Cyclical Sensitivity of British Internal Migration since the 1980's: Some Anecdotal Evidence

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Cyclical Sensitivity of British Internal Migration since the 1980s: Some Anecdotal Evidence

Yuzuru ISODA*

Abstract This paper examines short-term changes in the spatial mobility of various groups of the British population in order to explore the reasons why spatial mobility diminishes during a recession. The analysis reveals that mobility of owner-occupiers had been particularly sensitive to economic fluctuations related to severe fluctuations in the housing market since the 1980s. In addition to the decline in purchases of new houses during the recession, house price deflation acted to shorten the length of 'vacancy chains', resulting in a severe limitation in housing liquidity. The result is a further lowering of spatial mobility among owner-occupier households. Changes in the job turnover rate also contributed in lowering spatial mobility, but not by lowering the spatial mobility of those who change job. The spatial mobility of persons who changed job did not diminish during the recession, it was instead the opportunities to change jobs that was substantially reduced, thereby decreasing the aggregate occurrence of migration. This suggests that slowdown in the labour market adjustment process during a recession is responsible for the reduced labour demand rather than for the hesitation in the supply-side of the labour market due to increased risk and uncertainty.

Key words: spatial mobility, business cycle, housing market, job turnover, Great Britain, Labour Force Survey

1. Introduction

Changes in spatial mobility in the developed countries such as the United Kingdom, the Netherlands, the United States and Canada are known to fluctuate with the business cycle (Stillwell and Eyre, 1999). Mobility is high during an economic boom, and is low during a recession. This also applies to the case in Great Britain during the last two decades (Fig. 1).

This paper examines the 'cyclical sensitivity' of spatial mobility of different groups of the British population. The causes of short-term fluctuations in spatial mobility are explored by identifying which groups are more sensitive to economic

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fluctuations. This time-series analysis is implemented in order to examine the causes and effects of contemporary internal migration.

The conventional explanation for a fall in spatial mobility during a recession comes from human capital models (Armstrong and Taylor, 1993). A decline in the probabilities of obtaining a job and/or lower expected earnings would lower the rates of return from migration. Uncertainty arising from finding and holding on to a job in other regions would increase during a period when jobs are generally harder to find, therefore limiting the labour mobility altogether. In addition, potential migrants will be less able to finance the immediate cost of a move during a recession.

This explanation from the human capital models mainly applies to job seekers who search for jobs across regions, but inter-regional migration consists of various other migration streams. Earlier work on age-specific net migration (Isoda, 2000) identifies at least four migration patterns among age groups which are related to (1) education, (2) entrance into the labour market, (3) housing, and (4) retirement. All except the first of these four migration streams show significant changes during the deep recession of the early 1990s. Fluctuations in job prospects are therefore not the sole reason for cyclical changes in spatial mobility. The purpose of this study is to identify which migration stream is most affected by the business cycle, and how economic fluctuations affect the spatial mobility of each migration stream. The approach of decomposing spatial mobility by groups is preferred, because the use of macro approach to examine the effects of economic fluctuations on spatial mobility encounters severe difficulty due to multicollinearity, as different macroeconomic variables fluctuate simultaneously. Identifying groups that are more susceptible to
economic fluctuations would allow researchers to pinpoint which aspects of the business cycle are influencing their mobility.

The data for the analysis comes from the Labour Force Survey (LFS). The survey records each respondent’s address one year prior to the survey date as well as his/her current address; this provides information on spatial mobility along with other economic, socio-economic and demographic variables. Individual records of the survey are made available from the Data Archive via MIMAS of the Manchester Computing Centre. Each annual dataset contains approximately 150,000 records covering 0.3% of the population of Great Britain, and 13 annual datasets were compiled to obtain a consistent series over the period 1986-1998. This study therefore owes to two million LFS interviews made throughout the period; part of the aim of this study is to draw out the full richness of LFS datasets. An additional advantage of using LFS results, apart from their annual availability and their sample size, is that variables for ‘transition’ on economic activities are also available. The LFS records respondents’ economic activity one year prior to the survey date (mainly for the purpose of deriving industrial and occupational unemployment figures), and this enables us to investigate the links between sectoral mobility, social mobility and spatial mobility. Although the sample size is quite large, it is not yet large enough to consider geographical patterns of migration, when detail disaggregation of population is concerned. Therefore, this study only concentrates on an examination of a national fluctuation in changes in spatial mobility.

The next section discusses the business cycle and explains how it can be treated as an explanatory variable in relation to fluctuations in spatial mobility, together with the introduction of fluctuations in the British economy over the study period. Section three discusses the strategy of analysis by defining the concepts ‘general mobility’, ‘group mobility’ and ‘group share’ and explores the internal relationships among them. The fourth section begins the empirical analysis with the differences in cyclical sensitivity of spatial mobility by age groups, and attempts to explain the differences in their cyclical sensitivity in the two subsequent sections. Focusing on ‘housing career’ and economic aspects of the ‘life-course’, the fifth and sixth sections analyse the effects of housing tenure and transition in economic activity, respectively. Section seven develops links between sectoral mobility, social mobility and spatial mobility to explore fluctuations in spatial mobility among employees. Section eight provides concluding remarks.

2. **The business cycle since the 1980s and the cyclical macroeconomic variables**

The ‘business cycle’ is a vaguely defined concept. Despite the term ‘cycle’, short-term economic fluctuations are not regular or predictable. The business cycle is also
a mix of various aspects, covering most economic activities of a nation. Many of macroeconomic variables have the same periodic short-term fluctuations, and it is this simultaneity that underpins this broad-brush concept.

The business cycle is monitored statistically by changes in gross domestic product (GDP), a variable that reflects all aspects of a nation's economic activity. The Office of National Statistics (ONS) derives business fluctuations by the deviation of GDP from its long-term trend value, where long-term trend value is a running five-year mean of GDP. This indicator for business fluctuations is irrelevant in 'explaining' behavioural reactions, because it identifies business fluctuations only retrospectively, after the 'long-term' trend is specified. The average real GDP growth of the previous two years can derive roughly the same peaks and troughs of the business cycle, as can be seen in Fig. 2.

Of the specific components of the business cycle, the most well publicised is the change in unemployment rates. However, cyclical fluctuations in unemployment is a typical lagged indicator (Fig. 3). Unemployment has been high during the peak of economic prosperity in 1988, and reached its lowest point at the beginning of the 1990s. Meanwhile, changes in job vacancy roughly coincide with the business cycle. Labour market studies debate about the 'hysteresis' in unemployment–vacancy relationships (Jackman et al., 1989; Jones and Manning, 1992), that is, a rise in unfilled vacancies during the economic upturn does not match a fall in unemployment. This can partly be explained by the different response lags to business changes, in which vacancies can be notified or withdrawn immediately, whereas job matching and layoffs takes time.

