I Introduction

There has been much debate about the connection between housing tenure structure and the relatively low level of labour mobility in the UK, see Hughes and McCormick (1981, 1987), Minford et al. (1987) and McCormick (1997). These authors have seen the small size of the private rented sector, partly the result of controls on rents and security of tenure, and restrictions on the mobility of council tenants as important sources of inefficiency in British labour markets. The high degree of persistence in regional unemployment rates compared with the US is one symptom of this inefficiency. If regional unemployment rates respond only weakly to demand shocks, regional labour mismatch is high which implies both a loss in output and greater vulnerability to inflationary pressures.

Bover et al. (1989) and Muellbauer and Murphy (1991) suggested that the owner-occupied housing market was more intimately involved in accounting for these inefficiencies than had previously been thought. A body of econometric evidence has now built up to suggest that high relative earnings and employment opportunities encourage migration to a region while high relative house prices discourage it.¹

The most obvious mechanism for this negative effect of house prices on migration arises through cost of living differentials between regions. If earnings are not deflated by a regional cost of living index which appropriately incorporates housing costs, relative house prices will, in part, measure this omitted cost of living effect. However, there are likely to be further effects connected with constraints on credit availability and the risks associated with a high level of indebtedness both relative to income and to housing equity.

Typically, house price to income ratios in London and the rest of the South East exceed those in other regions. Mortgage lenders apply ceilings both on loan-to-value and loan-to-income ratios in allocating mortgage loans. Thus, first-time buyers in the South East or considering a move to the South East will be more likely to be constrained by loan-to-income ceilings and more likely to face cash flow problems if mortgage interest rates rise. When house prices have


* Nuffield College, Oxford
risen more strongly in the South East, owner-occupiers in other regions have to borrow relatively more to move to the South East. In contrast, South East residents have an equity cushion which they can use to reduce borrowing or spend on more luxurious housing by moving to other regions.

If one takes a narrow view of the determinants of house prices, i.e., regards them as largely determined by local labour and product market conditions, one might be justified in omitting relative house price effects in migration equations. However, the anomalous or weak earnings and unemployment effects found in such migration equations, see McCormick (1991), are prima facie evidence against this. The narrow view neglects the supply side, for example the greater restrictions on expanding housing supply in London and the South East, and even more importantly the wealth effects, interest rate effects and speculative portfolio investment effects in the determination of UK house prices documented in Muellbauer and Murphy (1997).

In the 1980s house price boom, increased portfolio demand for housing crowded out part of the demand by employees for living space. This is mostly clearly seen in the South East, which by 1987–8 was showing symptoms of speculative frenzy. Thus, in 1987–89 when relative unemployment rates in the South East had fallen sharply and relative earnings had experienced strong rises, net regional in-migration into the South East reached record lows of ~55,000 individuals per annum despite the labour market pressures for higher in-migration. This is an important practical example of the regional labour market inefficiency discussed above. Moreover, this episode added considerably to inflationary pressure as argued in Bover et al. (1989) and documented in institutional detail by Walsh and Brown (1991).

A frequently made point is that regional commuting can help to overcome the blockages the housing market can put in the way of an efficient regional allocation of labour and jobs. For example, one expects the 1987–89 period to be one where net commuting to the South East increased to offset the housing market constraints. More generally, reflecting the commuting/migrating trade-off, one should expect the housing market variables such as relative house prices, to have the opposite effect on net regional commuting compared with net regional migration. In contrast, the effects of relative earnings and employment opportunities should be in the same direction for both net commuting and net migration.

Gordon (1975), Molho (1982) and Jackman and Savouri (1992a) have pointed out a further implication of the commuting/migrating trade-off on the determinants of migration. This results from the fact that fixed costs are much greater for migrating, while commuting costs strongly increase with distance. Thus the trade-off operates more powerfully for contiguous region migration than non-contiguous region migration. If relatively cheap commuting is an alternative, the location decision will be more strongly influenced by relative housing market variables. It will be less strongly influenced by relative labour

\[2 \text{ Indeed, taking the utility loss of reduced leisure into account, they increase disproportionately with commuting times and so distance.}\]
market variables, since if commuting is relatively cheap, the decision of where to live can be made more independently from the decision of where to work. Jackman and Savouri (1992a) present evidence in favour of this hypothesis by interacting relative house price effects and relative labour market effects with a measure of contiguity between regions. This is the length of boundary shared by contiguous regions in a model of bilateral migration flows between all bilateral regional alternatives. They show that relative house prices operate more powerfully and relative vacancies operate more weakly on migration to contiguous regions.

In the present paper, we provide evidence for the first time on net commuting as well as net migration between British regions in a common framework with a more sophisticated modelling of housing market effects than seen in previous work. Our data on net commuting are derived from the ratio of employment on a region of employment basis to employment on a region of residence basis using Census of Employment and Labour Force Survey information for 1983 to 1995. The migration data come from the same source as Jackman and Savouri (1992a, 1992b), the National Health Service Central Register.

The plan of the rest of the paper is as follows. Section II provides basic facts on commuting and migration between regions in Great Britain and describes our data sources. Section III provides empirical results for an econometric model of net commuting and Section IV corresponding results for a model of net migration. Section V draws conclusions.

### II SOME BASIC FACTS ON REGIONAL COMMUTING AND MIGRATION

#### Regional commuting

The 1981 and 1991 Population Censuses provide accurate information on inter-regional commuting. Table 1 summarizes this information by showing, for each region, the ratio of employed residents working outside the region (the out-commuters) to employed residents living in the region, and the ratio of employees working in the region but resident outside (the in-commuters) to the number of employed residents living in the region. It should be no surprise that these figures suggest that small regions with many neighbours and good transport routes, such as the East Midlands tend to have high inter-regional commuting rates. The largest and most populous region, the South East, has the lowest out-commuting rate and one of the lowest in-commuting rates. The classic London commuter pattern is largely between the rest of the South East and London. However, East Anglia, the East Midlands and the West Midlands, with relatively high out-commuting rates owe these in part to their contiguity with the South East. It is evident that between 1981 and 1991 there has been some increase in gross commuting flows, despite the fact that 1991 was a year of severe recession in the South East.

There are three major potential sources for annual data on regional commuting. These are the Labour Force Survey (LFS), the New Earnings Survey (NES) and Inland Revenue data. The Labour Force Survey is a place of residence
based household survey but only began to record place of employment in 1992. Table 1 shows data from the Spring 1994 LFS which suggests results fairly comparable with the 1991 population census.

In principle, the (distinct) 1% samples of national insurance records used both by the NES to compute earnings data and the Inland Revenue to compute regional wage and salary information, contain information on the post-code of the employer and the employee. The first two digits of the post-code are sufficient to define the region. The NES currently does not collect this information on the employee for reasons of confidentiality which are hard to justify. The Inland Revenue and ONS appear not to have classified their data in this way either.

Despite these unfortunate gaps in our knowledge, the LFS does offer a way of extracting annual information back to 1984 on net commuting rates by region. LFS Historical Statistics published in 1997 provides estimates of the number of employees resident in each region from 1984 to 1996. These use information from 1981 and 1991 Censuses, intervening demographic estimates and applies a sophisticated grossing up methodology, which corrects for regionally varying patterns of non-response. These data provide a count of the number of persons employed by region of residence.

