REGIONAL DIFFERENCES IN THE SEVERITY OF RECESSIONS IN THE UNITED KINGDOM

Robert Dixon
Department of Economics, University of Melbourne, VICT 3010.

ABSTRACT: This paper aims to provide a fresh approach to understanding regional unemployment dynamics and differences. Specifically, a framework is developed to explain differences between regions in the severity (measured in terms of how far unemployment rises) of recessions. The main contribution of this paper is to draw attention to the role of the elasticity of the outflow rate with respect to unemployment in determining the severity of recessions. The key parameter of the model - the elasticity of the outflow rate with respect to unemployment - is estimated using regional data for the United Kingdom over the period 1989:1 - 2003:4. This elasticity appears to be higher in the north than the south implying that, for the same percentage increase in inflow, the level (and rate) of unemployment will rise further in northern regions than in southern regions. It follows that, if there has indeed been any reversal of the north-south divide in the United Kingdom as some have claimed, it must have its origins on the inflow, not the outflow, side of the labour market.

1. INTRODUCTION

This paper aims to provide a fresh approach to understanding regional unemployment dynamics and disparities. Specifically, we develop a model of the relationship between the inflow into unemployment and the equilibrium level of unemployment and then use this to explain differences between regions in the severity (measured in terms of how far unemployment rises) of recessions. The key parameter of the model is the elasticity of the outflow rate with respect to unemployment and this will be estimated using regional claimant count data for the United Kingdom over the period 1989:1 – 2003:4, a period which includes one major recession episode.[1] The advantage of using UK claimant count data is that it readily provides a long-run of consistent data on regional inflow and outflow as well as the relevant stock. (Unfortunately, Australian flows data is only available at the state level from 1997. As a result it does not allow us to look at any recession episodes.) While the focus of this paper is on explaining differences in the severity of recessions across regions, the ideas presented here can be applied to many other issues involving differences in regional unemployment.

---

[1] Monthly data on the number of people claiming unemployment-related benefits (ie Job Seekers Allowance and unemployment related National Insurance credits) and the associated in and out flow are published in the UK Office for National Statistics publication *Labour Market Trends*. The data used in this paper has been downloaded from the Office for National Statistics NOMIS web site (www.nomisweb.co.uk). Fothergill (2001) and Machin (2004) discuss the relationship between the claimant count data and other measures of unemployment.

2. A MODEL OF THE SEVERITY OF RECESSIONS

Changes in the number unemployed reflect the balance between the inflow into the unemployment 'pool' from the other labour market states (employment and not in the labour force) and the outflow from the unemployment pool to the other labour market states. Clearly, as indicated in equation (1) below, if inflow exceeds outflow, unemployment will rise; if outflow exceeds inflow, unemployment will fall, and; if outflow equals inflow, unemployment will remain constant.

$$\Delta U = IN - OUT \tag{1}$$

where U is the number unemployed, IN and OUT are the absolute number of persons flowing into and out of unemployment over the period respectively.

Figures 1-3 depict quarterly seasonally-adjusted unemployment and inflow and outflow data for persons in the twelve regions of the United Kingdom over the period 1989:1-2003:4.

Unemployment (U – solid line, this is the claimant count) is the uppermost series in each of the charts and is recorded on the RH scale. Inflow (IN – solid line, these are the number of 'new' claimants over the period) and Outflow (OUT – dashed line, these are the number who have ceased being claimants over the period) are the two inter-twined series below the unemployment series in each of the charts and are both recorded on the LH scale. The original data was monthly and seasonally adjusted but to remove much of the noise (which is found in flows data even after seasonal adjustment) the analysis reported here used quarterly averages of monthly data. (The 'spikes' in IN, and (especially) OUT, at the end of 1996 are associated with changes to the unemployment benefit system in the UK at that time.)

The most striking feature of these figures is the marked rise in the number unemployed in each region over the period 1990-1993. By focussing on the beginning (1990) and end (1993) of that recession episode it can be observed that in each region outflow levels are (momentarily) equal to inflow levels at the beginning of the contraction (when U was at its minimum) and again at the end of the contraction (when U was at its maximum). Notice also that both inflow and outflow were higher at the end of the contraction than they were at the beginning. Looking at the evolution of the three variables over time it can be observed that inflow and outflow have been highly and positively correlated with each other and both have been positively correlated with the level of unemployment over the period.[2] However, this positive relationship is brought

[2] That IN, OUT and U are positively correlated is a feature not only of this data set for this period. It is also found in the claimant count for persons in the regions of Great Britain over the period 1983 – 1996 (Martin & Sunley, 1999), for aggregate data dealing with: males alone in the UK over the period 1968 - 1992 (Burgess, 1994), persons in the UK over the periods 1972:2 – 1992:4 (Balakrishnan and Michelacci, 2001), 1993-2001 (Bell & Smith, 2002) and 1989-2003 (Dixon and Mahmood, 2006). The high and positive correlation between all three variables is also to be found in (aggregate) data for France,

out most sharply – and with powerful effect in terms of our understanding of unemployment – by focussing on the recession episode during which, as we have seen, inflow, unemployment and outflow all rose.[3]