Fig. 2  Business cycle: changes in GDP
Two-year average of GDP changes identifies roughly the same peaks and troughs identified by ONS cyclical indicator. (source: ONS DataBank)
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Fig. 3 Business cycle: labour market variables
Ucum is annual cumulative unemployment, Vcum is annual cumulative vacancies (see note 2 for definition). Job turnovers is the number of persons who changed firm during a one-year period, derived from the LFS data. (source: NOMIS and LFS)

Fig. 4 Business cycle: housing market variables
ΔHp% is annual percentage change in (real) house price. (source: ONS DataBank)

Housing variables also have a close relationship with the business cycle (Fig. 4). ONS identifies total dwellings started as a leading index, and the series shown in Fig. 4 is the number of housing starts in the private sector. House prices, on the other hand, changed parallel to housing starts; they show a sharp rise until 1988, and then fell dramatically in the early 1990s. House prices had fallen not only in real terms but
also nominally during the early 1990s. The economic boom and bust of the late 1980s in Britain was characterised by a severe fluctuation in house prices; it is now widely agreed that housing boom was the driving force of the economic boom of the late 1980s (Taylor and Bradley, 1994; Audas and McKay, 1997; Gibb et al., 1999).

A fluctuation in spatial mobility itself is an indicator of cyclical fluctuations in the economy, as shown in Fig. 1. Although the period covering only one cycle is available in the figure, past mobility fluctuations since the 1970s also shows a clear match with the business fluctuations (Jackman and Savouri, 1992). Fig. 1 distinguishes mobility within and across the Standard Regions. Although Standard Regions are too large for local labour market areas or local housing market areas, the two migration levels have very different characteristics; this distinction will be made throughout the analysis. Due to the ‘distance deterrence’ effect, short-distance moves are over-represented in intra-regional moves, therefore its characteristic mainly represents that of ‘pure home movers’, i.e. residential moves without a change in employment.

Various aspects of cyclical changes in the economy affect spatial mobility and their effects are immediate. Since the mid-1980s, changes in mobility within the Standard Region even preceded the peak and the trough of the short-term fluctuation in GDP growth for a period of six months to one year. During the study period, fluctuations in mobility within region are regarded as a leading cyclical indicator, and that of mobility across regions as a coincident indicator.

3. Strategy of analysis

This section gives the definition for ‘general mobility’, ‘group mobility’ and ‘group share’, and explores the internal relationship among them.

The population of a country can be divided into groups by any criteria:

$$P = P_1 + ... + P_i + ... + P_n$$

and so are the migrants:

$$M = M_1 + ... + M_i + M_n$$

The grouping of a population can be based on ‘static’ variables such as employment status, or on ‘transition’ variables such as whether employment status changed over a one-year period. Theoretically, a population can be disaggregated infinitely by using multiple dimensions, but the sample size limits the number of dimensions to be analysed at one time.

The ‘general mobility’, that is the spatial mobility of all population, is the weighted average of ‘group mobility’:

$$GM = \frac{\sum_{i=1}^{n} P_i \times GM_i}{\sum_{i=1}^{n} P_i}$$
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\[ m_i = \frac{M_i}{P_i} = \sum_{i=1}^{n} \frac{P_i M_i}{P_i} = \sum_{i=1}^{n} w_i m_i \]  

where \( m_i = \frac{M_i}{P_i} \) is the 'general' or average mobility, 

\( m_i = \frac{M_i}{P_i} \) is the 'group mobility' of \( i \)th group, and 

\( w_i = \frac{P_i}{P} \) is the 'group share' of the \( i \)th group to the total population.

The first derivative of equation 1 is:

\[ \frac{dm_i}{dt} m_i \left( \frac{m_i}{m_i - w_i} \right) \]

and since

\[ \sum_{i=1}^{n} m_i w_i = 1, \]

the percentage change in 'general mobility' is a weighted average of percentage changes in 'group mobility', and percentage changes in 'group shares'.

Equation 2 demonstrates that the spatial mobility of all population changes when mobility of sub-populations change, but also when the composition of the population changes. An expansion in a share of group of population having more than average mobility would contribute to increasing overall mobility, which is demonstrated as follows. Assuming a complementary group to the \( i \)th group, a partial derivative in general mobility in respect to group shares is written as:

\[ \frac{\partial m_i}{\partial t} = \frac{m_i}{m_i - w_i} \frac{\partial w_i}{\partial t} + \frac{m_i}{m_i - w_i} \frac{\partial m_c}{\partial t} \frac{\partial w_i}{\partial t}. \]

Since by definition, \( w_i + w_c = 1 \), \( \frac{\partial w_i}{\partial t} + \frac{\partial w_c}{\partial t} = 0 \), and \( m_i m_i + w_i m_i = m_i \),

\[ \frac{\partial m_i}{\partial t} = \frac{m_i - m_i}{m_i - w_i} \frac{\partial w_i}{\partial t} = \frac{m_i - m_i}{m_i - w_i} \frac{\partial w_i}{\partial t}. \]

Therefore, if group mobility is greater than general mobility, then the expansion in group share will be a positive contribution in raising general mobility.

Plane (1993) discusses that long-term mobility change in the United States is related to changes in the age-composition of the population. Although such a stable demographic variable as age is unlikely to have a significant impact on short-term mobility fluctuations, changes in shares do matter when dealing with groups based on economic aspects, such as economic activity, because its shares fluctuate together with the business cycle. Changes in population composition will be even more important with groups that are based on ‘transition’ variables, such as changes in economic activity before and after a one-year period, since they are very sensitive to changes in the economy. These will be discussed fully in section 6.

Equation 2 is an identity among general mobility, group mobility and group share. Null hypotheses are that (1) there are no differences in mobility changes among
groups, and (2) changes in general mobility are explained solely by changes in group mobility. Then, the group mobility fluctuates proportionately to general mobility:

\[ m_i = B_i m. A_i \times \varepsilon_i, \]

parameters \( A_i \) and \( B_i \) are to be estimated by the ordinary least-square method. If the null hypotheses are true, the parameter \( A_i \) should be unity for all groups, since:

\[ \frac{dm_i}{dt} = A_i \frac{dm.}{dt} + \frac{d\varepsilon_i}{dt}. \]

However, it is likely that \( A_i \) would take various values. When \( A_i \) is significantly different from zero (i.e. the correlation between logs of general mobility and group mobility are significant), the group mobility is identified as being 'cyclical'. In such a case, the parameter \( A_i \) gives the 'amplitude' of the fluctuation of the group mobility relative to the fluctuation in general mobility, where unity is the standard value. If \( A_i \) is significantly smaller than unity, then the group mobility would be identified as 'cyclically less sensitive', and if \( A_i \) is significantly greater than unity, then the group mobility would be identified as 'cyclically more sensitive'.