The Census of Employment count of regional employment is based on the place of employment and is a count of the number of jobs rather than the number of persons, the latter being lower because of multiple job holding. However, from unpublished information in the LFS, we can estimate the proportion of employees resident in each region with a second job, annually back to 1984. It is unlikely that regional commuters have a second job. Thus we

### Table 1

**Commuting data**

<table>
<thead>
<tr>
<th>Region</th>
<th>1991 Employed residents (000’s)</th>
<th>1981 Census</th>
<th>1991 Census</th>
<th>1994 LFS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>In rate</td>
<td>Out rate</td>
<td>Net rate</td>
<td>In rate</td>
</tr>
<tr>
<td>GB</td>
<td>23452</td>
<td>2.2</td>
<td>2.2</td>
<td>0.0</td>
</tr>
<tr>
<td>NN</td>
<td>1992</td>
<td>1.5</td>
<td>2.1</td>
<td>-0.6</td>
</tr>
<tr>
<td>YH</td>
<td>2009</td>
<td>2.4</td>
<td>2.5</td>
<td>-0.1</td>
</tr>
<tr>
<td>EM</td>
<td>1747</td>
<td>3.1</td>
<td>6.3</td>
<td>-3.2</td>
</tr>
<tr>
<td>EA</td>
<td>912</td>
<td>3.5</td>
<td>3.9</td>
<td>-0.4</td>
</tr>
<tr>
<td>SE</td>
<td>7682</td>
<td>1.8</td>
<td>0.7</td>
<td>1.1</td>
</tr>
<tr>
<td>SW</td>
<td>2006</td>
<td>1.9</td>
<td>2.7</td>
<td>-0.7</td>
</tr>
<tr>
<td>WM</td>
<td>2209</td>
<td>2.6</td>
<td>2.5</td>
<td>0.0</td>
</tr>
<tr>
<td>NW</td>
<td>2534</td>
<td>2.3</td>
<td>1.9</td>
<td>0.5</td>
</tr>
<tr>
<td>WW</td>
<td>1087</td>
<td>1.7</td>
<td>3.3</td>
<td>-1.6</td>
</tr>
<tr>
<td>SC</td>
<td>2074</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>

**Notes:**

Out rate = commuters out divided by employed residents ($\theta_2$ in text).
In rate = commuters in divided by employed residents ($\theta_1$ in text).

**Source:**

can convert the Census of Employment regional jobs count into a regional place of employment based count of persons employed.  

By definition:

\[
\frac{\text{number employed in a region}}{\text{number of employees resident in a region}} = 1 - \text{rate of out-commuting} + \text{rate of in-commuting} = 1 - \theta_2 + \theta_1
\]  

(1)

where these rates are defined relative to the number of employed residents.

To be precise, if NCE is the number of jobs from the Census of Employment, PS, is the proportion of employees with second jobs and NLFS is the number of resident employees from the LFS, the ratio of employment on a place of employment basis to employment on a place of residence basis, NR, is given by:

\[
\text{NR} = \frac{\text{NCE}}{(1 + \text{PS})\text{NLFS}} = 1 - \theta_2 + \theta_1. 
\]  

(2)

Since the net commuting rate \( \theta_1 - \theta_2 \) is a small number, typically under 4%, taking logs gives:

\[
\theta_1 - \theta_2 \approx \ln \text{NR}
\]  

(3)

to a very close approximation. In fact, we make one further adjustment to these data by subtracting the value of \( \ln \text{NR} \) for Great Britain from the value for the \( i \)th region. This corrects for any national discrepancies between the LFS and Census of Employment estimates.  

Figures 1 and 2 plot data from 1983 to 1995 on \( \ln \text{NR} \) respectively, for the

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{plot.png}
\caption{Commuting ratios (\( \ln NR_i - \ln NR_{gb} \)) for Northern Regions.}
\end{figure}

\begin{table}[h]
\centering
\begin{tabular}{|c|c|c|c|c|c|}
\hline
Year & NN & NW & YH & WW & SC \\
\hline
1983 & 0.01 & 0.02 & 0.03 & 0.04 & 0.05 \\
1984 & 0.02 & 0.03 & 0.04 & 0.05 & 0.06 \\
1985 & 0.03 & 0.04 & 0.05 & 0.06 & 0.07 \\
1986 & 0.04 & 0.05 & 0.06 & 0.07 & 0.08 \\
1987 & 0.05 & 0.06 & 0.07 & 0.08 & 0.09 \\
1988 & 0.06 & 0.07 & 0.08 & 0.09 & 0.10 \\
1989 & 0.07 & 0.08 & 0.09 & 0.10 & 0.11 \\
1990 & 0.08 & 0.09 & 0.10 & 0.11 & 0.12 \\
1991 & 0.09 & 0.10 & 0.11 & 0.12 & 0.13 \\
1992 & 0.10 & 0.11 & 0.12 & 0.13 & 0.14 \\
1993 & 0.11 & 0.12 & 0.13 & 0.14 & 0.15 \\
1994 & 0.12 & 0.13 & 0.14 & 0.15 & 0.16 \\
1995 & 0.13 & 0.14 & 0.15 & 0.16 & 0.17 \\
\hline
\end{tabular}
\caption{Data from 1983 to 1995 on \( \ln NR \) for Northern Regions.}
\end{table}

\( ^3 \) The LFS count also includes homeworkers and some workers for employers who do not operate a PAYE system. Since we have no information on their regional distribution, we omit these from our analysis.

\( ^4 \) See Spence and Watson (1993) for information on national discrepancies between the two sources.

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South East and its contiguous regions, and the remaining regions. These data show a rise in the net commuting rate to the South East in the 1980s broadly corresponding to the relative economic boom and the rise of relative house prices in that region. Net commuting rates for contiguous regions show broadly the reverse pattern, though sampling variability clearly makes some of the year to year fluctuations erratic in the less populous regions. For 1991, we can compare our estimates of the net commuting rates $\theta_1 - \theta_2$ with the Census values, see Table 2. The most notable discrepancy is for East Anglia where the Census figure of $-0.8\%$ contrasts with our estimate of $-5.4\%$, reflecting a Census of Employment estimate substantially below the LFS estimate of

![Figure 2. Commuting ratios (lnNRi − lnNRgb) for Southern Regions.](image)

**TABLE 2**

<table>
<thead>
<tr>
<th>Region</th>
<th>Census</th>
<th>Estimated</th>
</tr>
</thead>
<tbody>
<tr>
<td>GB</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>NN</td>
<td>-0.7</td>
<td>-2.4</td>
</tr>
<tr>
<td>YH</td>
<td>0.0</td>
<td>0.4</td>
</tr>
<tr>
<td>EM</td>
<td>-3.6</td>
<td>-3.9</td>
</tr>
<tr>
<td>EA</td>
<td>-0.8</td>
<td>-5.4</td>
</tr>
<tr>
<td>SE</td>
<td>1.2</td>
<td>2.0</td>
</tr>
<tr>
<td>SW</td>
<td>-0.8</td>
<td>-0.5</td>
</tr>
<tr>
<td>WM</td>
<td>0.0</td>
<td>-3.5</td>
</tr>
<tr>
<td>NW</td>
<td>0.3</td>
<td>0.4</td>
</tr>
<tr>
<td>WW</td>
<td>-1.7</td>
<td>-3.5</td>
</tr>
<tr>
<td>SC</td>
<td>-1.0</td>
<td>2.3</td>
</tr>
</tbody>
</table>

employment. The former excludes home workers and members of the armed forces which are included in the latter. East Anglia has the largest share of employment of any region in agriculture, where there are many ‘home workers’, as well as a disproportionate number of members of the armed forces.

