize how initial conditions and characteristics differ between migrants and non-migrants. They also help in assessing the relative importance of the husband's and wive's situations in making this decision.

The models are estimated over the entire sample of three-year intervals in which a move could have occurred in the middle year of the interval. As such, each married couple can contribute up to nine different observations to the sample. This is likely to lead to a correlation in contributions to the log-likelihood across different observations from the same couple. I use a generalized-estimating-equations (GEE) estimator (see Liang and Zeger, 1986) that takes into account a potential correlation across observations from the same couple (similar to that of a random-effects model).[14] Standard errors for the GEE estimators are calculated to be robust to any kind of correlation in the log-likelihood contributions for a couple.

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[14] In particular, I assume that the errors ($u_{ct}$) in the conditional mean model $Y_{ct} = \frac{e^{\beta' x_{ct}}}{1 + e^{\beta' x_{ct}}} + u_{ct}$ have an exchangeable correlation for observations from a given couple (c), that is $E(u_{ct}, u_{ds}) = \sigma_{12}$ if $c = d, t \neq s$. This is similar to the assumption of a random effect for couples in a linear model.

Four migration models are presented in Table 2 based on four different definitions of the migration event. The most encompassing definition is that of any move that involves a change in residence, which as noted above is mostly made up of short-distance moves. The results for "any move" in the table suggest that age does play a role in this decision, with older couples less likely to move.[15] This is a result common to most migration studies, as is the finding that the presence of school-age children lowers the probability of moving. Most of the other variables in the model for "any move" are not accorded statistical support, the exception being (somewhat surprisingly) that greater weeks worked of both the husband and the wife tend to lower this kind of move.

The final three columns of Table 3 show the extent to which the same factors help in explaining moves associated with a potential change in economic location. A common finding across the three definitions is that there is not much support for the possibility that initial earnings of the married couple plays a role in these kinds of moves. There is also not much evidence of an impact from the recent unemployment experience of the married couple. The husband's recent work experience also doesn't seem to play an important role. Indeed, the two characteristics provided the strongest statistical support are both related to the wife. In particular, her weeks worked in the previous year may serve to lower the probability of a "regional change" or "distant move," while an increased level of education for the wife appears to raise the probability of a "purposive move" or distant move.

One of the limitations of the models for the change in economic location is the small percentage of the sample actually making such a move. This lowers the precision of the estimators, and makes it difficult to reveal some effects that might be important.[16] This is highlighted by the limited evidence that the presence of children over the age of four lowers the probability of moving. A more positive implication is that the estimates do not support the hypothesis that there are major differences (in the observables) between those who change location and those who do not.

A simple model for the change in earnings is specified as

$$E_{3ct} = \beta_1' M_{2ct} + \beta_2' E_{1ct} + \beta_3' x_{1ct} + \varepsilon_{ct} \quad (1)$$

[15] Only the husband's age is included as a control, given the high degree of correlation in spouses' ages.

[16] For example, the estimated coefficient for the dummy for wife being the primary earner has an estimated coefficient of 0.544 in the purposive move equation. Given the low probability of this type of move, the percentage effect on the probability of moving is roughly equal to this estimate ($\frac{\partial P}{\partial x_j}\frac{1}{P} = \beta_j(1-P)$ in the logistic model), which is a substantial effect. However, it is statistically insignificant with a t-statistic of 1.38).

where $E_3$ is earnings (of either the husband or the wife) in year 3 of the interval, $E_1$ is earnings in year 1, and $x_1$ are characteristics of the couple in year 1. The migration variables for migration events that occur in year 2 are contained in $M_2$, and consist of a dummy for any kind of move along with a dummy for one of the change-in-location variables. This model allows for some regression to the mean by including lagged earnings as a control. Given this specification, the change-in-location coefficients can be interpreted as the estimated effect of this type migration relative to those couples with a residential move that did not involve a change in location. The GEE estimator (and procedure for calculating standard errors) allow for a possible correlation between error terms for the same married couple in a given equation.[17]

The results of the estimated earnings models are presented in Table 4, with separate sets of equations for each of the three change-in-location measures. Using the regional-change definition, there is little evidence that migrants' earnings evolve differently than that of other migrants, or of non-migrants. Moves for work-related purposes do suggest a negative influence of the move on wives' earnings of roughly £1000, though this estimate is not statistically significant (nor is the estimated increase in earnings for husbands). Interestingly, using the "distant move" definition suggest that earnings of both husbands and wives may fall after such moves, although the only effect which is statistically significant is the fall (of roughly £2000) in earnings for wives. The evidence of a negative influence of migration on wives is limited, but it is noteworthy that the arguably more accurate definition of change in economic location is the one that receives statistical support for an effect.