A regression of group share to general mobility would test the second null hypothesis:

\[ w_i = B w. m. A w. \varepsilon_w. \]

and its first derivative is,

\[ \frac{dw_i}{dt} = A w. \frac{dm.}{dt} + \frac{d\varepsilon_w}{dt}. \]

If changes in group share do not contribute to changes in general mobility, then the parameter \( A w. \) should be zero. Estimating cyclical fluctuation parameters for group shares in this way will enable the examination of the contribution of share changes to general mobility changes.

Mobility of each group is obtained through the cross-tabulation of population by group classification and by levels of move (i.e. no move, move within region and move across region) from the individual records of the survey.

4. Cyclical sensitivity of spatial mobility by age

Fig. 5 exemplifies the differences in cyclical fluctuation in inter-regional mobility. The vertical axis is shown in logarithmic scale so that percentage changes in mobility with differing mobility levels can be directly compared. The figure indicates that while both mobility of 20-24 year-olds and 60-64 year-olds fluctuate together with the general mobility, the mobility of 60-64 year-olds fluctuates more than the general
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Fig. 5 Cyclical fluctuations in mobility: examples
Fluctuation in inter-regional mobility for age group 60–64, \( m_2 (60-64 \text{ yrs}) \) is greater than that of general mobility, \( m_2 \) (all), and vice-versa for age group 20–24, \( m_2 (20-24 \text{ yrs}) \). (source: LFS)

Fig. 6 Age and cyclical sensitivity

mobility, and that of 20–24 year-olds fluctuates less.

Cyclical sensitivity of mobility by age, as measured by the method given in section 3, is summarised in Fig. 6. The amplitudes of fluctuations of intra-regional mobility (A1) and inter-regional mobility (A2) show cyclical sensitivities of each age group, where the amplitude value of 100% signifies that the degree of fluctuation is at the same level as general mobility. Amplitude values significantly different to 100% (at
1% significance level) are shown with an empty point symbol, and group mobility that had not been cyclical is shown with an x point.

Almost all age groups are affected by the business cycle but with differing sensitivity. Roughly, there is positive relation between cyclical sensitivity and age. There are three points in Fig. 6 that are noteworthy:

(1) intra-regional moves by middle aged (aged 40-54) are significantly more sensitive to cyclical changes;

(2) inter-regional migration by late middle-aged (aged 55-64) are also significantly more sensitive; and in contrast

(3) spatial mobility of young adults is significantly less sensitive or even non-cyclical, both intra- and inter-regionally.

The following two sections explore the reasons why spatial mobility of the above three age groups have particularly different cyclical sensitivities. The presumption is that the age of the migrant per se is not the direct reason for different cyclical sensitivity levels. Rather, it is the different situations that each age group faces that make their sensitivities different. Such situations are inferred by first identifying the characteristics associated with each age group, then estimating cyclical sensitivity of spatial mobility for those characteristics, and finally, examining how fluctuations in the economy affect the migration decisions of specified groups of people. This will enable us to identify which aspect of the business cycle most affects spatial mobility decisions.

The fifth section starts with an examination of intra-regional mobility of the middle aged, and the sixth section examines the inter-regional mobility of the late middle aged and the spatial mobility of young adults.

5. Cyclical sensitivity of spatial mobility by housing tenure

The expectations regarding a typical middle-aged person are that he/she is married, with teen-age child or children, and possibly owning a house. Analyses on these household/family variables reveal that it is the housing tenure most affects the cyclical sensitivity levels.

Housing tenure has a clear relationship with age, and transition in housing tenure over a lifetime is often called 'housing career'. Households start their housing career in either the social or the private rented sector (Fig. 7). Owner-occupier on mortgage predominates during the middle part of productive ages; the average age of first-time buyers is during the early 30s (ONS, 1999). Mortgage repayment normally completes before retirement age of household head, and outright owner predominates among older ages.

Table 1 summarises the cyclical sensitivity parameters for tenure groups. The table lists the set of parameters for both intra- and inter-regional mobility, and the
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80%
60%
40%
20%
0%

mortgagor
outright owner
social renter
private renter

Age of household head

16-19 30-34 45-49 60-64 75-79

Fig. 7 Housing tenure by age of head of household, 1986-1998 (source: LFS)

Table 1 Cyclical sensitivity parameters: housing tenure

<table>
<thead>
<tr>
<th>Owner-occupiers</th>
<th>Intra-regional mobility</th>
<th>Inter-regional mobility</th>
<th>Mean share wi</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mi</td>
<td>mi/m.</td>
<td>R</td>
</tr>
<tr>
<td>Owned outright</td>
<td>2.4%</td>
<td>0.30</td>
<td>0.02**</td>
</tr>
<tr>
<td>On mortgage</td>
<td>6.7%</td>
<td>0.86</td>
<td>0.85**</td>
</tr>
<tr>
<td>Social rented</td>
<td>Public</td>
<td>8.8%</td>
<td>1.13</td>
</tr>
<tr>
<td>Housing assoc</td>
<td>12.1%</td>
<td>1.55</td>
<td>0.31</td>
</tr>
<tr>
<td>Private rented</td>
<td>Furnished</td>
<td>43.9%</td>
<td>0.64</td>
</tr>
<tr>
<td>Unfurnished</td>
<td>19.8%</td>
<td>2.54</td>
<td>-0.37</td>
</tr>
<tr>
<td>Employment</td>
<td>13.3%</td>
<td>1.71</td>
<td>-0.23</td>
</tr>
<tr>
<td>Relative</td>
<td>13.4%</td>
<td>1.72</td>
<td>0.29</td>
</tr>
</tbody>
</table>

The stars next to R and Rw values indicate levels of statistical significance at 5% and 1%. Stars next to A values indicate whether the value is significantly different from 100% at significance level of 5% and 1%.

(source: LFS)

The first column labelled 'mi' lists the mean mobility over 13 annual figures. The next column 'mi/m.' is the ratio of ith group mobility to general mobility. Column 'R' is the correlation coefficient with stars indicating the confidence levels. Column A represents the amplitude of the fluctuation. The standard value for amplitude is 100% and the stars indicate whether the value is significantly different from 100%. Columns 'Rw' and 'Aw' are the correlation coefficients and amplitude values for changes in shares, respectively. The last column of the table, labelled 'Wi', is the mean share of the group to total population over the study period.