Regional migration

This is a topic about which much has been written, see the references above. We therefore summarize only some key points. Annual (indeed quarterly) information back to 1976 is available from the Office of Population Census and Surveys (OPCS) on regional migration flows. These data are based on National Health Service records of patients registering with local doctors and are adjusted for small lags between moving and registering, see Hornsey (1993) for discussion of the data.

Since 1982, an age breakdown of migrants has been available. This suggests that generally under 12% of migrants are over retirement age (65 for men, 60 for women) while under 20% are aged 15 years or less. Thus migrants consist largely of working age adults and their dependents. This suggests that dividing migration flows by the working age population in each region is a sensible scaling device and produces migration rates comparable with the commuting rates shown in Table 1.

\[ \text{Note that employment relative to working age population in Great Britain has been in the range 60–70\% in the period. Thus migration/working age population is of the same order of magnitude as working age migration/employment.} \]
Annual regional migration rates defined in this way for 1981, 1988 and 1991 are shown in Table 3. Comparing these with commuting rates for 1981 and 1991 shown in Table 1, suggests that the proportion of people who migrate regionally every year is substantially below the proportion who commute.

Figures 3 and 4 plot net region (in minus out) migration rates respectively, for the South East and its contiguous regions, and for the remaining regions. These confirm that despite strong relative labour market pressures, there was a

Figure 3. Net migration rate (net in-migration as proportion of working age population) for Northern Regions.

Figure 4. Net migration rate (net in-migration as proportion of working age population) for Southern Regions.

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sharp decline in the 1987–89 period in net migration to the South East. This is prima facie evidence for strong discouragement from high relative house prices.

Disaggregating the gross flows by age suggests a rise in the proportion of those over retirement age in total out migration from the South East from 10.5% in 1982–85 to 11.7% in 1986–88, falling to around 7.5% in 1989–1992. Since labour market attachment is weaker for this age group, one expects relative house prices to be even more sharply associated with their migration flows.

III AN ECONOMETRIC MODEL OF REGIONAL NET COMMUTING RATES

We showed in Section II that, to a close approximation, the log of NR, the regional ratio of employment on a place of work basis, to employment on a place of residence basis, is equal to the net commuting rate into a region, \( \theta = \theta_1 - \theta_2 \) where \( \theta_1 \) is the in-commuting rate and \( \theta_2 \) is the out-commuting rate. The measurement of NR was described\(^6\) in Section II.

Drawing on the earlier discussions, we assume that commuting patterns to and from a region are dominated by the labour market and housing situations in the region relative to its contiguous regions. For each region, we construct averages of the contiguous region variables weighting each region according to numbers in full-time employment. The variables entering the net commuting rate equation are then defined as the ith regional values minus the average of the contiguous region values. For example, if \( u_i \) is the unemployment rate, \( rcu_i = u_i - \) contiguous region unemployment rate. Our labour market variables are the unemployment rate and its first difference, log average earnings for full-time employees, \( lfte \), and its first difference and the proportion of employment in the production sector, \( pr \). The latter, which enters in lagged form, is interpreted as a proxy for an out-of-date pattern of employment skills. A region with a high value of \( pr \) should, other things being equal, have lower rates of out-commuting and higher rates of in-commuting. However, note that regional fixed effects control for time-invariant differences between regions in their intrinsic attractiveness, their labour force characteristics and availability and cost of transport, as well as for the discrepancies highlighted in Table 2.

The housing market variables are the log of second-hand house prices, \( lhp \), a measure of the interest rate cost of moving, and a measure of downside rate of return risk, \( rorm \); \( rorm \) is defined as the three year moving average of \( rorr \), where \( rorr \) equals zero if the rate of return is positive and equals the rate of return if this is negative. The rate of return is defined as \( (0.02 + \Delta \ln hp_i - abmr_i)/(1 - l\nu r) \). In this expression, the 0.02 is taken as the net imputed rent from owner-occupation, \( \Delta \ln hp_i \) is the rate of capital gain in housing in region \( i \), \( abmr \) is the tax adjusted building society mortgage interest rate divided by 100, and \( l\nu r \) is the average UK loan-to-value ratio for

\(^6\)Note that to correct for any common national discrepancies in the LFS and Census of Employment measures, we subtracted the log ratio for Great Britain from each of the regional log-ratios.

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building society transactions. Thus, \((1 - lvr)\) represents the proportionate equity stake of an average house buyer, incorporating a gearing factor in the rate of return, see Muellbauer and Murphy (1997).

The interest cost or gain of moving is hard to measure. In principle, both real and nominal interest rates are relevant, the latter because of cash flow problems and default risk. The costs differ with the length of previous tenure and previous house price changes which affect the net equity stake, if any, a potential migrant may have. Our measure is a crude proxy, the mortgage interest rate weighted by the ratio of the average mortgage in a region divided by full-time earnings. We denote this measure \(wabmr\), the weighted interest rate. The regions with higher house prices tend to have higher mortgage to income ratios.

The first version of the model we estimate has the following ‘equilibrium correction’ specification:

\[
\theta_t = \beta_0 + \beta_1 \theta_{t-1} - \beta_2 \Delta rcu_t - \beta_3 \Delta rclfte_t + \beta_4 \Delta rclhp_t + \beta_5 \Delta rclhp_t - 1 - \beta_6 \Delta rcpr_t - 1 + \beta_7 \Delta wabmr_t + \epsilon_t
\]  

(4)

The parameters marked with an asterisk and a time subscript indicate a weighting by the UK proportion of owner-occupiers. Thus \(\beta^*_t = \beta_{poouk_{t-1}}\). As owner-occupation becomes more widespread, one expects relative house prices to matter more, a point confirmed by our estimates for migration below.

To recapitulate, \(rc\) denotes the deviation between the region and the average contiguous region value of a variable, and the variables and the directions of their expected effects are as follows:

- \(u\) is the unemployment rate: higher unemployment or a rise in unemployment in a region discourages net commuting into the region.
- \(lfte\) is the log of average full-time earnings in a region: higher earnings or a rise in earnings encourages net in-commuting.
- \(pr\) is the proportion of employment in the production sector: the more old fashioned is the skill base of workers in a region, the more in-commuting and the less out-commuting takes place.
- \(lhp\) is the log house price: the higher are prices, the more net in-migration is discouraged and net in-commuting encouraged. The current rate of change effect has an ambiguous sign: it may proxy expected capital gains which reduce the user cost of housing. However, recent capital gains increase the debt burden of potential in-migrants and the net equity cushion of out-migrants, discouraging net in-migration.
- \(rorm\) is a downside rate of return risk indicator where a negative value implies a downside risk, discouraging in-migration and so encouraging in-commuting. Hence, a negative coefficient is expected.

\(^7\)This effect is explored in greater detail in our migration equations below where the quality and quantity of data permit this.
was a proxy for the interest rate cost of moving: a higher relative value discourages migration to a region and so encourages net in-commuting.