Earnings may change over time because of changes in work hours or because of changes in hourly pay. To consider the first influence, I estimated regression models for the change in weeks worked, in which the models were specified similar to the earnings-change models. The dependent variable corresponds to the weeks worked in the third year, with a control for weeks worked in the first year.[18] The estimates are presented in Table 4, and suggest that there is a fall of 5 weeks in the average weeks worked for the wife following a distant move. This effect is statistically significant, as is the smaller estimated fall associated

[17] This possibility suggests a potential problem in estimating equation (1), as correlation in the error terms over time for a married couple should lead to $E_1$ and $\varepsilon$ being correlated in any given year. This is not likely to be a major concern in this paper, as the estimated correlation coefficient for the errors is small. In any case, the low degree of correlation between $E_1$ and $M_2$ implies that any inconsistency in estimating $\beta_2$ is not likely to have much influence on the estimate of $\beta_1$, as is confirmed by an estimation of a pure earnings-change model that constrains $\beta_2 = 1$.

[18] A measure of average hours per week over the same period is not available in the BHPS.

with a regional change (though the effect for a purposive move is not significant). Given an average weekly salary of roughly £280 for wives, this suggests that roughly £1350 of the estimated £2000 decline in wives' earnings associated with a distant move is related to a fall in weeks worked. By contrast, none of the estimated effects on husbands' weeks worked are sizeable or statistically significant.

The BHPS also provides a measure of weeks unemployed over the BHPS year. Estimates of an equation explaining annual weeks of unemployment are presented in Table 5. The results do not provide much suggestion that the fall in weeks worked associated with a distant move end up as in increase in weeks unemployed. In fact, the only statistically significant coefficient associated with migration is a negative coefficient on a purposive move for wives' unemployment weeks, suggesting unemployment falls after this type of move. Interestingly, there is no evidence of a suggestion of permanence in the weeks of unemployment for wives, as unemployment two years ago helps little in explaining unemployment in the most recent year. On the other hand, there is some suggestion of permanence for husbands.

The evidence from Table 3 through 5 suggests some negative impact of a change-in-location on wives' earnings, with much of this explained by a fall in weeks spent out of the labor force. This characterization is provided statistical support only when the arguably most accurate definition of a change in location is used. By contrast, there is little statistical support for any effect of migration on husbands' earnings.[19] This may come as somewhat of surprise, given the expectation that at least one of the two spouses would tend to gain as a result of the move. The conclusions of a spousal difference in effects, however, is not that clear given that the estimated effect of long-distance move on husbands' earnings is also negative, and actually not that far in magnitude from the statistically significant negative effect for wives. In this sense, the results are somewhat less clear about the tied-mover phenomenon than was reported in Blackburn (2005), where there was a clearer difference in effects for husbands and wives.

**IV. Comparison with Estimated Effects from U.S. Data**

As discussed in section II, there may be reasons to expect that costs of migration would be higher in Great Britain than in the U.S., thereby leading to lower rates of migration

[19] The estimated coefficient on the purposive move variable is larger for husbands if I restrict the definition of this variable to moves where the husband stated job-related reasons for moving (the definition used in the reported results is either the husband or wife stated job-related reasons). However, it is still statistically insignificant. If I define the purposive-move variable as a situation in which only the wife states job-related reasons for a move, I obtain a negative coefficient estimate on the purposive move variable for husbands and a positive estimate for wives, but neither is statistically significant.

in Britain and possibly higher returns to migration.[20] If there is a higher cost barrier to moving in Britain, then, we might expect there to be less evidence of a negative influence on wives compared to the U.S. Models similar to those of section III but estimated with U.S. data were presented in Blackburn (2005), although results are not completely comparable given the difference in currency values. One way to compare the extent of the fall in earnings across countries is to compare the average percentage change in earnings following migration. In this section, I consider alternative specifications of the earnings model that allow effects to be interpreted in percentage terms, and report estimates using both the British and U.S. data.