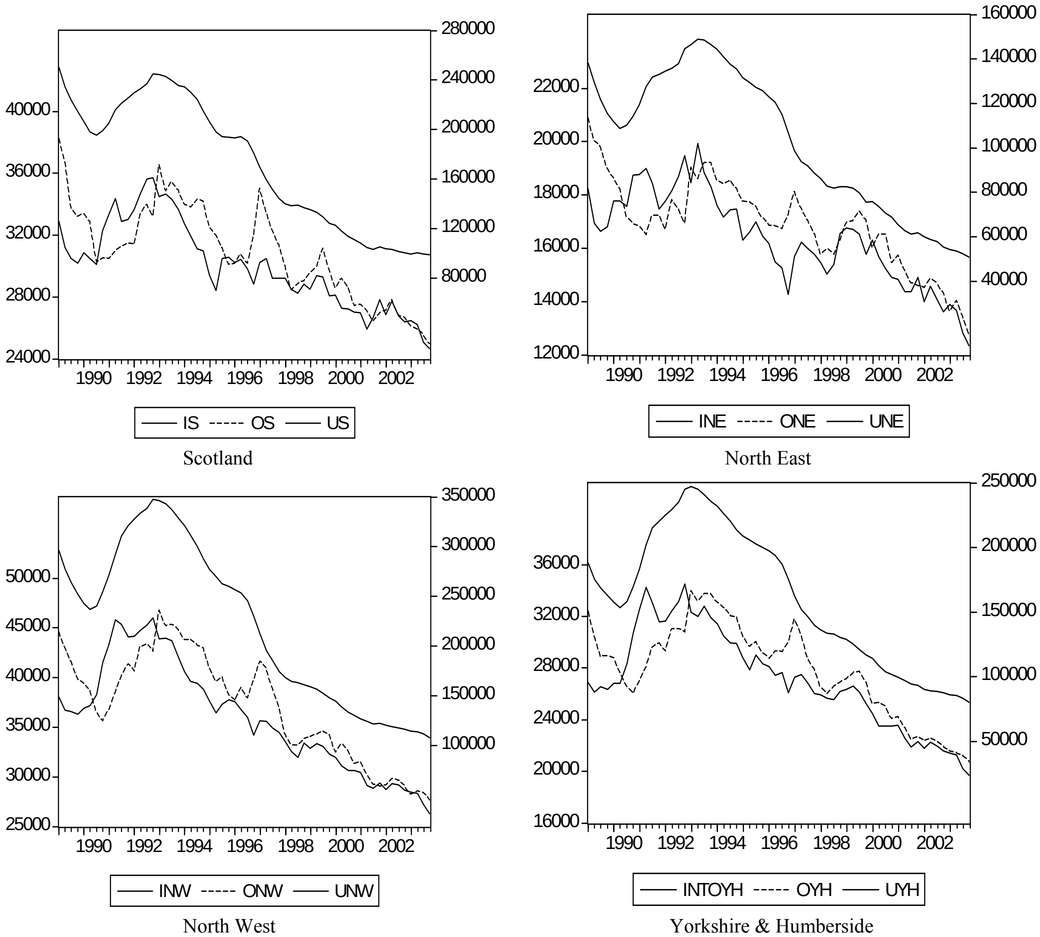

Figure 1. Number unemployed (upper solid line – RH Scale), inflow (lower solid line – LH Scale) and outflow - (broken line – LH Scale): 1989:1 – 2003:4.

Germany, Spain and the USA (Burda and Wyplosz, 1994; Balakrishnan and Michelacci, 2001).

[3] The term ‘recession’ is used in this paper to refer to the period during which there is a sustained increase in the unemployment during the contraction phase of the business cycle.

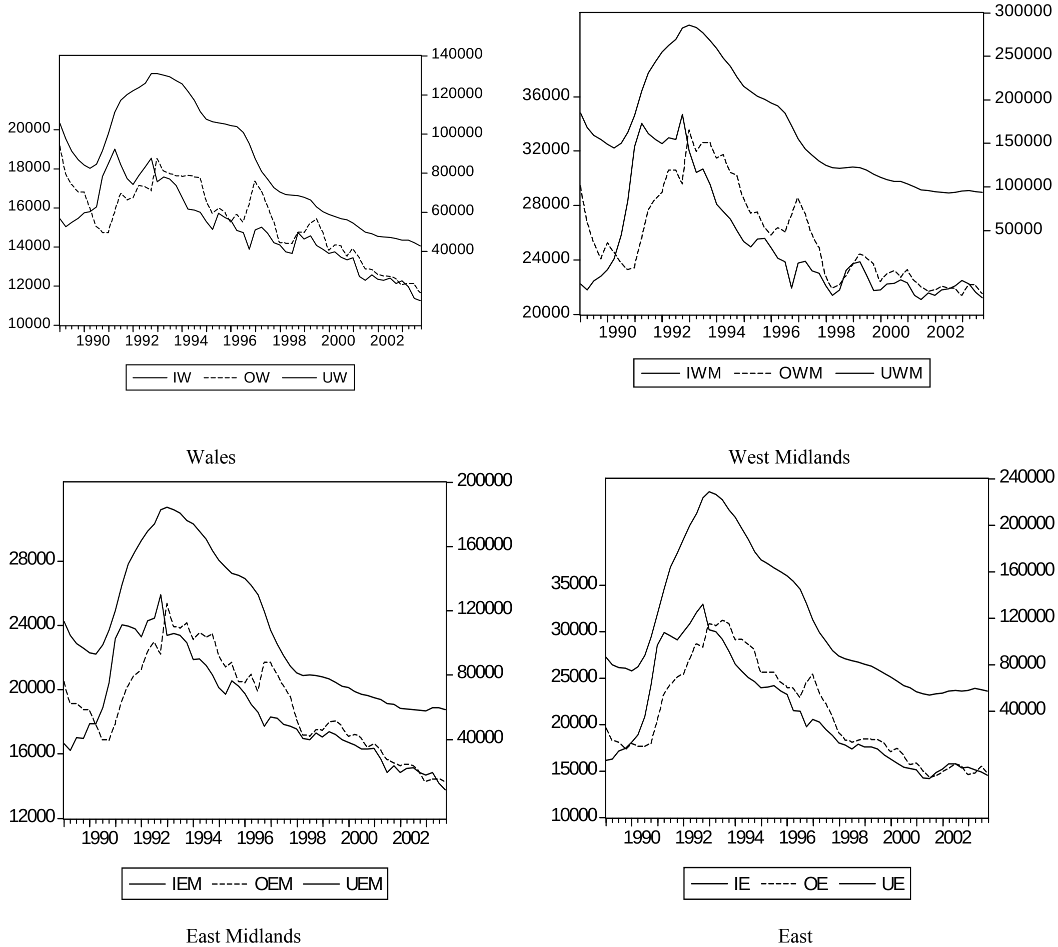

Figure 2. Number unemployed (upper solid line – RH Scale), inflow (lower solid line – LH Scale) and outflow - (broken line – LH Scale): 1989:1 – 2003:4.