We have also investigated a more sophisticated form of (4) which incorporates potential influences on overall gross commuting rates as well as the influences of relative size of region. Let us write (4) in the form:

\[ \theta_t = \beta_0 + \beta \theta_{t-1} + f(x_t) + \epsilon_t. \]  

(5)

Now suppose that a decline in housing market turnover nationally causes migration rates to fall because it takes longer to buy and sell a house. One would expect both in-commuting and out-commuting to rise, implying a multiplicative increase in \( f(x_t) \). We therefore reformulate (5) as:

\[ \theta_t = \beta_0 + \beta \theta_{t-1} + \lambda_t f(x_t) + \epsilon_t. \]  

(6)

where \( \lambda_t \), which is normalized at unity in 1990, declines with national housing market turnover.

Moreover, we also incorporate a relative size of region effect. For example, consider East Anglia, a small region with large and powerful neighbours, particularly the South East. It seems plausible that a given change in relative conditions has a bigger impact on net commuting to East Anglia relative to its workforce or working age population than it would on the net commuting rate for the South East. To be specific, we formulate \( \lambda_t \) as

\[ \lambda_t = 1 - \delta_1 (\text{lp tran} - \text{lp tran}_0) - \delta_2 (\text{clw pop}_t - \text{clw pop}_{SE}) \]  

(7)

Here \( \text{lp tran} \) is the log ratio of property market transactions in England and Wales excluding right-to-buy sales, to the housing stock, which is expected to reduce commuting rates. \( \text{clw pop} \) is the log of the sum of working age populations in the contiguous regions: the greater this is, the more one might expect net in-commuting to be affected by relative labour and housing market conditions.

One problem in the data to which we have already alluded is sampling variability for the smaller regions. This has two aspects: efficiency of estimation and bias. The first we handle by estimating (4) and (6) using generalized least squares. The bias problem concerns the downward bias on \( \beta \) because of measurement error in \( \theta_{t-1} \) and the bias which the presence of fixed effects induces when the number of time series observations is small. One way of dealing with the first is to instrument \( \theta_{t-1} \) using the fitted value from a first stage estimation of (4) or (6). This suggested a value of \( \beta \) in the region of 0.4 rather than around 0.1 from GLS. Note that \( \beta \) represents not only search costs and other employment adjustment costs relevant for commuting flows, but serially correlated omitted variables such as changes in the transport infrastructure and in relative commuting costs.

We estimate the model given by equation (4) from 1984 to 1995, the information on the lagged dependent variable for 1984 coming from the 1983

\[ \text{lp tran} \]  

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LFS. The results shown in Table 4, column 1, where $\beta$ is freely estimated, correspond well with the effects anticipated by the economics of commuting and migration decisions. The change and level of the unemployment rate and of earnings are highly significant for commuting rates as expected, as is the proportion of employment in the production sector. The housing market effects are significant too. With only 12 years of data for 10 regions and substantial variability in the LFS data, even (4) is probably a little too complex. In the event, we could accept the restrictions $\beta_6 = 0$, $\beta_8 = 0$ and $\beta_{10} = \beta_{11}$ so that the housing market variables all appear as lagged levels, except for mortgage costs which appear as a current level. These lags may reflect the fact that the LFS data are measured in late Spring of each year and the Census of Employment data correspond to June of each year. The shorter lags we find in the migration equation below, may reflect the fact that these are annual flows measured to the end of the year.

### TABLE 4

<table>
<thead>
<tr>
<th></th>
<th>Column 1</th>
<th>Column 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>dep. Var. $\beta$</td>
<td>0.12 (0.022)</td>
<td>0.4 (---)</td>
</tr>
<tr>
<td>$\Delta$unemployment $(-\beta_1)$</td>
<td>−1.3 (0.052)</td>
<td>−1.7 (0.23)</td>
</tr>
<tr>
<td>$\Delta$ln earnings $(-\beta_3)$</td>
<td>−0.24 (0.042)</td>
<td>---</td>
</tr>
<tr>
<td>ln earnings $\beta_4$</td>
<td>0.265 (0.020)</td>
<td>0.336 (0.096)</td>
</tr>
<tr>
<td>prop. prod. sector $(-\beta_5)$</td>
<td>0.50 (0.029)</td>
<td>0.38 (0.18)</td>
</tr>
<tr>
<td>$\Delta$ln house prices $(-\beta_6)$</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>ln house prices $\beta_7$</td>
<td>0.051 (0.009)</td>
<td>0.168 (0.018)</td>
</tr>
<tr>
<td>$\Delta$downside risk $(-\beta_8)$</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>downside risk $\beta_9$</td>
<td>−0.089 (0.012)</td>
<td>−0.186 (0.026)</td>
</tr>
<tr>
<td>mortgage cost ($\beta_{10} = \beta_{11}$)</td>
<td>0.0041 (0.0004)</td>
<td>---</td>
</tr>
<tr>
<td>intercept</td>
<td>0.019 (0.007)</td>
<td>0.022 (0.023)</td>
</tr>
</tbody>
</table>

Notes:
Heteroscedastic consistent (White) standard errors are shown in parentheses.

<table>
<thead>
<tr>
<th></th>
<th>$R^2$</th>
<th>s.e.</th>
<th>D.W.</th>
<th>$R^2$</th>
<th>s.e.</th>
<th>D.W.</th>
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<tr>
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<td>0.143</td>
<td>0.009</td>
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<td>0.014</td>
<td>2.38</td>
<td>0.050</td>
<td>0.016</td>
<td>2.32</td>
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<td>0.009</td>
<td>2.63</td>
<td>0.009</td>
<td>0.010</td>
<td>2.67</td>
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<td>YH</td>
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<td>0.012</td>
<td>1.08</td>
<td>0.029</td>
<td>0.012</td>
<td>1.27</td>
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<td>0.017</td>
<td>2.20</td>
<td>0.023</td>
<td>0.020</td>
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<td>0.613</td>
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<td>1.39</td>
<td>0.531</td>
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<td>0.000</td>
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<td>1.90</td>
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<td>1.93</td>
<td>0.000</td>
<td>0.013</td>
<td>2.69</td>
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Notes:
Fixed effects relative to the South East corresponding to column 1 are: North −0.03 (0.10), North West −0.006 (0.007), Yorks and Humberside −0.025 (0.009), West Midlands −0.026 (0.013), East Midlands −0.070 (0.014), East Anglia −0.043 (0.013), South West −0.025 (0.012), Wales −0.016 (0.010) and Scotland −0.012 (0.007).
One problem with these estimates, apart from the bias towards zero in the estimate of $\beta$, the effect of the lagged dependent variable, results from the many coefficients in the covariance matrix used in GLS. With 10 regions and only 12 time periods, these will be quite imprecisely estimated and the quoted estimated standard errors are likely to be too low, even after a degree of freedom correction. One can argue that more robust results are obtained when plausible restrictions are imposed on the covariance matrix. We therefore repeated the GLS estimation, setting off all-diagonals in the covariance matrix corresponding to non-contiguous regions to zero.

This produced some changes in the parameter estimates, weakening the relative unemployment, earnings and mortgage costs levels effects and strengthening those of relative house prices. The point estimate of $\beta$ rises to 0.24. Restricting $\beta$ to 0.4 to overcome the measurement bias has little effect on the results. Table 4 column 2 shows the results when $\beta = 0.4$, $\beta_2 = 0$, $\beta_4 = 0$ and $\beta_{10} = \beta_{11} = 0$, i.e., eliminating levels effects in unemployment and earnings and mortgage costs altogether. Given the likely correlation between relative house prices and earnings, unemployment and mortgage costs, it is not surprising that the omission of these levels effects results in substantially bigger relative house price effects in column 2 than in column 1. Even with a 10% upward adjustment in the estimated standard errors for degrees of freedom, all the parameter estimates are still highly significant except for the coefficient on the relative proportion of workers in the production sector whose significance is now marginal.