One potential criticism of the simple earnings-change model is that it assumes a constant dollar amount effect from moves no matter the level of initial earnings. If migration has a larger dollar effect (either positive or negative) for individuals with larger initial earnings, these models may be less sensitive in identifying this effect. A more appropriate specification might allow observable determinants to affect the growth rate (g) of earnings. This would lead to the equation:

$$\mathrm{E}_{3\mathrm{it}} = (1+\mathrm{g}_{\mathrm{it}})\mathrm{E}_{1\mathrm{it}\,\mathrm{i}} + \varepsilon_{\mathrm{it}} = (\gamma_0 + \gamma_1 \mathrm{M}_{2\mathrm{it}} + \gamma_2 \mathrm{X}_{1\mathrm{it}})\mathrm{E}_{1\mathrm{it}} + \varepsilon_{\mathrm{it}} \qquad (2)$$

which involves including lagged earnings in interactive form with the migration variables and other earnings determinants. In this model, the coefficients can be interpreted as percentage impacts (in terms of how they affect a two-year growth rate). One limitation of the model in equation (2) is that it constrains the estimated impact of variables to be zero if initial earnings is zero (that is, $E(E_{3it} \mid M_{2it}, X_{1it}, E_{1it} = 0) = E(E_{3it} \mid E_{1it} = 0) = 0$). One way to generalize this equation is to allow for the possibility of expected earnings changes for those without initial earnings, as in:

$$\mathrm{E}_{3\mathrm{it}} = (\gamma_0 + \gamma_1 \mathrm{M}_{2\mathrm{it}} + \gamma_2 \mathrm{X}_{1\mathrm{it}})\mathrm{E}_{1\mathrm{it}} + (\lambda_0 + \lambda_1 \mathrm{M}_{2\mathrm{it}} + \lambda_2 \mathrm{X}_{1\mathrm{it}})\mathrm{D}_{1\mathrm{it}} + \varepsilon_{\mathrm{it}} \qquad (3)$$

where $D_{1it}$ is a dummy variable equal to one if initial earnings is equal to zero.[21]

Estimates of the earnings-growth model for Britain are presented in Table 6. For each definition of a change in location, estimates are presented for the migration coefficients for both husbands and wives. The estimates reported in the initial-earnings rows of the table are

[20] Evidence on the actual earnings before and after migration suggests there are no apparent immediate gains from changes in economic location in either country. This may be explained by the fact that earnings in the initial year of the three-year interval systematically overstates what earnings would have likely been in the third year if migrants had actually chosen not to migrate, or it could be related to the fact that the benefits of migration largely reside in nonpecuniary aspects of the change in location (see Blackburn, 2005).

[21] These equations are estimated with a constant term, though excluding the constant has only minor effects on the migration coefficient estimates.

$\hat{\lambda}_0$ in the "$E_{t-1}$=0" columns, and $\hat{\gamma}_0$ in the $E_{t-1}$>0 columns. All interactions with initial earnings and the zero earnings dummy are formed as deviations from the means of the variable in question, allowing for the interpretation of $\hat{\gamma}_0$ and $\hat{\lambda}_0$ as the impact or $E_{1it}$ and $D_{1it}$ (respectively) when all other variables are equal to their sample means. For husbands, the estimates suggest that an individual with average characteristics and no earnings in year 1 would have an expected level of earnings of about £4500 by year 3, while a wife with no earnings initially would have expected earnings of only £1200 by year 3. Both spouses have a high degree of earnings persistence when their earnings are initially positive, with expected earnings in year 3 equal to 99 percent of year 1 earnings for an individual with average characteristics.

The coefficient estimates for the migration variables provide an interesting characterization for husbands who are initially without earnings. The effect of a local move on earnings is negative – implying that the average earnings increase for a local migrant is £1500 smaller than for a husband who doesn't change residences. However, the impact of a change in location (relative to a local move) is positive, and statistically significant for both a regional change and a purposive move. This latter result is as theory would predict, in that husbands without jobs would likely move longer distances only if there was a benefit in higher expected earnings. The coefficient estimates for the distant-move variable, however, is not statistically significant. And there is no evidence that husbands with positive initial earnings are accorded higher earnings growth if they migrate.

The estimates for wives are similar to the results reported in Table 3. There is some suggestion of a positive impact from a change in location for wives with initial earnings of zero, but this effect is never statistically significant. The strongest evidence of a change-in-location effect is for the distant move measure, where a statistically significant coefficient estimate suggests that a distant move lowers the growth rate in earnings. Interestingly, there is some suggestion of a positive association of a local move with earnings growth for wives. Also, the purposive-move measure has a statistically significant negative coefficient estimate for the growth rate part of the equation (although the two location-move variables are not jointly significant in that case).

Similar earnings-growth models were estimated for the U.S. using data from the PSID from the mid 1990s.[22] A migration measure based on distance of a move is not available, but

[22] Blackburn (2005) provides details on the data set construction. The models have a few additional controls, for tenure with the current employer and changes in the state unemployment rate.

it is possible to construct measures similar to the regional change and purposive move variables. In particular, moves that cross state boundaries are treated as changes in locations, while moves that were motivated for non-consumption reasons are treated as purposive moves. The U.S. estimates are presented in Table 7.