Table 1 shows that mobility of both categories in owner-occupier sector ('owned
outright’ and ‘on mortgage’) had been significantly more cyclically sensitive, both intra- and inter-regionally. Their fluctuation had been two to three times greater than the fluctuation of the general mobility. The economic boom and bust from the late 1980s to the early 1990s was characterised with severe fluctuation in house price, and this certainly had effect on migration. This, combined with the fact that the middle-aged are predominantly in the owner-occupier sector, suggests that higher cyclical sensitivity of intra-regional mobility among the middle aged is caused by the fluctuation in the British housing market.

Private rented housing in Britain has been greatly limited due to public policy. Shares of household in the owner-occupied sector now add up to about 65% of all households; the private rented sector shares less than 10%. Much of the internal migration in Britain therefore involves buying and selling of homes. At the same time, moving houses for residential amenity ranks in high position as a main reason for a move, both intra- and inter-regionally (Halfacree, 1994). Therefore, property transactions and house price changes are important factors determining spatial mobility.

The housing boom of the late 1980s was induced by government policy encouraging owner-occupation, and generous mortgage supplied through competition between banks and building societies after financial liberalisation. The long period of real income growth after the 1980-1 recession, and the 1960s baby boom cohorts reaching home-buying age acted to push up demand for housing. Inelasticity in housing supply due to tight land planning strictures and significant lags in house-building caused houses price to rise, and asset appreciation allowed for mortgages to become even more generous (Audas and McKay, 1997).

Demand for houses among first-time buyers increased under such house price inflation and low mortgage interest with tax relief on mortgage interest. The final blow came from the ending of ‘double tax relief’, that had allowed unmarried couples to claim two sets of mortgage interest tax relief, which had created artificial demand during the last month of the policy changes coming into effect (Gibb et al, 1999). During this house price inflation, the home building sector had recovered from a severe slump in the early 1980s, and the supply of new houses gradually increased (see Fig. 4).

Considering only pure demand and supply side of the housing market is not enough in the understanding of British housing transactions. Over 80% of all property transactions are second-hand houses, thus there is a need to consider ‘supply-cum-demand side’, that is, ‘re-housing’ of existing owner-occupiers. The effect of higher house price itself on house supply and demand among existing owner-occupiers is ambiguous. A higher house price would mean that current owner-occupiers can sell their previous houses at higher price, but simultaneously, the alternative house would cost more. Therefore, ‘re-housing’ intended to trade up housing by purchasing more
'housing service' would be discouraged, while those intending to trade down and withdraw housing equity would be encouraged; the effect of the house price level on housing transaction depends on a balance of the two.

House price change has an independent effect on housing transaction. Boyer et al. (1989) argues that rising house prices discourages existing owner-occupiers to move in fear of further appreciation of the property. Retrospectively, from the empirical observation, it was during the house price inflation that the number of housing transactions was high, and housing transactions had instead become severely inactive during the subsequent house price deflation. Further argument by Levin and Wright (1997) is needed to explain this discrepancy. They assert that speculative behaviour on housing transactions could occur among existing home owners if they have a priori reasons for a move related to transition in employment and in housing needs. Those intending to move anyway would bring forward the purchase of a house at the intended destination before house price rise any further. This would be made possible because households could purchase alternative housing before selling the existing one, since rising house prices would cover the extra cost of owning two houses during a transition period (such as interest on bridging loans). A flow of houses available for immediate sale in the housing market would substantially enhance housing liquidity. This enables the extension of housing 'vacancy chains' (discussed below) providing various matching combinations between potential buyers and the housing stock. As a result, second-hand transaction also increases during house price inflation.

Housing transactions ($T_i$) consist of the sale of new houses ($NEW_i$) and transactions of second-hand houses ($SEC_i$):

$$T_i = NEW_i + SEC_i.$$  

However, transactions of second-hand houses are not totally independent from the purchases of new houses, because the purchase of new houses by previous owner-occupier households (and their subsequent moves) generates vacancies in the existing housing stock, thus creating further housing transactions. Because of this 'vacancy chains', second-hand housing transactions consist of those initiated by the addition of new houses into the housing stock, and those occur regardless of a new housing purchase.

$$SEC_i = NEW_i f(X_i) + ELSE_i,$$

where $f(X_i)$ is a function of macroeconomic variables determining extra transactions of second-hand housing per new houses supplied. $ELSE$ represents the number of other second-hand housing transactions such as sale of inherited houses, sales of houses to sitting tenants, and various other transactions. Assuming a linear conjunction of variables for $f(X_i)$, the number of all transactions can be written as:
\[ T_t = (1 + f(X_t))NEW_t + ELSE_t = (1 + \alpha_0)NEW_t + \sum\alpha_i NEW_t \times X_{it} + \beta + \varepsilon_t, \]

where \( \alpha \) and \( \beta \) are parameters estimated by the regression, and \( \varepsilon \) is the error term. \( 1 + f(X_t) \) can be thought of as a proxy for 'length of vacancy chains'.

Time-series macroeconomic variables since the 1980s were taken from ONS DataBank via the Data Archive. Variables such as house price, household disposable income and interest rates were examined in explaining changes in 'length of vacancy changes', and the final model is summarised in table 2. The coefficients appeared consistent with the argument made above. Zero-order correlation coefficient for housing completes demonstrates that housing completes is the best single variable depicting changes in property transactions. Its coefficient tells us that the total volume of property transactions is more than eight times the number of new houses supplied, on average, of which these extra transactions fluctuate with other variables in the model. Real house price levels appeared to have negative effect on number of transactions, ceteris paribus, suggesting that there are more households trading up housing than otherwise; this could be a possible reflection of rise in owner-occupation and general improvement in housing quality in recent years. However, house price changes supersede the negative effect of levels, which raises the number of property transactions when house prices are higher. Finally, the positive effect of general inflation is consistent with the popular argument that asset demand for housing increases to beat inflation (Gibb et al., 1999).