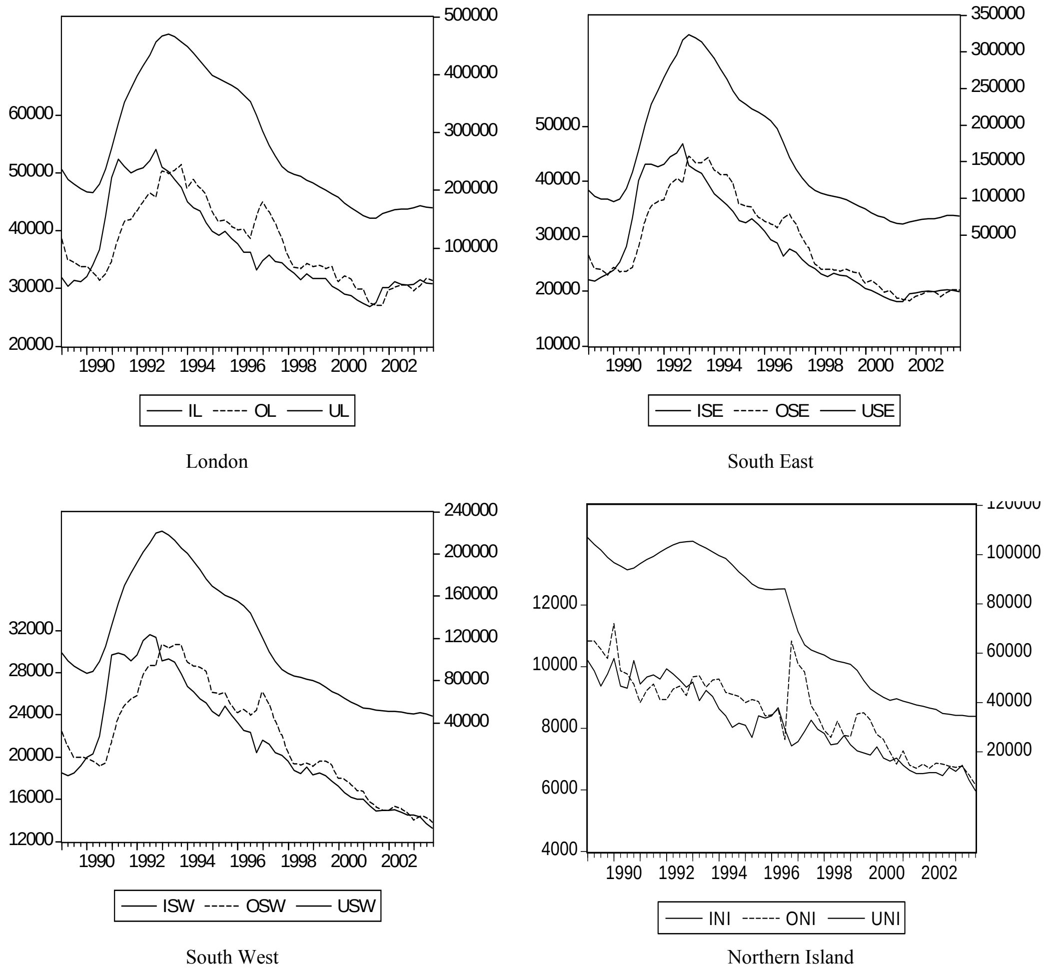

Figure 3. Number unemployed (upper solid line – RH Scale), inflow (lower solid line – LH Scale) and outflow - (broken line – LH Scale): 1989:1 – 2003:4.

Table 1 reports some quantitative data related to the severity of the recession in the different regions. The first column gives the dates for the turning points in the unemployment series. The first date is the period in which unemployment was at its lowest before it began to rise while the second date is the period in which unemployment was at its highest before it began to fall. Fortunately, as the reader can see from the charts in Figures 1-3, there is no ambiguity about these dates. Note, before proceeding further, that since these dates are the turning points for unemployment (*U*), they are periods when we can regard *U* as being (momentarily, at least) constant and equation (1) tells us that they must also be the periods in which *IN* and *OUT* were equal. (It is also clear from the charts in Figures 1-3 that this is indeed the case.) The second column of Table 1 gives the percentage increase in unemployment during the recession, ie between the two turning points.[4] Clearly, as Audas and Mackay (1997), Martin (1997) and others have pointed out, in the recession of the early 1990s unemployment increased more in southern regions than in northern and 'peripheral' regions. This has led some researchers to conjecture that the north-south divide in the UK may have ended – an issue which will be addressed in a later section of the paper.

Table 1. Percentage increases in unemployment and inflow during the 1990-1993 recession.

Region	Turning points	Increase in U	Increase in IN
Northern Ireland	90:3 – 92:4	11.6	6.7
Scotland	90:3 – 92:4	22.5	17.0
North East	90:2 – 93:2	31.2	11.5
North West	90:2 – 92:4	38.0	21.2
York. & Humb.	90:2 – 93:1	46.6	18.6
Wales	90:2 – 93:1	45.5	9.3
West Midlands	90:2 – 93:1	65.6	28.3
East Midlands	90:2 – 93:1	65.7	26.5
East	90:1 – 93:1	101.8	50.1
London	90:2 – 93:2	82.1	38.1
South East	90:1 – 93:1	109.0	57.1
South West	90:1 – 93:1	87.2	37.3
United Kingdom	90:2 – 93:1	60.5	27.0

The third column of Table 1 shows the percentage increase in inflow (*IN*) which was observed during the contraction. We note that the increase in inflow was lower in the north than the south and that this clearly has something to do with the observed smaller increase in unemployment in the north than the south.[5]

An important question that arises in this context is the following: What can we say about the relationship between the percentage increase in unemployment and the percentage increase in inflow over the course of the contraction?