As in the British results, earnings-model estimates for U.S. husbands suggest very little impact of migration on earnings growth for husbands with positive earnings in the year before the move. Also similar to the British results is the estimated increasing impact of a locational change on earnings for husbands who start off with no earnings, although this estimate is only (marginally) statistically significant with the purposive-move measure. It is also this measure that provides statistically significant evidence that local moves reduce the expected earnings increase for those who begin with zero earnings. On net, then, the evidence concerning positive impacts of location changes on husbands' earnings is similar between the two countries. In fact, the major difference in the results between the two countries has to do with the much larger estimated earnings change in the U.S. for non-migrant husbands who initially have zero earnings.

The estimated models for wives do suggest that changes in location lead to lower earnings growth for wives with positive earnings in the first year of the interval. The models also support that changes in location lower the expected earnings increase for women with zero initial earnings. The magnitude of the effect for positive earners, however, does vary considerably between the two measures, with a change in state suggesting a much larger negative impact than the purposive-move measure (which is only marginally statistically significant). The results using the state-change measure – which may be more directly comparable to the "distant move" measure for Britain – do suggest a somewhat larger negative effect for wives in the U.S. than in Britain.[23] The only statistically significant difference, however, is related to the evidence concerning earnings changes for wives who initially have zero earnings, as it is not possible to argue that the growth-rate coefficient estimates are statistically significantly different between the two countries.

The evidence, then, is somewhat less supportive of a negative effect of changes in location on wives earnings in Britain compared to the U.S. It was originally expected that the low rates of migration compared to the U.S. (almost half in the samples) would weaken the power of the analysis in Britain. It is worthwhile noting, however, that this was not the case

[23] Ham, Li, and Reagan (2004) suggest that, in U.S. data, using state changes does not mischaracterize many short-distance moves as long-distance moves, though it does tend to miss a larger number of long-distance moves.

to any great extent, as suggested by the similar magnitudes for the standard errors on the growth-rate coefficient estimates across the two countries.[24]

## V. Conclusions

Human-capital theories of migration suggest that one motivating factor for changing residential location is to enhance one's earnings. One potential implication of these theories is that we should expect to see an increase in earnings following a migration event. For married couples, this does not necessarily imply that earnings should increase for both partners, and prior research with U.S. data has suggested that earnings fall for wives relative to husbands following a migration event. Using data on internal migration in Britain in the 1990s, I also find evidence that earnings fall for wives following a long-distance move. There is less evidence of an earnings change following migration for husbands, providing support for the suggestion that wives are more likely to be tied movers whose labor market situations suffer as a result of the change in location.

Rates of migration are smaller in Britain than in the U.S., with one possible explanation being that costs of moving are higher in Britain. If so, it would be natural to expect that the average change in earnings would need to be greater in Britain than in the U.S. in order for migration to be beneficial. While comparisons of results across the two countries are not clean, there is some suggestion that the negative migration impacts for wives are more important in the U.S. – though the economic magnitude of this difference is not large. Results from both countries suggest little earnings impact from long-distance migration for husbands, with the only significant effects being for the small minority of husbands with no earnings in the year before migration.[25]

The fall in earnings for British wives is primarily associated with a fall in weeks of work following migration. There was no evidence of an increase in unemployment, suggesting the fall in work hours is either a choice by the couple or a response to the difficulties in finding work in the new area. The idea that this response may be a choice would be more plausible if there were greater evidence of an increase in earnings for husbands following a long-distance move. The failure to find a positive effect for husbands is not unusual in the literature, however, and may perhaps be explained by nonpecuniary benefits being the primary factors in relocation decisions. In any case, the comparison of

[24] The smaller variation in earnings in Britain, leading to a smaller residual variation in the equations, is no doubt part of the explanation for why the precision of the estimates is so similar.

[25] Roughly nine percent of husbands have no earnings in the initial year in Britain.

impacts between husbands and wives does suggest that, in both countries, long-distance moves are primarily associated with a fall in the wife's earnings relative to their husband's.

## Appendix

Let B be continuous with density $f_B$ , and C continuous with density $f_c$, with B and C independent. B is observed only when B>C. I wish to consider how the truncated mean $E(B \mid B > C)$ changes as the mean of C changes, and as the standard deviation of B changes.