The addition of new houses to the existing housing stock stimulates transactions through 'vacancy chains', and the 'length of vacancy chains' will be extended by house price inflation, further increasing housing transactions. Property transactions had dropped since the end of 1980s, both from fall in number of housing completes, and by contraction of the length of vacancy chains caused by the reversal of house price

<table>
<thead>
<tr>
<th>Property transactions: linear regression</th>
<th>t</th>
<th>partial</th>
<th>zero-order</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>360</td>
<td>0.70</td>
<td></td>
</tr>
<tr>
<td>NEW (housing completes)</td>
<td>8.08</td>
<td>2.82</td>
<td>0.706</td>
</tr>
<tr>
<td>NEW* real house price</td>
<td>-0.00005</td>
<td>-4.35</td>
<td>-0.838</td>
</tr>
<tr>
<td>NEW* real house price % change</td>
<td>11.9</td>
<td>5.06</td>
<td>0.873</td>
</tr>
<tr>
<td>NEW* inflation rate</td>
<td>31.2</td>
<td>3.70</td>
<td>0.795</td>
</tr>
<tr>
<td>R</td>
<td>0.983</td>
<td></td>
<td></td>
</tr>
<tr>
<td>degree of freedom</td>
<td>8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(source: ONS DataBank)
Cyclical sensitivity of British internal migration since the 1980s

Fig. 8 Migration and property transactions

Changes. Number of property transactions and migration into owned houses are internally related, and their fluctuations are closely related (Fig. 8). Housing construction and house price aspects of the business cycle affects housing liquidity, and determines the number of property transactions. Therefore, migration involving property transactions, i.e. moves of owner-occupiers, had been disproportionately
affected by business fluctuations.

Since tenure mobility occurs by moving house, there is a need to confirm whether tenure mix among migrant households is the same as that of all households. Fig. 9 plots shares of tenure for intra-regional mover households by age of head of household, which clearly shows a different pattern. Note that tenure here refers to tenure after the move. Ages 40-54 predominantly move into owned houses (on mortgage or owned outright), whereas older age groups move predominantly into social housing (either public housing or housing association houses), which explains that among intra-regional movers, the middle-aged have been most affected by the economic fluctuations.

However, a question arises as to why a business cycle effect on owner-occupation for younger age groups (particularly ages 30-39) does not appear much in cyclical sensitivity of intra-regional mobility for those age groups. It might be that for first-time buyers, the house price level effect and house price change effect (discussed above) largely offset each other. House price inflation encourages buying a house, but higher house prices for the first-time buyers will become a barrier to tenure mobility. Conversely, house price deflation may postpone home purchase or result in difficulty obtaining a mortgage, but lower house price itself would facilitate access to home ownership. This assumption remains speculative as LFS does not record movers housing tenure before a move, and there is no way to distinguish between first-time buyers to previous owners.

6. Transition in economic activities and spatial mobility

Cyclical sensitivity of inter-regional mobility of those in the late middle ages is explained in a similar way. Persons aged 55-64 are likely to be near or at retirement, and the assumption is that migration across regions in this age band is retirement-related. The effect of house price changes on spatial mobility of owner-occupiers also applies to this age group, but there are reasons to assume that the effect would be amplified. First, potential retirement migrants can adjust the timing of the move more freely according to economic and financial situation at the time. Second, it is expected that households intending to trade down housing is more pronounced since (1) they are able to choose house at region with lower house price as they are no longer tied to their region of employment, and (2) they are able to choose a smaller dwelling due to a contraction in household size. The related final reason is that retirement homes are often bought by selling the existing owned houses, as a retiree normally does not have access to a mortgage. Buying a retirement home might become unaffordable if the existing house cannot be sold at the desired price. Fig. 10 shows that over half of inter-regional migrants in their late middle-ages move into houses owned outright,
Cyclical sensitivity of British internal migration since the 1980s

Note also, by comparing Fig. 10 and 9, the difference of movement into social housing between intra-regional movers and inter-regional migrants. The difference clearly confirms the point which Hughes and McCormick (1987) raised in the 1980s, that public housing is hardly an option for inter-regional movers for alternative housing. This difference, which is particularly apparent among older age groups, explains the reason why intra-regional mobility at or near retirement is not as much cyclically sensitive as inter-regional mobility, and thus supporting the presumption that age is not the direct cause of different cyclical sensitivity levels.

In addition, the spatial aspect of house price and migration should also be considered. During house price inflation, disparities in regional house prices tend to widen, as house prices in regions where prices had already been high rise faster than the rest (Gissani and Hadjimatheou, 1991). Such regions are urban counties of the South East and other densely inhabited areas. At the same time, migration of the older population occurs almost exclusively from urban regions to 'rural' regions (Isoda, 2000). Retirement migration will be encouraged when the house price gap is greater.

Table 3 summarises cyclical sensitivity parameters for transition in economic activity. The first block of rows summarises the cyclical sensitivity parameters for those whose economic activity status did not change during a one-year period, followed by blocks of inflow into and outflow from each of the categories, and the final block of selected specific transitions. The transition in question is those who retired during a one-year period prior to the survey date, in another words, the inflow into retirement. This group of people has a very high cyclical sensitivity in mobility

which is made possible by the wealth accumulated during their productive years.
Yuzuru ISODA

across regions, more than three times the general mobility, and the argument so far seems valid. This value of 367% for amplitude is the largest found in this study.

On the contrary, mobility of students is not cyclical both intra- and inter-regionally. Many of the moves involved with this group of people are those migrate to enter universities. Mobility of persons finishing full-time education (either at degree level or below) is also not cyclical. These, together with mobility changes of students, explain why mobility of 16-24 year olds is less cyclically sensitive. Age at entering universities and finishing full-time education is institutionally fixed and this makes their mobility less cyclically sensitive, or not cyclical at all. In fact, since the mid 1980s, mobility of the ages 16-24 has risen despite the economic downturn because of a substantial increase in seats at universities, and more share of young people are attending courses than ever.

Before proceeding to the next section, other important groups in economic activity transition listed in Table 3 require explanation. Inter-regional mobility of people who ceased to be engaged in domestic work (outflow from ‘Housework’) receives the second