[4] Since we are dealing with discrete and relatively large changes, proportionate changes are calculated as (largest – smallest) divided by ½ (largest + smallest). It is possible to examine percentage changes in inflow and unemployment relative to the size of the labour force (see Dixon et al, 2003 for an example of this). There are three reasons why I have not followed that approach here. First, it is not clear exactly what 'labour force' figures should be matched with the claimant count data. Second, the movements in the level of inflow and unemployment in the recession were so great that they would easily dominate changes in the size of the labour force. Third, since we would be deflating both inflow and outflow by the same variable (the labour force) there is little to be gained by doing so in this context.

[5] Martin and Sunley, 1999 also find that the rise in inflow is smaller in north than in south.

Comparing the figures in the last two columns of Table 1 we see that for all regions the percentage increase in unemployment is greater than the percentage increase in inflow. If we take the figure for the United Kingdom as a whole as 'representative' we see that over the contraction the percentage increase in unemployment was (60.5/27.0 =) 2.24 times the percentage increase in the inflow. Some obvious questions follow from this. The two to be explored in this paper are the following: (a) Why is it that the percentage increase in unemployment is greater than the percentage increase in inflow? and (b) Does the relationship between the percentage increase in inflow and the percentage increase in unemployment differ between the regions, and if so why? The purpose of this paper is to deal with these questions and also to ask is there anything here which supports Martin's view that the old north-south divide has disappeared and that there is now "a new regional geography of unemployment" (Martin, 1997, p 247) in the UK?

To develop an intuitive explanation for the fact that the percentage increase in unemployment is greater than the percentage increase in inflow, it is convenient to begin by considering the evolution of the three variables IN, U and OUT over the course of a recession. For convenience we assume that unemployment and (especially) inflow rise and fall over time in a smooth wave-like fashion. At the turning point when the contraction first begins, unemployment will be at its 'lowest level' (where it is momentarily, at least, constant), it then rises (which must be because inflow exceeds outflow, and the rise in the unemployment will persist only so long as this is true) until it reaches a turning point when it is at its highest level (and where, again, unemployment is, momentarily at least, constant). Now, when unemployment is at its 'lowest level', inflow and outflow must be equal and this must also be true when unemployment is at its highest level. As the recession begins inflow will rise relative to outflow (of course the recession begins because inflow rises relative to outflow) and inflow will keep rising until the peak is reached. For unemployment to stop rising, outflow must rise over the course of the recession and it has to keep rising until it has caught up with inflow. Once it has caught up, inflow and outflow will again be equal and unemployment will stop rising, i.e. it (unemployment) will have peaked and the contraction phase will be at an end. Note that outflow levels were the same as the inflow levels at the beginning (when U was at its minimum) and the end of the recession (when U was at its maximum). Since inflow is higher at the end than the beginning, this implies that outflow increases over the course of the recession and is higher at the end than the beginning, as we have seen in Figure 1.[6] Another way to put all this is to say that over the course of a recession we move from a situation where inflow

[6] Although it is true that during a contraction the probability of any one unemployed person finding a job falls, the number of persons unemployed rises and the rise in the latter is greater than the fall in the former. The result is that, on balance, outflow (including outflow into employment) rises in recessions. This may seem odd but it is a common finding in the flows literature (see for example the papers cited in note 2 above) and, as we shall see, is completely consistent with the notion that during a contraction the probability of any one unemployed person finding a job falls.

and outflow are both equal and (momentarily at least, constant), through a number of periods where inflow exceeds outflow to a situation where inflow and outflow are again both equal – albeit with both at a higher level than they were before the recession began – and (again momentarily, at least) constant. In his pioneering paper on regional unemployment Singer describes the process this way (note that he refers to our inflow as "additions" and to our outflow as "absorption" and that the number unemployed are referred to as "the unemployment register"): "Thus we have something like a trade cycle theory for the unemployment register. The outside stimulus comes from the sudden increase (or drop) in the number of additions to the register. This increases (or decreases) the size of the register, this increases (decreases) the number of absorptions from the register in such a way as to close the gap with the number of additions and to bring the rise (fall) in total unemployment to a halt, in the absence of a new stimulus in either direction on the additions side" (Singer, 1939b, p 45).[7]

We are now in a position to develop a formal model of the relationships between *IN*, *U* and *OUT* which can be used to answer the questions posed earlier about the relationship between the percentage increase in *U* and the percentage increase in *IN*, amongst other things.

Adopting a Keynesian view of the labour market we will regard inflow (*IN*) as exogenous – reflecting variations in the demand for labour which in turn will be driven by fluctuations in (the rate of growth of) GDP amongst other things – while outflows will be treated as (largely) endogenous. (Formal tests for causality and exogeneity support this stance – as do the charts in Figures 1-3.) In modelling outflow (*OUT*) we draw on the idea to be found in the literature on worker flows that the number of persons moving out of unemployment (*OUT*) in each period will equal to the product of the (transition) probability of any one unemployed person moving out of unemployment over any period (this transition probability is often called 'the outflow rate') and the number unemployed (*U*) at the beginning of the period. So that:

$$OUT_t = \phi_t \times U_{t-1} \quad (2)$$

where ϕ is the outflow rate and $0<\phi>1$.

Although the outflow rate itself is not used as a key component of our model (it will be seen shortly that it is simply a stepping stone to a more fundamental parameter) the reader may be interested in the mean values of ϕ for British regions. These are given in Table 2. There is a clear tendency for it to be higher in the south than in the north (London is the only exception) implying that, at least on average, that the chances of moving out of unemployment very definitely depends upon where one lives.[8]

---

[7] Singer's ideas on unemployment are discussed at greater length in Dixon and Mahmood (2006).

[8] Green (1986) made a detailed study of outflow probabilities across 280 local labour market areas in Great Britain for 1984. He found that "Off-flow rates [our outflow

Table 2. The mean value of the outflow rate (ϕ) and the correlation coefficient (r) between the outflow rate and unemployment for each region over the period 1989:1 – 2003:4.