On this basis, our estimates suggest that rising relative earnings and falling relative unemployment encourage in-commuting and high relative house prices also encourage in-commuting by discouraging in-migration. However, as far as the Southern regions are concerned, lower relative house prices in the early 1990s, which should have encouraged in-migration, were significantly offset by a large perceived downside rate of return risk which discouraged in-migration and so encouraged in-commuting.

Table 4 also shows $R^2$, equation standard errors and Durbin-Watson statistics for each region. As expected, the standard error is lowest in the most populous region and the negative autocorrelation induced by measurement error expected in column 2 is generally reflected in the Durbin-Watson statistics. The low $R^2$ found in some regions is probably also influenced by measurement error and suggests that the model has almost no explanatory power for the North, the North West the East Midlands, Wales and Scotland.

The attempt to estimate (6) failed to give sensible convergent results. In addition to measurement errors in the data, note that we have no information on variations in regional commuting costs or the improvement of regional transport links. More sophisticated models clearly require better data.

IV AN ECONOMETRIC MODEL OF REGIONAL NET MIGRATION RATES

As discussed in the Introduction, we expect the labour market effects on net migration rates to be in the same direction as on net commuting rates but the
housing market effects to act in the opposite direction and to have relatively more powerful effects on migration. Moreover, for contiguous regions to which commuting costs are lower, the greater ability to separate place of residence from place of work, increases the housing market effects on migration and diminishes the labour market effects.

In Section II, we defined the net migration rate:

\[ m_i^* = \frac{NM_i}{wpop_i} \]  

(8)

where \( NM_i \) = net migration to region \( i \) and \( wpop_i \) is the working age population of region \( i \).

Jackman and Savouri (1992a, 1992b) scale migration flows by dividing by the national migration rate between regions. This has the advantage of standardizing, at least partly, for national variations in migration due, for example, to varying turnover rates in the labour market and the housing market and to national changes in tenure structure and in associated mobility rates.

To achieve the same effect but without affecting the general scaling of our dependent variable, which is comparable to that of the commuting rate, we define our dependent variable to be:

\[ m_i = \frac{m_i^*}{\left(\frac{M}{M_{90}}\right) / \left(\frac{wpop}{wpop_{90}}\right)} \]  

(9)

where \( M \) is the sum of gross migration inflows for regions of Great Britain and \( wpop \) is the GB working age population and the 90 subscript refers to the 1990 value.

Our specification for \( m_i \) is analogous to that for the commuting equation (6) but with a distinction between the contiguous region effects and more general effects relative to Great Britain as a whole. While the notation \( r_{ci} \) refers to the deviation between \( x_i \) and the average value for the contiguous regions, \( r_{i} \) is the deviation between \( x_i \) and the average value for Great Britain. To illustrate, the effect of lagged unemployment is then represented as:

\[ -\alpha_2 (ru_{it-1} - \lambda_1 rcu_{it-1}) \]  

(10)

where \( \lambda_1 > 0 \). The contiguous regions are part of the GB average. Thus, (10) allows a weaker relative unemployment effect for contiguous regions.

Analogously, the effect of lagged house prices is then represented as:

\[ -\alpha_7 (rlhp_{it-1} + \lambda_2 rchp_{it-1}) \]  

(11)

where \( \lambda_2 > 0 \) allows a higher relative house price effect for migration to and from contiguous regions.

For migration, we have a longer and more accurate span of data than for commuting, making it possible to estimate a more sophisticated model. We have added some further elements, missing from (6), to our equation for the net migration rate.

\[ ^9 \text{There is a minor further distinction in that the contiguous region averages all use full-time employment weights, while the GB average uses the weight most relevant for that variable. For example, for unemployment this will be regional labour force numbers, including the self employed. The differences in weighting are slight.} \]

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Our equation for net migration rates corresponding to (8) and (10) has the following form:

\[ m_n = \alpha_{i0} + \lambda_{it} \left[ -\alpha_1 (\Delta ru_{nt} - \lambda_1 \Delta ru_{nt-1}) - \alpha_2 (ru_{nt-1} - \lambda_1 rcu_{nt-1}) + \alpha_3 (\Delta rlft_{nt-1} - \lambda_1 \Delta rlft_{nt-1}) + \alpha_4 (rlft_{nt-1} - \lambda_1 rclft_{nt-1}) + \alpha_5 (\Delta rpr_{nt} - \lambda_1 rpr_{nt-1}) + \phi_2 (rhwpop_{nt-1} - \lambda_1 rhwpop_{nt-1}) - \frac{\alpha_6 (\Delta rlhp_{nt} - \lambda_2 \Delta rlhp_{nt-1})}{-\alpha_7 (\Delta rlhp_{nt-1} - \lambda_2 \Delta rlhp_{nt-1})} - \phi_5 (rlpooit_{nt} - \lambda_1 rclpooit_{nt-1}) - \phi_6 (\Delta rrorm_{nt} - \lambda_1 \Delta rrorm_{nt-1}) - \alpha_{10} (\Delta rwabmr_{nt} - \lambda_2 \Delta rwabmr_{nt-1}) \right] + \eta_{it} (12) \]

and \( \lambda_{it} = 1 + \delta_1 (lptran_it - lptran_{it-1}) - \delta_2 (chwpop_{it} - chwpop_{SEit}) \), in contrast to (11) above.

The labour market terms associated with parameters \( \alpha_1 \) to \( \alpha_{11} \) correspond to terms associated with parameters \( \beta_1 \) to \( \beta_{11} \) in the commuting equation. As explained above, they incorporate lower migration responses to contiguous region labour market relativities and higher responses to contiguous region housing market relativities. As in the commuting equation all the house price effects are weighted by the UK proportion of owner-occupiers, \( poouk \). Thus, \( \alpha''_{it} = \alpha_i (poouk_{it}) \) to denote this weighting.

There are six additional terms not present in the commuting equation. The first term, with parameter \( -\phi_1 \), measures a return migration effect after two years. The second term, with parameter \( -\phi_2 \), can be interpreted as a kind of equilibrium correction term. Net regional migration is an important element in the change of relative regional populations. In the long run, there is a tendency for relative regional population sizes to respond to the same relative labour market and housing market forces as act on net migration. This implies the negative effect shown in the equation. Note also that tendencies towards return migration will also be reflected in this variable; thus a region which has had high inflows in the recent past, may have a tendency for these to reverse, other things being equal. This effect will reflect longer-run return migration beyond that captured in the \( -\phi_1 m_{nt-2} \) term.

The third term, with parameter \( \phi^*_3 t \), reflects the larger absolute impact relative house prices might be expected to have when the proportion of retired people is higher.\(^{10}\)

The fourth term, with parameter \( \phi^*_4 t \), measures the expected house price appreciation element in relative user costs. Note that the interest rate element largely disappears when taking regional differentials. This is expected to have a

\(^{10}\) Note the absence of the contiguous region effect, which applies much less strongly to the retired who are non-commuters, both in the levels and the interaction effect of the proportion of retired people.
positive effect, offsetting temporarily, the levels of relative house prices. These expectations are derived from a forecasting system of equations for regional house price differentials of a semi-rational form. Thus, it incorporates lagged information on interest rates, relative earnings and relative house prices but not on housing supply and demography on which households will be less well informed. The model confirms South East leadership with regional relativities largely driven by the lagged deviation from the South East and from contiguous regions.