<table>
<thead>
<tr>
<th></th>
<th>Intra-regional mobility</th>
<th>Share</th>
<th>Inter-regional mobility</th>
<th>Share</th>
<th>Mean share</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mi mi/m.</td>
<td>R A</td>
<td>mi mi/m.</td>
<td>R A</td>
<td></td>
</tr>
<tr>
<td>Same</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Working</td>
<td>8.1% 1.05</td>
<td>0.96**</td>
<td>119% -0.48 -18%</td>
<td>1.1% 0.86</td>
<td>0.97**</td>
</tr>
<tr>
<td>Unemployed</td>
<td>11.8% 1.52</td>
<td>0.50</td>
<td>60% -0.23 80%</td>
<td>1.3% 1.05</td>
<td>0.50 76%</td>
</tr>
<tr>
<td>Student</td>
<td>16.1% 2.06</td>
<td>0.40</td>
<td>43% -0.07 -9%</td>
<td>3.8% 3.13</td>
<td>-0.37 -66%</td>
</tr>
<tr>
<td>Retired</td>
<td>2.4% 0.31</td>
<td>0.41</td>
<td>90% -0.30 46%</td>
<td>0.4% 0.22</td>
<td>0.55** 118%</td>
</tr>
<tr>
<td>Housework</td>
<td>8.6% 1.22</td>
<td>0.54</td>
<td>57% 0.36 44%</td>
<td>1.1% 0.66</td>
<td>0.68** 138%</td>
</tr>
<tr>
<td>Sick or disabled</td>
<td>8.1% 0.78</td>
<td>0.24</td>
<td>49% 0.61 4%</td>
<td>0.5% 0.43</td>
<td>0.21 26%</td>
</tr>
<tr>
<td>Other</td>
<td>7.8% 1.00</td>
<td>0.09</td>
<td>26% -0.15 -47%</td>
<td>1.1% 0.86</td>
<td>0.54 256%</td>
</tr>
<tr>
<td>Inflow into:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Working</td>
<td>11.8% 1.51</td>
<td>0.62**</td>
<td>42% 0.79** 64%</td>
<td>3.9% 3.20</td>
<td>0.85** 89%</td>
</tr>
<tr>
<td>Unemployed</td>
<td>14.9% 1.91</td>
<td>0.65**</td>
<td>60% -0.37 -70%</td>
<td>3.4% 2.73</td>
<td>0.62** 113%</td>
</tr>
<tr>
<td>Student</td>
<td>12.6% 2.60</td>
<td>0.49</td>
<td>77% -0.38 -154%</td>
<td>10.0% 8.11</td>
<td>0.73** 162%</td>
</tr>
<tr>
<td>Retired</td>
<td>3.3% 0.45</td>
<td>0.99*</td>
<td>230% 0.68 80%</td>
<td>0.9% 0.73</td>
<td>0.64** 267%**</td>
</tr>
<tr>
<td>Housework</td>
<td>17.1% 2.26</td>
<td>0.88**</td>
<td>90% -0.54 -30%</td>
<td>2.7% 2.22</td>
<td>0.75** 116%</td>
</tr>
<tr>
<td>Sick or disabled</td>
<td>6.6% 0.65</td>
<td>0.33</td>
<td>85% -0.69 -34%</td>
<td>0.9% 0.71</td>
<td>0.25 67%</td>
</tr>
<tr>
<td>Other</td>
<td>6.8% 0.88</td>
<td>0.42</td>
<td>175% -0.14 -124%</td>
<td>1.5% 1.18</td>
<td>0.28 87%</td>
</tr>
<tr>
<td>Outflow from:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Working</td>
<td>12.1% 1.68</td>
<td>0.73**</td>
<td>90% -0.63 -86%</td>
<td>3.6% 2.91</td>
<td>0.69** 114%</td>
</tr>
<tr>
<td>Unemployed</td>
<td>12.5% 1.59</td>
<td>0.54</td>
<td>50% 0.56** 130%</td>
<td>2.0% 1.64</td>
<td>0.74** 99%</td>
</tr>
<tr>
<td>Student</td>
<td>12.1% 1.68</td>
<td>0.08</td>
<td>10% -0.05** 62%</td>
<td>6.1% 4.99</td>
<td>0.40 31%</td>
</tr>
<tr>
<td>Retired</td>
<td>3.0% 0.26</td>
<td>-0.09</td>
<td>-29% 0.24 -253%</td>
<td>0.5% 0.54</td>
<td>0.44 128%</td>
</tr>
<tr>
<td>Housework</td>
<td>6.8% 0.68</td>
<td>0.66*</td>
<td>164% -0.14 -33%</td>
<td>1.1% 0.92</td>
<td>0.85** 243%**</td>
</tr>
<tr>
<td>Sick or disabled</td>
<td>8.0% 1.02</td>
<td>0.37</td>
<td>107% -0.44 -34%</td>
<td>0.9% 0.74</td>
<td>0.61 245%</td>
</tr>
<tr>
<td>Other</td>
<td>13.5% 1.74</td>
<td>0.49</td>
<td>75% -0.06** 38%</td>
<td>3.3% 2.72</td>
<td>0.74** 226%</td>
</tr>
<tr>
<td>Selected transitions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work-Unemp</td>
<td>15.5% 1.99</td>
<td>0.63*</td>
<td>97% -0.59 -355%</td>
<td>3.6% 2.96</td>
<td>0.78** 141%</td>
</tr>
<tr>
<td>Unemp-Work</td>
<td>12.2% 1.57</td>
<td>0.52</td>
<td>53% 0.63** 121%</td>
<td>2.3% 1.88</td>
<td>0.73** 120%</td>
</tr>
<tr>
<td>Student-Work</td>
<td>15.5% 1.73</td>
<td>0.07</td>
<td>8% 0.60** 78%</td>
<td>7.4% 5.98</td>
<td>0.54 208%</td>
</tr>
<tr>
<td>House-Work</td>
<td>9.7% 1.25</td>
<td>0.29</td>
<td>32% 0.26 38%</td>
<td>1.6% 1.34</td>
<td>0.68** 145%</td>
</tr>
</tbody>
</table>

(source: LFS)
largest amplitude value in Table 3. This is because a segment of those engaging in domestic work represent a reserve of labour that becomes economically active during an economic boom and become ‘discouraged’ worker during a recession. The mobility of those who changed economic activity from domestic work to employment (in the row labelled ‘House-Work’) had been significantly cyclical, though not particularly more sensitive. The change in group share, as discussed in section 3, also counts for aggregate mobility changes. Flow (share) of transition from domestic work to employment is significantly cyclical having an amplitude value of almost 100%. The amplitudes of fluctuations in group mobility and group share add up to more than 200%, thus contributing higher volatility in inter-regional mobility among those ceased to be engaging in housework.

Another significantly high sensitivity is found for those working both before and after a one-year period. Although this group is only 20% more sensitive than general mobility, it is noteworthy because 40% of the entire population is included in this category. The discussion will be fully elaborated in the next section.

7. Sectoral, social and spatial mobility

The Labour Force Survey records a rich source of information on industry and occupation for persons engaged in employment both at the beginning and the end of a one-year period. Arguably, there are links between sectoral mobility (labour mobility across industries), social mobility, and spatial mobility.

Savage (1991) asserts that there are bilateral links between spatial mobility and social mobility, although they are not necessary conditions for each other. Social mobility may occur within a large organisation often involving transfer of personnel among different branches, or through voluntary means by changing firms within a region or across regions. Considering the large pecuniary and nonpecuniary costs of relocation, this is sensible that labour migrates not only for a mere increase in earnings, but also for upward advancement on the social class ladder or improvement of the career prospects.