Region	Mean of ϕ	r
Northern Ireland	0.128	-0.973
Scotland	0.190	-0.977
North East	0.176	-0.979
North West	0.181	-0.975
York. & Humb.	0.184	-0.977
Wales	0.192	-0.977
West Midlands	0.168	-0.943
East Midlands	0.190	-0.970
East	0.202	-0.960
London	0.144	-0.962
South East	0.208	-0.955
South West	0.211	-0.961
United Kingdom	0.178	-0.962

We now combine the ideas contained in equations (1) and (2) to find an expression for equilibrium unemployment. Unemployment will be in equilibrium in the sense that Ut = Ut-1 (and this will be true for the turning points at the beginning and end of the contraction) when inflow is equal to outflow, in other words, unemployment will be in equilibrium when:

$$IN_t = OUT_t = \phi_t \times U_t \quad (3)$$

and so the value of the unemployment when it is in equilibrium will be[9]

$$U_t = \frac{IN_t}{\phi_t} \quad (4)$$

Although it might be tempting to assume that the outflow rate (ϕ) is exogenous (and perhaps even constant), there are many reasons why we should model it as endogenous and as varying with U.[10] To begin with, if ϕ were constant, equation (4) implies that between the beginning and the end of the recession the percentage change in U will be (roughly) the same as the percentage change in IN, but we have already seen in Table 1 that the ratio

probabilities] are generally higher in the South than in the North" (p 53) and concluded: "While unemployment undoubtedly is a dynamic phenomenon, the chances of moving into and out of unemployment … very definitely depend in part upon where one lives" (p 53). Over twenty years on, the conclusions remain the same.

9 So far as I am aware, Singer was the first to note and make use of this relationship, see Singer (1939a & b).

10 Burgess (cited in Martin and Sunley, 1999, p 527), also argues that the outflow rate is endogenous.

between the two variables is above 1 and is indeed above 2 in many regions. We saw, for example, that for the United Kingdom as a whole the ratio between them was 2.24. Also, direct evidence on the value of ϕ over time indicates that it is unwise to assume that it is constant.

Figures 4-6 shows a time series for the values of ϕ (and unemployment) for persons in the regions over the period 1989:1 – 2003:4. In every region ϕ fell during the recession episode and then rose slowly until late 1996 when it rose sharply (as a result of the introduction of the Jobseeker's Allowance) and has continued to rise, albeit at a slower rate, since. So there is little doubt that ϕ varies over time.

Notice that, if we treat ϕ as a variable, equation (4) yields an expression for the percentage change in U between equilibria (and thus between the turning points which are to be found at the beginning and end of a recession) of:[11]

$$\frac{\Delta U}{U} = \frac{\Delta IN}{IN} - \frac{\Delta \phi}{\phi} \tag{5}$$

Equation (5) makes intuitive sense. Again, let's focus on the recession episode. Over the course of the recession phase of the business cycle, outflow must rise to (eventually) exactly match the rise in the inflow – which we are taking to be exogenous. Given that ϕ does not rise during a recession (we have just seen that it falls), an increase in outflow can only be brought about by an increase in unemployment (equation (2) tells us this).[12] The rise in unemployment required to raise outflow to equal the (now higher) inflow will depend upon two things: (a) how far inflow has risen and (b) how far ϕ falls over the course of the recession. Another way to put this is that, because ϕ falls, unemployment has to rise further than it otherwise would in order to get outflow to rise by the same amount as inflow, and the further ϕ falls, the more severe (in terms of the increase in unemployment) will the recession be. [13]

---

[11] This expression is really only an approximation to the exact relationship which is given in an Appendix. Note also the minus sign on the RHS of (5). This means that the larger the fall in ϕ, the larger the rise in the unemployment will have to be to bring the recession to an end.

[12] I am simplifying a great deal here as for the purpose of exposition it is assumed that outflow is purely endogenous. In practice the outflow rate will be influenced by such policy variables as rules concerning the eligibility for benefits and the maximum duration of those benefits.

[13] We have noted that, over the course of a recession ϕ falls while unemployment rises. In principle, the two changes could offset (or more than offset) each other. However, in practice, the relative proportionate changes are such that the net effect is a rise in outflow. In other words, although ϕ falls over the course of a recession, the empirical evidence (see the next section of the paper) is that it falls by an absolute magnitude which is only around 1/2 of the rise in unemployment. As a result, in each case *OUT* rises over the course of the recession by an amount which is less than proportionate to the rise in unemployment and is instead equi-proportionate to the rise in *IN*.