The fifth term, with parameter $\phi_5$, measures the impact of relative owner-occupation rates. One reason why these rates have increased in the 1980s has been ‘right-to-buy’ sales to council tenants at discounts as high as 50%. Such sales have been accompanied by clauses restricting resale within a given number of years, typically five. This ‘lock-in’ effect should result in lower out-migration from regions with high owner-occupation rates, compared with some base period. Hence a positive effect on net-immigration is predicted.

The last term, $\phi_6$, measures the impact of a dummy which is +1 in 1988 and −1 in 1987 on migration between the South East and East Anglia. This is probably the result of the 1986 ‘Big Bang’ reform of financial institutions in the City of London. This created large salary rises and extra employment in the City in 1986 but was followed by rationalization in the sector in 1987. Associated with it appears to have been a rise in net migration to the South East in 1986 and a fall in 1987, with the reverse flows taking place in East Anglia. Note that $\phi_6$ is zero for the other regions.\(^{11}\)

We use published data on regional migration from 1981 and unpublished data provided by OPCS for 1976–1980. Thus, we can estimate (12) for 1978–1995, again using GLS in the seemingly unrelated regression feature of Hall et al.’s TSP. The results are shown in Table 5. The labour market and housing market effects almost all have the expected signs and the significance of the latter is particularly striking. Column 1 imposes the restriction $\lambda_1 = \lambda_2$ which is easily accepted. Freely estimated values are $\lambda_1 = 0.23 (0.085)$ and $\lambda_2 = 0.24 (0.088)$. The parameter $\lambda = \lambda_1 = \lambda_2$ measures the reduced impact of labour market variables for contiguous region migration and the increased impact of housing market variables, and is significant and of a plausible magnitude.

Turning to the labour market effects first and contrasting them with those in the commuting equation, the $\Delta$ unemployment effect is small and insignificant in the migration equation, so that we can accept $\alpha_1 = \alpha_2$, though it was large and significant in the commuting equation. This makes sense since one expects

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\(^{11}\) We also investigated the increased impact one might expect from relative house prices in the period after financial liberalization. Financial liberalization, reflected in much easier access to mortgage loans in the 1980s, brought substantial rises in loan-to-value ratios so lowering cash deposits required for home buying. Restricted access to credit in earlier years at given house price differentials, should have made it harder for households to overcome these differentials. We interacted relative log house prices with $1 - l_vfr$, where $l_vfr$ is the UK loan-to-value ratio for first-time buyers thus measuring the proportion of the price of a home which a first-time buyer has to put up as a deposit. We expected a negative effect to reflect the greater impact of relative house prices before the early 1980s, but found an insignificant positive effect.

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migration to respond to more long-term employment opportunities. However, for earnings the rate of change effect, $\alpha_3$, exceeds the level effect, $\alpha_4$.

The lagged proportion of employment in the production sector, a crude proxy for an old-fashioned skill base of the workforce, has a small negative effect, instead of the large positive effect in the commuting equation. One might have thought that, other things being equal, a lack of modern skills among the work-

### TABLE 5

Estimates for net migration rate equation (12), 1978–1995

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<thead>
<tr>
<th></th>
<th>Column 1</th>
<th>Column 2</th>
<th>Column 3</th>
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<td>mig $_1$ ($\alpha_1$)</td>
<td>0.24</td>
<td>0.26</td>
<td>0.51</td>
</tr>
<tr>
<td>mig $_2$ ($\alpha_2$)</td>
<td>0.09</td>
<td>0.07</td>
<td>0.10</td>
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<td>$\Delta$ unemployment ($\alpha_3$)</td>
<td>-0.23</td>
<td>-0.22</td>
<td>0.008</td>
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<td>unemployment $_1$ ($\alpha_4$)</td>
<td>0.050</td>
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<tr>
<td>$\ln$ earnings ($\alpha_5$)</td>
<td>0.024</td>
<td>0.020</td>
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<tr>
<td>$\ln$ prod. sector $_1$ ($\alpha_6$)</td>
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<td>$\Delta$ house prices ($\alpha_7$)</td>
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<td>$\Delta$ mortgage cost ($\alpha_9$)</td>
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<td>w.age pop $_1$ ($\phi_1$)</td>
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<td>p.ret $\times \ln$ hpt $_1$ ($\phi_2$)</td>
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<td>-0.025</td>
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<td>housing turnover $_1$ $-$ 2.16 $-$ 2.96 $-$ (0.39)</td>
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Figure 5. Unemployment, full-time earnings, and share of production workers in total, for South East relative to Great Britain.

Figure 6. Downside risk, mortgage cost, relative house prices and relative owner-occupation rate for south east.
force in a region would result both in higher in-commuting and higher in-migration. However, we know from the Labour Force Survey for 1994 that employees who commute between regions earn, on the average 62% more than the average earnings of employed residents in the region. Commuters are likely to be a selective group of highly skilled people. If regional migrants are less selective and if a high proportion of employment in the production sector also signals more limited long-term employment opportunities for the mass of the work force, the negative impact on net migration is explicable.

The relative house price effects, including the interactions with the proportion of people over the retirement age, and the offsetting effects of expected house price appreciation operate in the expected direction and are strongly significant. As expected, recent experience of a negative rate of return in housing discourages in-migration.

A high rate of owner occupation in a region, by discouraging out-migration, increases net in-migration. One interpretation is as the lock-in effect associated with right-to-buy sales to existing council tenants, though the rate of owner-occupation is not an ideal proxy for this concept.

The multiplicative $\lambda_o$ effect responds strongly to the rate of turnover in the housing market. Note that though our net migration rates are scaled by the total gross migration rate between regions in Great Britain, this is likely to be insufficient to correct net migration for variations in national economic conditions. Many moves, even long-distance ones have little to do with fluctuations in economic activity. But our $\lambda_o$ interaction effect applies only to the effect of variations in relative economic conditions between regions. Housing market turnover is likely to have a bigger impact on these relative economic factors than on the gross migration rate in Great Britain. The relative regional

Figure 7. Forecast and actual change in log house prices for South East relative to Great Britain.
size component of $\lambda$, reflected in the parameter $\delta_2$ was always insignificant and is omitted in the Table 5 results.

The reported standard errors for parameter estimates and for equations are asymptotic. Moreover, we have tested and imposed a number of parameter restrictions on the model. On both accounts, therefore, the standard errors are a little optimistic (note, for example, a $t$-ratio of 23 for the relative house price levels effect!). But even a 20% upward adjustment of the standard errors would have left almost all the estimated parameters still very significant.

Lagrange multiplier tests for residual autocorrelation suggested potential problems in the South East, reflected in the Durbin-Watson of 1.20 for that region. There is also evidence of serial correlation in its contiguous regions, East Midlands and East Anglia. This suggests that our specification could be improved further.