*(1) Effect of Increasing Average Cost on the Expected Earnings Gain from Migration*

Start by treating C as fixed and using the truncated density for B to define

$E(B \mid B > C, C) = \int_C^{\infty} B \frac{f_B(B)}{1 - F_B(C)} dB$, for which

$$\frac{\partial E(B \mid B > C, C)}{\partial C} = \frac{f_B(C)}{1 - F_B(C)} \left[ \int_C^{\infty} \left( \frac{B f_B(B)}{1 - F_B(C)} dB \right) - C \right]$$

$$= \frac{f_B(C)}{1 - F_B(C)} \left[ E(B \mid B > C, C) - C \right] \geq 0$$

The truncated mean increases as the lower truncation point increases, which is not surprising. If the truncation point is random, we can use

$$E(B \mid B > C) = E_C(E(B \mid B > C, C) = \int_{-\infty}^{\infty} \left( \int_C^{\infty} B \frac{f_B(B)}{1 - F_B(C)} dB \right) f_C(C) dC$$

$$= \int_{-\infty}^{\infty} h(C) f_C(C) dC$$

where h(C) is monotonically nondecreasing in C.

To analyze changes in the mean of C, let $C_2$=C+d. Then

$$E(B \mid B > C_2) = \int_{-\infty}^{\infty} h(C + d) f_C(C) dC$$

and

$$\frac{\partial E(B \mid B > C_2)}{\partial d} = \int_{-\infty}^{\infty} \frac{\partial h(C + d)}{\partial d} f_C(C) dC \geq 0$$

given that $\frac{\partial h(C + d)}{\partial d} \geq 0$. Increasing the mean of the truncation-point distribution should increase the truncated mean of B (except in certain degenerate cases).

*(2) Effect of Increasing the Standard Deviation of Benefits on the Expected Earnings Gain*

To analyze changes in the standard deviation of B, let B2= $(1-k)\mu_B + kB$ . Increases in k will increase the standard deviation of $B_2$ without changing the mean. Treating C as fixed, the truncated mean for $B_2$ can be written:

$$E(B_2 \mid B_2 > C, C) = (1-k)\mu_B + E(kB \mid ((1-k)\mu_B + kB) > C, C)$$

$$= (1-k)\mu_B + kE(B \mid B > z, C),$$

where $z = \mu_B + (C-\mu_B)/k$. It follows that:

$$\frac{\partial E(B_2 \mid B_2 > C, C)}{\partial k} = -\mu_B + E(B \mid B > z, C) + k\frac{\partial E(B \mid B, z, C)}{\partial z}\frac{\partial z}{\partial k}$$

$$= (E(B \mid B > z, C) - \mu_B) - \frac{(C-\mu_B)}{k}\frac{\partial E(B \mid B, z, C)}{\partial z}$$

which has an indeterminate sign. Heckman and Honore (1990) have shown that if the density of B is log concave

$$0 \le \frac{\partial E(B \mid B > z, C)}{\partial z} \le 1.$$

In this case, we can use the fact that $E(B \mid B > z, C) \ge C$ to show that

$$\frac{\partial E(B_2 \mid B_2 > C, C)}{\partial k} \ge 0 \ ,$$

for values of $k \ge 1$, implying that increases in the standard deviation increase the truncated mean. The class of log-concave densities includes the normal, the uniform, Beta densities, and extreme value densities. We can use a similar argument to the one in part (1) to show that the unconditional derivative would be positive if C were treated as random.

Heckman and Honore also show that if the distribution is log convex,

$$\frac{\partial E(B \mid B > z, C)}{\partial z} \ge 1 \ ,$$

so that the derivative for the truncated mean of $B_2$ does not have an obvious sign. Log-convex distributions include Pareto densities and gamma densities (under certain parameter values).

I have performed a number of simulations of truncated means under various assumptions about its distribution, and treating C as either fixed or a normal random variable. Distributions used for B include the gamma, the Laplace, the exponential, and the negative binomial. In all cases, increasing the standard deviation of the benefit distribution increased the truncated mean of benefits.

*(3) Effects on the Probability of Migration*

It is easy to show that increasing the mean of the cost distribution will decrease the probability of moving, that is:

$$P(B > C_2) = 1 - F_B(C + d)$$

so that

$$\frac{\partial P(B > C_2)}{\partial d} = -f_B(C + d) \leq 0 .$$

Increasing the standard deviation of benefits does not have as obvious an effect on the probability of moving. Given that

$$P(B_2 > C) = P\left(B > \frac{C}{k} + \frac{k-1}{k}\mu_B\right) = 1 - F_B\left(\frac{C - \mu_B}{k} + \mu_B\right)$$

it follows that

$$\frac{\partial P(B_2 > C)}{\partial k} = \frac{f_B\left(\frac{C - \mu_B}{k} + \mu_B\right)\left(C - \mu_B\right)}{k^2}$$

the sign of which depends on the sign of $C - \mu_B$. Given the low probability of moving, the cost of moving is likely to be higher than the average benefit, so that if C is nonrandom and positive, the partial derivative is positive. If C is random but always greater than $\mu_B$, increases in the standard deviation will increase the probability of moving (this is not as clear in other cases).