Table 4 groups persons according to whether they had changed firm during a one-year period. Persons working for the same firm who had moved within a region constitute mainly of ‘pure home movers’ (those who changed their house only). Employed who work for the same firm and migrated across regions are mainly organisational movers who are transferred to different branch of the same firm. About half of inter-regional labour migration occurs without changing firm. Here, it appears that spatial mobility of persons working for the same firm had been cyclically more sensitive, compared to voluntary movers who changed firm. In the case of ‘pure home movers’, the changes in housing markets would have directly affected their
Table 4  Cyclical sensitivity parameters: Job changes and sectoral mobility

<table>
<thead>
<tr>
<th></th>
<th>Intra-regional mobility</th>
<th></th>
<th>Inter-regional mobility</th>
<th></th>
<th>Mean share (wi)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Mobility</td>
<td>Share</td>
<td>Mean</td>
<td>Mobility</td>
</tr>
<tr>
<td>Same firm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Changed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Changed within ind.</td>
<td>7.5%</td>
<td>0.96</td>
<td>0.97**</td>
<td>122%</td>
<td>-0.89**</td>
</tr>
<tr>
<td>Changed across ind.</td>
<td>14.0%</td>
<td>1.88</td>
<td>0.85**</td>
<td>103%</td>
<td>0.07**</td>
</tr>
<tr>
<td>Changed within class</td>
<td>14.2%</td>
<td>1.82</td>
<td>0.90**</td>
<td>119%</td>
<td>0.08</td>
</tr>
<tr>
<td>Changed across class</td>
<td>13.9%</td>
<td>1.78</td>
<td>0.72**</td>
<td>94%</td>
<td>0.08</td>
</tr>
</tbody>
</table>

(source: LFS)

Fig. 11  Spatial mobility and job turnover rate
Key: m2 (all): general inter-regional mobility, m2 (w-w): inter-regional group mobility of those working both at beginning and end of one-year period, w (changed): share of persons who changed firm during one-year period (the denominator is the number of persons working both at beginning and end of one-year period), m2 (changed): inter-regional group mobility of persons who changed firm. (source: LFS)

mobility. The large cyclical fluctuation in organisational mobility, conversely, implies that personnel allocation policy within organisations is heavily affected by the recession, from a slowdown in production and a financial difficulty of issuing relocation package to their employees.

Persons who changed firm and moved across the region has been significantly less sensitive. Much greater amplitude is recorded in group share of persons who changed firm, in another words, job turnovers (Fig. 11). This demonstrates that reduction in spatial mobility of the working population during the recession is mainly because of fewer opportunities to change job. This confirms Jackman and Savouri’s (1992) assumption that mobility during the recession declines because there would be fewer job engagements to be made.
Cyclical sensitivity of British internal migration since the 1980s

Table 5 Regression result on job turnovers

<table>
<thead>
<tr>
<th>Job turnovers: linear regression coefficients</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>1.43</td>
</tr>
<tr>
<td>Cumulative vacancies</td>
<td>4.05</td>
</tr>
<tr>
<td>Cumulative unemployment</td>
<td>-2.49</td>
</tr>
<tr>
<td>R</td>
<td>0.892</td>
</tr>
<tr>
<td>degree of freedom</td>
<td>8</td>
</tr>
</tbody>
</table>

See note 2) for variable definitions.
(source: ONS DataBank and LFS)

Number of job turnovers has a slightly lagged cyclical fluctuation compared to that of job vacancies. Job turnovers are basically high when there are more unfilled vacancies, but especially so when unemployment is relatively low. Regression result for job turnovers in Table 5 demonstrates a strong positive relation with number of vacancies, discounted by the level of unemployment. Changes in number of job turnovers is mainly determined by the demand-side of the labour market, while optimism among the workforce from low unemployment seems to facilitate labour mobility between jobs. The implication is that lower spatial mobility during the recession is largely a result rather than a cause of the slowdown of labour market adjustment process.

I have distinguished two levels of change of firm in Table 4: those who changed firm within industry class and those who changed across industry class, the latter of which can be referred to as sectoral mobility. The Standard Industry Class that divides industries into 10 categories was used here. Values for Rw and Aw show that both levels of changes in firm had been highly cyclical. The supply-side of the labour market adjustment process involves (1) sectoral mobility within region, (2) spatial mobility (across region) within sector, or (3) sectoral and spatial mobility; and annual averages of these three categories of labour mobility between 1986-1998 are 4.8%, 0.8%, and 0.2% of total employees, respectively. Since (inter-regional) spatial mobility of those who had sectoral mobility was also cyclically sensitive, the third type of labour mobility, which is potentially the most effective in the labour adjustment, was most affected by the recession, because fluctuation in sectoral mobility and spatial mobility are combined. The labour market adjustment process during the recession slows down both spatially and sectorally.

Similar results are found for social mobility (Table 6). There are more people who change occupation during a prosperous period, and this is true for both changes in occupation within SEG and across SEG. Spatial mobility for both levels of social mobility is also significantly cyclical. Therefore, this dimension makes a considerable contribution to fluctuations in general mobility, as their cyclical fluctuation in spatial
Yuzuru ISODA

Table 6 Cyclical sensitivity parameters: occupation changes and social mobility

<table>
<thead>
<tr>
<th></th>
<th>Intra-regional mobility</th>
<th>Inter-regional mobility</th>
<th>Mean share of mobility</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mi</td>
<td>mil/m</td>
<td>R</td>
</tr>
<tr>
<td>Same occupation</td>
<td>7.5%</td>
<td>0.96</td>
<td>0.97**</td>
</tr>
<tr>
<td>Changed occupation</td>
<td>13.3%</td>
<td>1.74</td>
<td>0.97**</td>
</tr>
<tr>
<td>Changed within SEG</td>
<td>13.3%</td>
<td>1.68</td>
<td>0.85**</td>
</tr>
<tr>
<td>Changed across SEG</td>
<td>13.9%</td>
<td>1.78</td>
<td>0.89**</td>
</tr>
</tbody>
</table>

(source: LFS)

mobility is amplified by cyclical fluctuations in social mobility.