In column 2, we report the results of estimating the net migration equation up to 1990, thus omitting the years when the Southern part of the country suffered its worst recession since the 1930s. The unemployment, earnings, and the various house price effects are quite stable over the two samples. There are larger differences in the three parameters, $\lambda$, $\delta_1$ and $\phi_5$, indicating further evidence of a specification error. One interpretation of $\phi_5$ is as a ‘lock-in’ effect arising from right-to-buy sales of council houses. However, the owner-occupation rate represents a mix of other influences as well. For example, given the decline in the construction of social housing, regions with above average long-term in-migration are likely to experience above average increases in their owner-occupation rates. Omitted long-term influences on migration may therefore be reflected in the owner-occupation rate. The failure to distinguish these may account for the parameter instability in $\phi_5$ and may be contributing to residual autocorrelation in the South East.

Another potential cause of difficulties is the Poll Tax introduced in Scotland in 1988, in England and Wales in 1989 and replaced by the Council Tax in 1992. Some among the younger, more mobile population, tried to avoid payment of the Poll Tax by avoiding being registered on the electoral register and may similarly have avoided the NHS register. This could have led to an undercounting of in-migration into regions, such as the South East, where in-migration of young people tends to be positive. Indeed, this hypothesis could account for part of the fall of net in-migration into the South East in 1989–91 which our model cannot explain.

The shifts in the parameter estimates of $\lambda$ and $\delta_1$ may also indicate a problem. Our measure of the housing market turnover rate may not be the most appropriate. If $\delta_1$ is restricted to the full sample value, the estimate of $\lambda$ is similar to the full sample estimate.

Generally speaking, the really robust effects are the levels effects of unemployment, earnings and relative house prices. These always come through very strongly irrespective of how the rest of the equation is specified and whether or not relative house prices are weighted by the rate of owner-occupation. However, the omission of all the housing effects from the model results in an insignificant and perversely signed unemployment levels effects,
though the change in the unemployment rate still has a negative effect on net migration rates. The level earnings effect is significantly negative, a perverse result. These results are reported in column 3 of Table 5.

Enthusiasts for general equilibrium interpretations, seeing only the results in column 3, might be tempted to conclude that migration is driving both earnings and unemployment, so that simultaneous equation bias has grossly contaminated these estimates. Given the evidence of columns 1 and 2, that would clearly be wrong. We suspect that many of the apparent anomalies in earlier studies of labour market effects on migration, which McCormick (1991) discusses, have their cause in the omission of relevant housing effects.

It is worth making two more points regarding the house price effects on migration. It has often been argued that house prices represent income expectations so that their labour market and consumption consequences may be dominated by these expectations effects, see Spencer (1989) and Pagano (1990). Because migration should respond to earnings expectations, there should on this count be a positive response of net in-migration to higher relative house prices. A second argument in the same direction arises from the possibility that an exogenous in-migration shock could raise house prices in a region. Yet empirically we find a strong negative response. Therefore, there are two possibilities. One is that the earnings expectations effect and the endogeneity bias are rather weak relative to the other roles of house prices. The other is that we have biased house price effects and the discouraged migration effect is even stronger than our estimates indicate.

The housing market effects, omitted from many earlier migration studies, including those as recent as Pissarides and McMaster (1990), clearly have extremely important implications not only on explaining variations in rates of net migration, but in obtaining sensible earnings and unemployment effects on migration.

V Conclusions

We have developed econometric models for net regional commuting and migration in Britain using a common framework. The results support the hypothesis that migration responds strongly to relative earnings and relative employment prospects, as measured by the unemployment rate. However, the evidence is for extremely important housing market effects. High relative house prices discourage net migration to a region, though expected house price rises, by reducing the user cost of housing, can provide a temporary offset. Furthermore, recent experience of negative returns in the housing market acts as a strong disincentive against net migration to a region. As owner-occupation has risen, the evidence is that the influence of relative house prices on net migration rates has risen also.

Though our data on net commuting is for a shorter period and suffers from sampling variability, the same basic set of forces operate. As expected, the relative labour market factors are even more powerful than on migration. But because of the commuting/migration trade-off, relative housing market
conditions also have quite significant effects on commuting patterns. They act in the opposite direction from their effects on migration patterns.

More research needs to be done on inter-regional commuting patterns. Much better data than we have been able to use could be collected as an administrative by-product of the national insurance and taxation systems. It is a matter for serious regret that these data are not being routinely produced.

The commuting/migration trade-off also implies a different response of migration to contiguous region relativities than to relativities with more distant regions. As Gordon (1975), Molho (1982) and Jackman and Savouri (1992a) have noted, labour market relativities should have weaker effects and housing market relativities stronger effects for contiguous region migration decisions. Our findings support this conjecture.

Thus, for contiguous regions, commuting can act as a significant safety valve to offset the pressures the housing market can exert on the operation of regional labour markets. Of course, commuting comes at a cost and a sharply increasing one with time and distance.

The UK recession of the 1990s, heavily concentrated in the South, reduced North-South unemployment differentials to the lowest levels seen since at least the 1920s, for example, temporarily raising the unemployment rate in London above that of Scotland.

At the time of writing, there are signs of the traditional North-South divide re-emerging, with higher unemployment rates, lower earnings and lower house prices in the North. The relative appreciation of house prices in the South East of the last four years is playing an increasingly important part in this process and is likely to put pressures of the kind experienced in the second half of the 1980s on the allocation of labour between regions and on pay. One aspect of this, as in the 1980s, is that the demand for living space by employees is crowded out by portfolio demand for houses. Long distance commuting is unlikely to be sufficient to offset these regional imbalances. These are serious problems for UK entry into the Eurozone given the likely downward pressure on interest rates coming from this source.

To clarify the nature of the problems our paper addresses and to illustrate the scope for improvements, we now consider policy reform in two areas, policy towards the private rented sector and the Council Tax.

The market rented sector in the UK has, after many years of rent and tenure controls and fiscal bias against landlords and tenants, fallen to what is surely a sub-optimal size, as low as 7% of dwellings (excluding social housing) in 1990, though a slight recovery has since occurred. Various functional arguments in favour of a larger market rented sector are set out in McLennan (1994). Research by Hughes and McCormick (1981, 1987) and others suggests that of all tenure groups, tenants in the private rented sector have the highest mobility rates, even after controlling for age and other characteristics. A larger market rented sector permits greater labour mobility because transactions costs are lower which allows it to act, as a more efficient buffer stock for fluctuations in

12 See Gordon (1990) and McCormick (1997).
regional mobility. When landlords are institutional investors, portfolio driven increases in regional house prices will not translate into the crowding out of living space for employees which can occur in owner-occupied housing. A larger institutional market rented sector would make less likely the kind of pressure on the labour market which came from the South East housing market in the late 1980s.

Though controls on rent and security of tenure are no more, the private rented sector is still subject to two types of tax discrimination. The first is that landlords, unlike owner occupiers, are subject to capital gains tax. The second arises through Council Tax and is explained below. It can be argued that policy should go beyond creating a level playing field and for a time favour the market rented sector to counteract the long-lasting effects of past distortions.