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| Table 1: Means and Standard Deviations, 1993-97 | | | | |
|---|---|---|---|---|
| Variable | Initial Values for Two-Year Changes | | Change in Values over Two-Year Period | |
| | Mean | Std. Dev. | Mean | Std. Dev. |
| ***N=7,609(1,848)*** | | | | |
| Joint Earnings | 36,067 | 19,882 | 1,902 | 10,997 |
| Husband's Earnings | 25,211 | 15,138 | 1,270 | 9,197 |
| Wife's Earnings | 10,855 | 10,823 | 632 | 5,778 |
| Husband's Annual Weeks Worked | 46.7 | 15.2 | -0.2 | 10.2 |
| Wife's Annual Weeks Worked | 38.6 | 22.0 | 0.01 | 15.8 |
| Husband's Annual Weeks Unemployed | 2.3 | 9.5 | -0.6 | 8.6 |
| Wife's Annual Weeks Unemployed | 0.6 | 4.6 | -0.04 | 5.9 |
| Wife is Dominant Earner | 0.160 | | 0.006 | |
| Age of Husband | 40.1 | 8.1 | | |
| Husband's Educational Contribution | 0.39 | 0.21 | | |
| Wife's Educational Contribution | 0.51 | 0.37 | | |
| Husband's Tenure | 5.9 | 6.1 | | |
| Wife's Tenure | 5.4 | 4.5 | | |
| Any Children <5 | 0.23 | | | |
| Any Children 5-17 | 0.47 | | | |
| Any Move | 0.057 | | | |
| Change in Region | 0.012 | | | |
| Reason for Move to Change Location | 0.012 | | | |
| Distant Move (>50 km) | 0.008 | | | |

*Notes:*
(1) The first sample size reported is the number of two-year comparisons, the second sample is the number of unique married couples.
(2) All income amounts are expressed in 1993-94 pounds, using the retail price index.
(3) The means/standard deviations of all variables are measured across the total number of two-year comparisons in the data. All calculations are weighted using the initial year longitudinal weights.

**Table 2**
**Estimates of Logistic Models of the Probability of A Move**

| *Independent Variable* | *Any Move* | *Regional Change* | *Purposive Move* | *Distant Move* |
|---|---|---|---|---|
| Husband's Earnings (in 10,000s) | 0.007<br>(0.005) | 0.005<br>(0.009) | 0.017<br>(0.010) | 0.014<br>(0.010) |
| Wife's Earnings (in 10,000s) | 0.006<br>(0.007) | 0.031<br>(0.013) | 0.001<br>(0.015) | 0.015<br>(0.015) |
| Wife is Primary Earner | -0.212<br>(0.186) | 0.172<br>(0.391) | 0.544<br>(0.394) | -0.385<br>(0.499) |
| Husband's Weeks Worked | -0.014<br>(0.005) | 0.007<br>(0.014) | 0.021<br>(0.020) | -0.015<br>(0.014) |
| Wife's Weeks Worked | -0.009<br>(0.003) | -0.012<br>(0.007) | -0.008<br>(0.006) | -0.013<br>(0.007) |
| Husband's Weeks Unemployed | -0.004<br>(0.006) | 0.003<br>(0.022) | 0.022<br>(0.022) | -0.001<br>(0.019) |
| Wife's Weeks Unemployed | -0.006<br>(0.008) | -0.030<br>(0.021) | 0.002<br>(0.011) | -0.007<br>(0.017) |
| Head's Age | -0.077<br>(0.007) | -0.052<br>(0.017) | -0.036<br>(0.018) | -0.052<br>(0.020) |
| Male Education | -0.401<br>(0.705) | 1.672<br>(1.386) | -0.436<br>(1.319) | -1.047<br>(1.379) |
| Female Education | 0.608<br>(0.374) | 0.636<br>(0.711) | 1.279<br>(0.673) | 2.268<br>(0.769) |
| Any Children <5 | 0.095<br>(0.117) | 0.494<br>(0.265) | 0.548<br>(0.283) | 0.249<br>(0.333) |
| Any Children 5-17 | -0.583<br>(0.110) | -0.384<br>(0.259) | -0.023<br>(0.240) | -0.427<br>(0.287) |

*Notes:* The estimates are for logistic models using generalized estimating equations assuming an exchangeable error correlation. Standard errors are robust to misspecification of the likelihood function (other than misspecification of the conditional mean). All models also include eight year dummies and a constant term.