A more intriguing might be to consider whether migrants’ social class changed upward, or downward. Fielding (1992) have demonstrated that upward social mobility is linked to spatial mobility using the Office of Population Census and Survey Longitudinal Study that links individual records of the decennial Census between 1971 and 1981. However, the data on one-year changes in social class revealed no indication that spatial mobility is related to upward social mobility. Migration and social mobility are closely related, and enhanced social mobility during an economic boom requires or enables higher spatial mobility. However, the fluctuations in social mobility occurred mainly from expansion and contraction of manual occupations during the study period. During the economic boom, shares of occupations in ‘foreman and supervisors’ and ‘own account workers’ expanded while occupations in ‘semi-skilled workers’ and ‘unskilled workers’ contracted. And there was no indication that upward mobility (i.e. social mobility from manual to non-manual occupations) is overly represented among movers. This finding does not contradict Fielding’s (1992) study; rather it suggests that short-term consequence of migration on individual migrants should be regarded as different from long-term prospects, therefore supports the human capital approach that lifetime (or longer-term) consequences of migration should be considered in explaining individual motives for moves.

8. Conclusion

The analysis of cyclical sensitivity of spatial mobility for various sub-groups revealed that each group has substantially different sensitivity to economic fluctuations. This finding substantiates the assertion that population sub-groups are affected by a specific aspect of the business cycle rather than by economic fluctuations as a whole. In particular, owner-occupier households are heavily affected by house price and housing construction aspects of the business cycle, that have characterised the economic boom and bust of the late 1980s. House price changes (rather than house price levels) had significant effect on housing liquidity, consequently determines the spatial mobility of owner-occupier households. Conversely, changes in the spatial
mobility of students and persons finishing full-time education were less cyclical, or even non-cyclical.

These findings are related to significant differences in the cyclical sensitivity of spatial mobility among different age groups. Owner-occupiers are predominantly middle to late middle-aged, and inter-regional migration of persons at or near retirement (aged 55-64) were found to be particularly sensitive to economic fluctuations. On the contrary, the spatial mobility of young adults (aged 16-24) was particularly less sensitive. These findings confirm the speculation that recent short-term changes in migration are due to fluctuations in housing markets (Isoda, 2000), and provide an explanation for the reversal in the counterurbanization trend after the collapse of the housing market at the end of 1987. Isoda (2000) demonstrates that migration flow patterns of the young adults and the middle aged are in reverse direction; young adults tend to move into urban areas, especially to Greater London, while middle-aged move away from Metropolitan Counties and other urban locations. Because the middle aged are disproportionately affected by the reversal of housing market changes, the outflow from major urban locations diminished more than the inflow to such areas, thus creating a revival of population growth in British cities since the end of the 1980s.

This paper has also examined the inter-linkages among sectoral mobility, social mobility and spatial mobility. The main findings included (1) organisational migration is strongly affected by the business cycle; whereas (2) voluntary labour mobility is least affected; contrary to intuitive expectation based on the human capital approach. If labour mobility during a recession becomes inactive because of rising uncertainty and risk, voluntary labour mobility should be the more affected.

The spatial mobility of those changing jobs were not cyclical, even without controlling for adverse conditions such as changes in house price, suggesting that spatial extent of job search might even widen, ceteris paribus, during a recession. However, the number of voluntary labour migration would still decline during a recession because there would be fewer job turnovers to be generated. Job turnover is mainly determined by labour demand, and so I conclude that the deceleration of the labour market adjustment during a recession is responsible for the demand-side, rather than the supply-side's inability to adjust to the new economic environment due to fear.

This supports Jackman and Savouri's (1992) migration model based on the 'job matching approach' that sees inter-regional labour migration as a special case of job matching that occurs inter-regionally. They demonstrate that national mobility changes are due to changes in the number of job engagements made, by using aggregate variables of migration count and number of job engagements. The analysis in this paper confirmed the validity of their presumption through the use of individual level data.

This paper has taken the approach examining sub-groups classified by single
dimensions analysed subsequently. The strength of this approach is that there is no need to assume a functional form in determination of migration probability, and so provides empirically accurate description of migration changes for sub-groups. However, the major shortcoming is that the pure effect of each individual attribute on mobility could not be estimated by this approach. The attempt to measure the pure effects of economic changes on mobility using statistical modelling should be exercised as a next step.

Acknowledgements

Materials from the Labour Force Survey and Quarterly Labour Force Survey are Crown copyright; and these materials have been made available by the Office for National Statistics through the Data Archive and have been used by permission. Neither the ONS nor The Data Archive bear any responsibility for the analysis or interpretation of the data reported here. Unemployment and vacancy data have been purchased from NOMIS, Crown copyright reserved. The research has taken place at the London School of Economics and Political Science. I would like to thank Professor Paul Cheshire for his comments and suggestions. The original paper was presented at the Royal Geographical Society (with the Institute of British Geographers) Annual Conference 2000 at Sussex University on 7 January 2000. This research is partly funded by Heiwa Nakajima Foundation.

Notes

1) Prior to 1992, the respondents' address is recorded only at the Standard Region level with the distinction between Metropolitan Counties and the 'shire' counties. County level data are available since then, but as the migration rate is around 2%, for inter-county moves, the sample size is not large enough to derive reliable estimates at an annual basis.

2) Unemployment and vacancy data in Fig 3, and the regression analysis in Table 5 use 'annual cumulative' unemployment and vacancies. These variables are the sum of annual inflow and stock at the beginning of the period, thus incorporating flow and stock aspects of unemployment and job vacancies. Claimant unemployment count and vacancies notified to Job Centres were used as sources, and are available from National Online Manpower Information Service (NOMIS) at Durham University.

3) Standard Regions divides Great Britain into 10 regions, and is comparable to the European Union's Nomenclature of Unit of Territories (NUTs) 1 level.

4) Equation 2 can be derived by first differentiating equation 1 as:

\[
\frac{dm_i}{dt} = \sum_j \left( w_i \frac{dm_j}{dt} + m_i \frac{dw_j}{dt} \right)
\]

Then dividing both sides by \( m_i \) and making adjustments,

\[
\frac{1}{m_i} \frac{dm_i}{dt} = \sum_j \left( w_i \frac{dm_j}{dt} \right) + \frac{m_i}{w_i} \frac{dw_i}{dt}
\]

which is equivalent to equation 2.

5) Married persons, larger families, multiple-earner households and households with teen-
age child(ren) all showed a tendency for greater cyclical sensitivity in spatial mobility, but a breakdown by housing tenure gave the most extreme differences in cyclical sensitivities.

6) SEG (social economic group) is a widely used indicator of social class which combines occupation and industry. ONS defines 16 classes as follows: employer and manager in large establishment; employer and manager in small establishment; professional self-employed; professional employee; intermediate non-manual worker; junior non-manual worker; personal service worker; foreman and supervisors; skilled manual workers; semi-skilled manual workers; unskilled manual workers; own account workers; employer and manager in farming; own account farmer; agricultural worker; member of armed forces. The first six classes are non-manual occupations and all others except ‘member of the armed forces’ are manual occupations.

References