Five arguments can be made against the current Council Tax system. By not being linked to current market values, Council Tax fails to give important stabilization benefits both at regional and national levels. Since house prices rise relative to incomes in typical consumer-led upswings, the higher tax revenue collected as they do so could substantially dampen these cycles particularly at the regional level where feedbacks via spending often increase regional imbalances. Secondly, the tax raises revenue, £9.8b in 1996, which, as a fraction of national income is only one third of that raised by the old Domestic Rates. There are strong general efficiency arguments in favour of property taxes, and insufficient use is being made of this part of the tax base. Thirdly, the tax is in most respects highly regressive: those in a £1m house pay only twice the amount paid by those living in a £70,000 house and the top priced authority, Westminster, has the lowest tax rate in the country. Fourthly, this regressiveness is linked to a serious inefficiency in the use of housing and land resources. Note that by converting a house in the form of three flats into a single family residence, the Council Tax bill is substantially reduced. Thus the form of Council Tax encourages this kind of conversion at a time when the trend is towards smaller households requiring smaller units, and also discourages the building of smaller units. Moreover, since rental units tend to be disproportionately smaller, the Council Tax effectively taxes the rental sector more heavily. Finally, Council Tax is subject to the potential difficulty of a mis-match between cash-flows and property values which impinges on the elderly and increases resistance against higher tax rates.

There are thus four key points to reforming Council Tax:

Revalue every two years, or index annually to local house price indices with full revaluation every 5 years. If the current banded system is retained, as few as eight bands is far too crude.

Tax rates should be approximately proportional to house value minus say £20,000, with local authorities restricted to a range from a floor, say, of 0-6% to a ceiling of 1% (thus avoiding the Westminster problem).

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To make effective the automatic stabilizing role of the role, rate support grants should be cut when higher house prices raise the tax base, so that councils do not merely spend the extra revenue.

Finally, the option should be offered (following long practice in many parts of North America), for the over-65’s to build up a Council Tax charge with accumulated interest, registered annually at the Land Registry, and settled on sale of the dwelling or on death of the surviving resident spouse. Efficient financial markets will readily allow local authorities to convert these claims into cash.

The research in this paper has highlighted problems arising from the interaction of labour and housing markets in Great Britain. The proposed reforms should improve the automatic stabilizers at national and regional levels, reduce crowding out by wealthy investors of housing for employees, and assist in the regeneration of the private rented sector, thereby reducing mobility barriers.

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DATA APPENDIX

Descriptions of variables

$m_{it}$ Internal migration: recorded net movements between the standard regions of Great Britain, scaled as described in the text. Figures are derived from re-registrations recorded at the NHS Central Register. 

$\theta_{it}$ Regional commuting: the log ratio of employment on a census of employment basis to employment on a Labour Force Survey basis, the latter adjusted for second jobs.

$u_{it}$ Regional unemployment rate. 

$lfte_{it}$ Log average weekly earnings of full-time employees. 

$pr_{it}$ Share of production workers in total employment. 

$lhp_{it}$ Log mix-adjusted second-hand house prices. 

$lpoq_{it}$ Log percentage of owner-occupiers. 

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rrorm\(_n\) ‘Downside risk’ variable. Defined as equal to the log change in house prices minus the mortgage interest rate, adjusted for gearing (that is, the loan to value ratio) and for imputed rent. When this is negative, there is a downside risk; otherwise the variable is set to zero. The variable enters as a three year moving average.

wabmr\(_n\) ‘Mortgage cost’ variable. Defined as the mortgage interest rate adjusted for the size of mortgages in the region relative to population and earnings.

\(\Delta r\text{lhplh}\) \(_n\) Expected change in house prices over the next year. \textit{Source}: Authors’ calculations.

\(l\text{vor}\) \(_n\) Loan to value ratio for all purchasers from building societies. \textit{Source}: \textit{Housing Finance}.

\(l\text{vorf}\) \(_n\) Loan to value ratio for first-time buyers from building societies, excluding ‘right-to-buy’ purchases. \textit{Source}: Department of Environment, Transport and the Regions.

\(w\text{pop}\) \(_n\) Working age population. \textit{Source}: OPCS.

\(\begin{array}{l}
\hline
\text{Variable name} & \text{Mean} & \text{Std. deviation} & \text{Minimum} & \text{Maximum} \\
\hline
\text{mse} & -0·002 & 0·002 & -0·005 & 0·001 \\
\theta\text{se} & 0·033 & 0·005 & 0·022 & 0·041 \\
\rho\text{use} & -0·022 & 0·009 & -0·032 & -0·008 \\
\rho\text{use} & -0·025 & 0·009 & -0·036 & -0·012 \\
\Delta r\text{use} & 0·000 & 0·004 & -0·009 & 0·006 \\
\Delta r\text{use} & 0·000 & 0·004 & -0·006 & 0·006 \\
\Delta r\text{lhpr}\text{ese} & 0·179 & 0·040 & 0·113 & 0·225 \\
\Delta r\text{lhpr}\text{ese} & 0·006 & 0·009 & -0·009 & 0·022 \\
\Delta r\text{lhplh}\text{ese} & 0·110 & 0·028 & 0·065 & 0·144 \\
\Delta r\text{lhplh}\text{ese} & 0·004 & 0·006 & -0·005 & 0·015 \\
\Delta r\text{lhplh}\text{ese} & -0·114 & 0·006 & -0·128 & -0·106 \\
\Delta r\text{lhplh}\text{ese} & -0·070 & 0·005 & -0·083 & -0·064 \\
\Delta r\text{lhplh}\text{ese} & 0·335 & 0·086 & 0·256 & 0·536 \\
\Delta r\text{lhplh}\text{ese} & 0·004 & 0·052 & -0·127 & 0·084 \\
\Delta r\text{lhplh}\text{ese} & 0·264 & 0·072 & 0·194 & 0·411 \\
\Delta r\text{lhplh}\text{ese} & 0·003 & 0·039 & -0·083 & 0·060 \\
\Delta r\text{lhplh}\text{ese} & 0·042 & 0·001 & 0·040 & 0·042 \\
\Delta r\text{lhplh}\text{ese} & 0·042 & 0·001 & 0·041 & 0·043 \\
\Delta r\text{lhplh}\text{ese} & -0·024 & 0·039 & -0·121 & 0·003 \\
\Delta r\text{lhplh}\text{ese} & -0·014 & 0·031 & -0·088 & 0·019 \\
\Delta r\text{lhplh}\text{ese} & -0·001 & 0·023 & -0·041 & 0·049 \\
\Delta r\text{lhplh}\text{ese} & 0·000 & 0·020 & -0·028 & 0·057 \\
\Delta r\text{lhplh}\text{ese} & 0·029 & 0·006 & 0·014 & 0·038 \\
\Delta r\text{lhplh}\text{ese} & 0·002 & 0·002 & -0·003 & 0·004 \\
\Delta r\text{lhplh}\text{ese} & -0·001 & 0·005 & 0·009 & 0·007 \\
\Delta r\text{lhplh}\text{ese} & -0·001 & 0·001 & -0·002 & 0·001 \\
\Delta r\text{lhplh}\text{ese} & -0·001 & 0·025 & -0·059 & 0·032 \\
\Delta r\text{lhplh}\text{ese} & 0·002 & 0·014 & -0·014 & 0·034 \\
\hline
\end{array}\)

\textbf{Notes:}
See text for description of variables. Housing market variables in this table are not weighted by the proportion of owner-occupiers in the UK. Sample period is 1977 to 1995.
Notes: The following convention for variable names is used in the paper. For example, $u_t$ is the regional unemployment rate, $ru_t$ is the regional unemployment rate minus the GB unemployment rate, and $rcu_t$ is the regional unemployment rate minus the unemployment rate of the contiguous regions. Contiguous region variables are calculated using employment weights.

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