**Table 3**
**Estimates of Regressions for End-of-Period Earnings**

| *Independent Variable* | ***Regional Change*** | | ***Purposive Move*** | | ***Distant Move*** | |
|---|---|---|---|---|---|---|
| | *Husbands* | *Wives* | *Husbands* | *Wives* | *Husbands* | *Wives* |
| Any Move | 609<br>(497) | 111<br>(326) | 477<br>(488) | 310<br>(319) | 777<br>(506) | 448<br>(318) |
| Locational Move | -232<br>(1329) | 376<br>(954) | 720<br>(1383) | -1077<br>(756) | -1450<br>(1698) | -2033<br>(1051) |
| Initial Earnings | 0.765<br>(0.017) | 0.829<br>(0.019) | 0.764<br>(0.017) | 0.829<br>(0.019) | 0.765<br>(0.017) | 0.829<br>(0.019) |
| Age | -105<br>(18) | -14<br>(12) | -105<br>(18) | -13<br>(12) | -104<br>(18) | -13<br>(12) |
| Education | 9189<br>(748) | 1130<br>(291) | 9173<br>(748) | 1154<br>(292) | 9212<br>(749) | 1169<br>(291) |
| Any Child < 5 | 308<br>(293) | -1152<br>(224) | 301<br>(292) | -1139<br>(224) | 311<br>(293) | -1142<br>(223) |
| Any Child 5-17 | 538<br>(268) | 280<br>(159) | 537<br>(268) | 283<br>(159) | 539<br>(268) | 283<br>(159) |

*Notes:* Earnings are expressed in 1993 pounds. Estimates are for a linear regression model using generalized estimating equations assuming an exchangeable error correlation (equivalent to a random effects assumption). Standard errors are robust to misspecification of the likelihood function (other than misspecification of the conditional mean). All specifications also include eight year dummies and a constant.

| Table 4<br>**Estimates of Regressions for End-of-Period Annual Weeks Employed** | | | | | | |
|---|---|---|---|---|---|---|
| *Independent Variable* | ***Regional Change*** | | ***Purposive Move*** | | ***Distant Move*** | |
| | *Husbands* | *Wives* | *Husbands* | *Wives* | *Husbands* | *Wives* |
| Any Move | -0.85<br>(0.52) | -0.27<br>(0.75) | -0.88<br>(0.53) | -0.63<br>(0.77) | 0.73<br>(0.54) | -0.12<br>(0.77) |
| Locational Move | -0.18<br>(1.21) | -3.58<br>(1.80) | 0.04<br>(1.09) | -1.14<br>(1.68) | -1.11<br>(1.64) | -4.82<br>(2.32) |
| Initial Weeks Employed | 0.53<br>(0.02) | 0.49<br>(0.02) | 0.53<br>(0.02) | 0.49<br>(0.02) | 0.52<br>(0.02) | 0.49<br>(0.02) |

*Notes:* Estimates are for a linear regression model using generalized estimating equations assuming an exchangeable error correlation (equivalent to a random effects assumption). Standard errors are robust to misspecification of the likelihood function (other than misspecification of the conditional mean). All specifications also include husband's age, individual's education, two children dummies, eight year dummies, and a constant.

| Table 5<br>**Estimates of Regressions for End-of-Period Annual Weeks Unemployed** | | | | | | |
|---|---|---|---|---|---|---|
| *Independent Variable* | ***Regional Change*** | | ***Purposive Move*** | | ***Distant Move*** | |
| | *Husbands* | *Wives* | *Husbands* | *Wives* | *Husbands* | *Wives* |
| Any Move | -0.43<br>(0.40) | 0.36<br>(0.31) | 0.53<br>(0.43) | 0.47<br>(0.32) | 0.42<br>(0.43) | 0.30<br>(0.31) |
| Locational Move | -1.07<br>(1.00) | 0.12<br>(0.57) | 0.40<br>(0.84) | -0.70<br>(0.23) | 1.19<br>(1.29) | 0.52<br>(0.88) |
| Initial Weeks Unemployed | 0.38<br>(0.03) | 0.06<br>(0.05) | 0.38<br>(0.03) | 0.06<br>(0.05) | 0.38<br>(0.03) | 0.06<br>(0.05) |

*Notes:* Estimates are for a linear regression model using generalized estimating equations assuming an exchangeable error correlation (equivalent to a random effects assumption). Standard errors are robust to misspecification of the likelihood function (other than misspecification of the conditional mean). All specifications also include husband's age, individual's education, two children dummies, eight year dummies, and a constant.