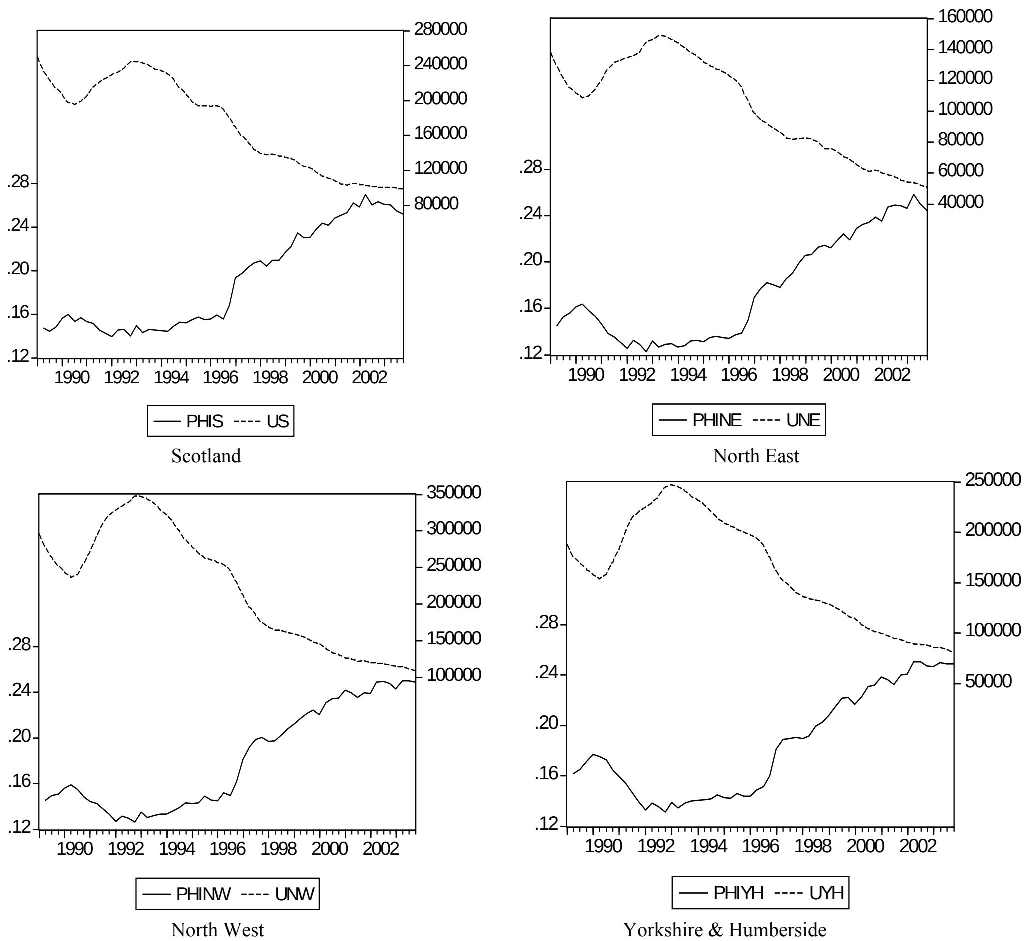

Figure 4. Outflow rate (ϕ) (solid line – LH Scale) and unemployment (broken line – RH Scale): 1989:1 – 2003:4.

3. THE ELASTICITY OF THE OUTFLOW RATE WITH RESPECT TO UNEMPLOYMENT

Figures 4-6 suggest not only that the outflow rate is not constant over time but also that it varies inversely with unemployment. The second data column of Table 2 reports correlation coefficients for ϕ and unemployment for each region over the period 1989:1 – 2003:4. We see that the two variables are highly negatively correlated for all of the regions. However, it would also seem that a reasonable specification of the relationship between ϕ and U is of the ‘doublelog' or 'constant elasticity' form. This is evident in Figures 7-9 which show scatter diagrams for the logarithms of ϕ (vertical axis) against the logarithm of U (horizontal axis) for persons in each of the regions over the period 1989:1 – 2003:4. The hypothesis that the two are linearly related in the logarithms seems most reasonable. This means that it is not the 'outflow rate' (ie ϕ) itself but rather the '<u>elasticity</u> of the outflow rate with respect to unemployment' which should be regarded as constant over time.

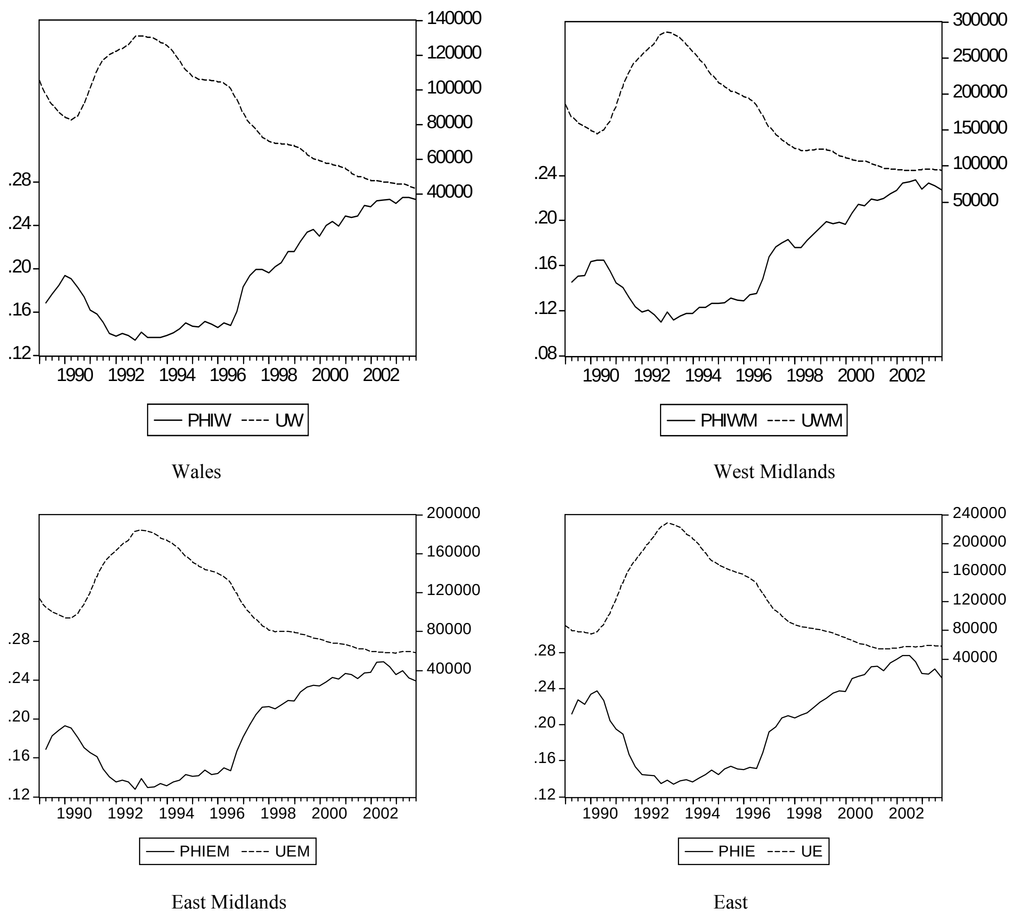

Figure 5. Outflow rate (ϕ) (solid line – LH Scale) and unemployment (broken line – RH Scale): 1989:1 – 2003:4.