**Table 6**
**Estimates of Earnings Growth Models**

| *Independent Variable* | ***Regional Change*** | | ***Purposive Move*** | | ***Distant Move*** | |
|---|---|---|---|---|---|---|
| | $E_{t-1}=0$ | $E_{t-1}>0$ | $E_{t-1}=0$ | $E_{t-1}>0$ | $E_{t-1}=0$ | $E_{t-1}>0$ |
| **Husbands** | | | | | | |
| Any Move | -1677<br>(605) | 0.012<br>(0.025) | -1411<br>(617) | 0.014<br>(0.024) | -1599<br>(595) | 0.024<br>(0.026) |
| Locational Move | 11003<br>(5100) | -0.006<br>(0.046) | 11955<br>(4308) | -0.015<br>(0.049) | 7503<br>(4738) | -0.063<br>(0.055) |
| Initial Earnings | 4680<br>(574) | 0.991<br>(0.006) | 4633<br>(575) | 0.991<br>(0.006) | 4614<br>(578) | 0.991<br>(0.006) |
| P-value for joint test | 0.097 | | 0.020 | | 0.152 | |
| **Wives** | | | | | | |
| Any Move | 468<br>(469) | 0.029<br>(0.031) | 636<br>(483) | 0.051<br>(0.028) | 352<br>(480) | 0.074<br>(0.029) |
| Locational Move | 2257<br>(1679) | 0.020<br>(0.057) | 1057<br>(1440) | -0.116<br>(0.058) | 2942<br>(1979) | -0.210<br>(0.077) |
| Initial Earnings | 1216<br>(183) | 0.990<br>(0.018) | 1192<br>(184) | 0.989<br>(0.018) | 1202<br>(183) | 0.988<br>(0.018) |
| P-value for joint test | 0.351 | | 0.129 | | 0.015 | |

*Notes:* Estimates are for a linear regression model using generalized estimating equations assuming an exchangeable error correlation. Standard errors are robust to misspecification of the likelihood function (other than misspecification of the conditional mean). All specifications include husband's age, individual's education, two children dummies, and eight year dummies. All variables are included as interactions with a dummy for initial earnings equal to 0, and a dummy for initial earnings greater than 0. The specifications also include a constant, initial earnings, and a dummy for initial earnings greater than 0 (the latter coefficient estimate is reported in "initial earnings" in the $E_{t-1}=0$ columns). The joint-test p-value is for a test of the null hypothesis that both locational move interactions have zero coefficients.

| Table 7<br>**Estimates of Earnings Growth Models for the U.S.** | | | | |
|---|---|---|---|---|
| *Independent Variable* | ***State Change*** | | ***Purposive Move*** | |
| | $E_{t-1}=0$ | $E_{t-1}>0$ | $E_{t-1}=0$ | $E_{t-1}>0$ |
| **Husbands** | | | | |
| Any Move | -2733<br>(3004) | 0.017<br>(0.029) | -5811<br>(2440) | 0.026<br>(0.035) |
| Locational Move | 11309<br>(11367) | 0.009<br>(0.055) | 13193<br>(7239) | -0.015<br>(0.049) |
| Initial Earnings | 23111<br>(1923) | 0.955<br>(0.007) | 23241<br>(1919) | 0.955<br>(0.007) |
| P-value for joint test | 0.601 | | 0.181 | |
| **Wives** | | | | |
| Any Move | 687<br>(863) | 0.080<br>(0.030) | 1137<br>(1049) | 0.064<br>(0.042) |
| Locational Move | -2427<br>(1290) | -0.285<br>(0.082) | -2332<br>(1244) | -0.127<br>(0.071) |
| Initial Earnings | 6631<br>(2039) | 0.882<br>(0.011) | 6827<br>(2062) | 0.883<br>(0.011) |
| P-value for joint test | 0.0004 | | 0.037 | |

*Notes:* See notes to Table 7 concerning estimation and specification of models. The data source is the U.S. Panel Study of Income Dynamics, for moves occurring in the years 1993-1998. The U.S. models also includes controls for employment tenure (in the year before the move), and the change in the unemployment rate from the pre-move to the post-move year.