Consistent with the 'log-linear' approach, define the elasticity of ϕ with respect to unemployment to be:

$$\beta = \left(\Delta\phi/\phi\right)/\left(\Delta U/U\right) \tag{6}$$

The elasticity can be thought of as the measuring the extent by which the outflow rate (ϕ) falls as unemployment increases (I write "falls" because we have already seen that ϕ and U are negatively correlated). The specific import of the size of β in the context of this paper is this: the 'greater' the elasticity (ie the more negative is β) the larger unemployment will have to rise during the course of a contraction in order to make outflow rise to a level where it is equal to inflow (and thus bring the contraction/recession to an end).

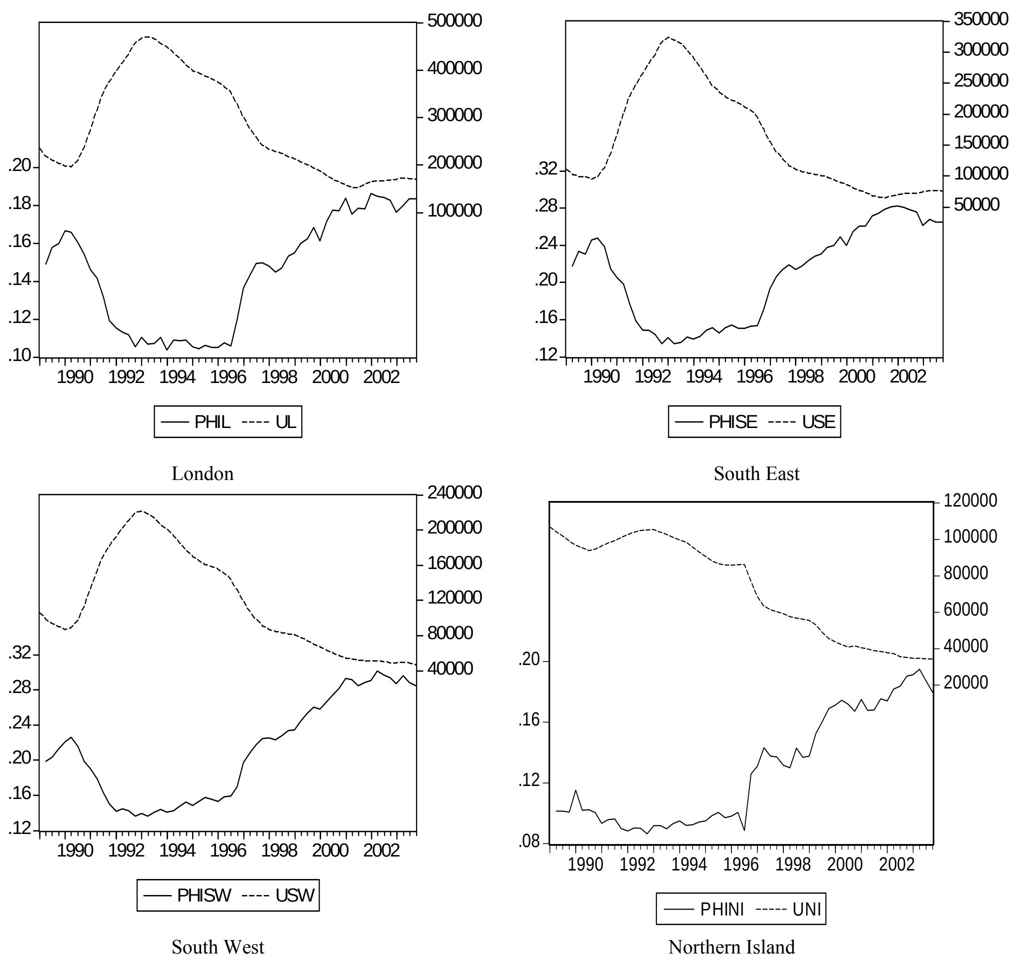

Figure 6. Outflow rate (ϕ) (solid line – LH Scale) and unemployment (broken line – RH Scale): 1989:1 – 2003:4.

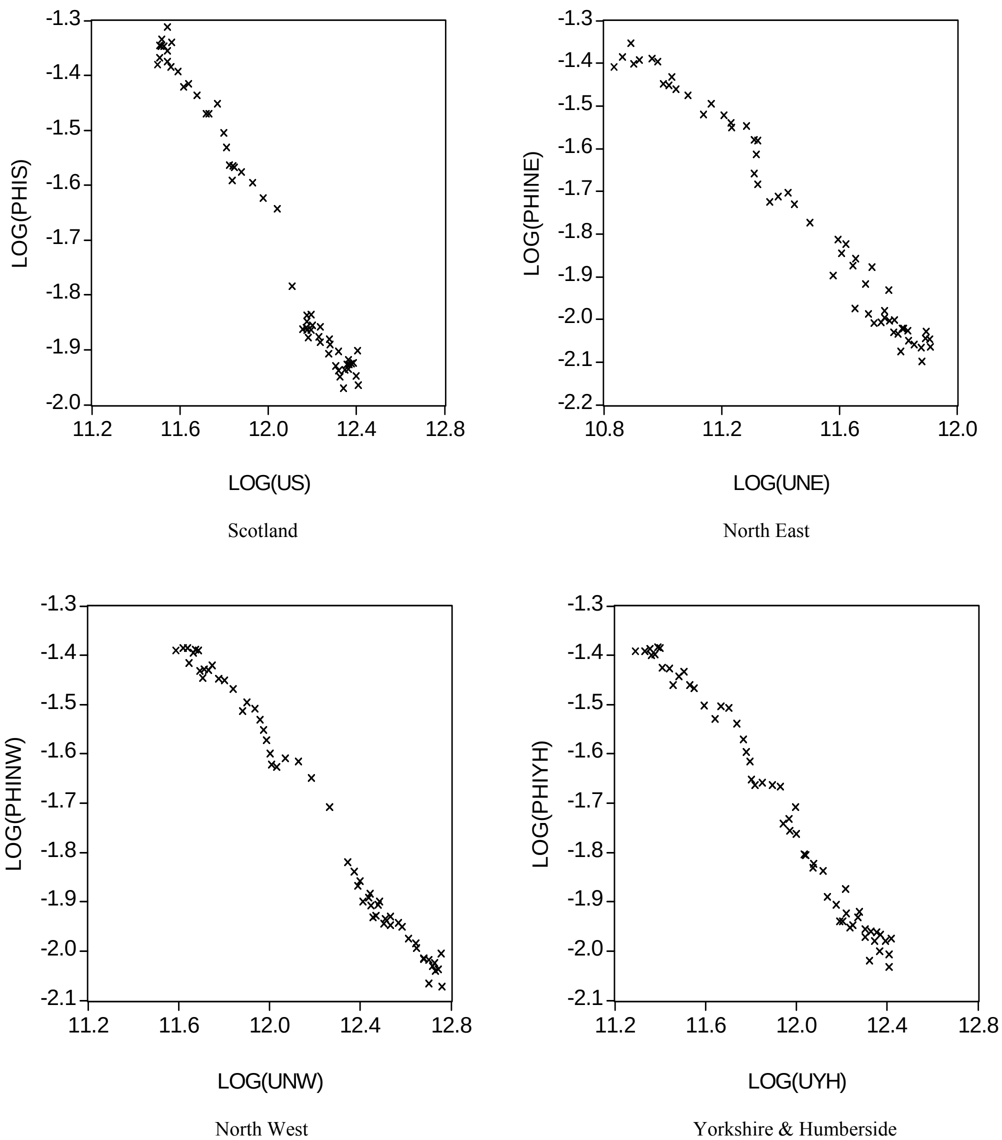

Figure 7. Scatter diagram for the logarithm of ϕ (vertical axis) against the logarithm of U (horizontal axis): 1989:1 – 2003:4.

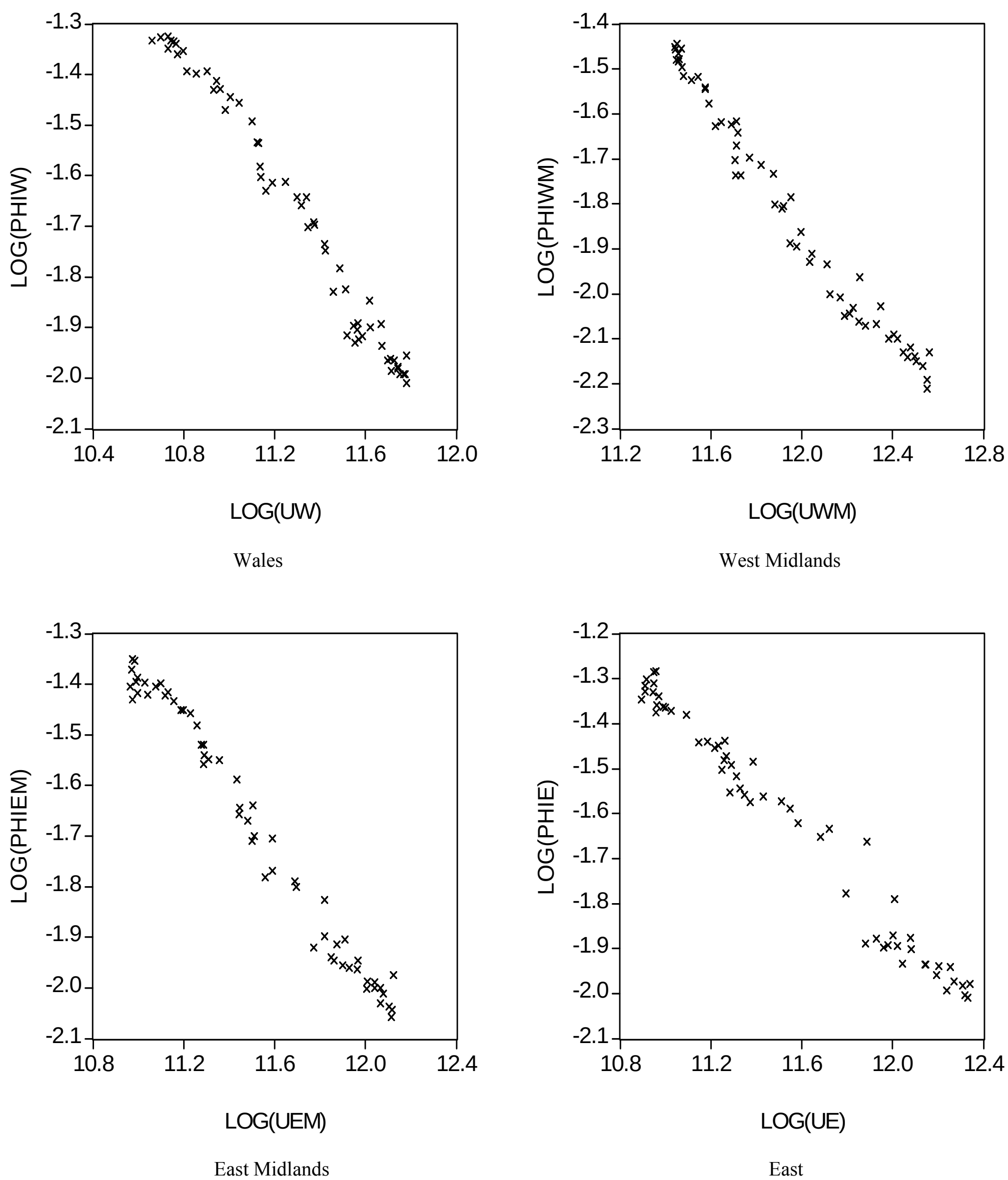

Figure 8. Scatter diagram for the logarithm of ϕ (vertical axis) against the logarithm of U (horizontal axis): 1989:1 – 2003:4.

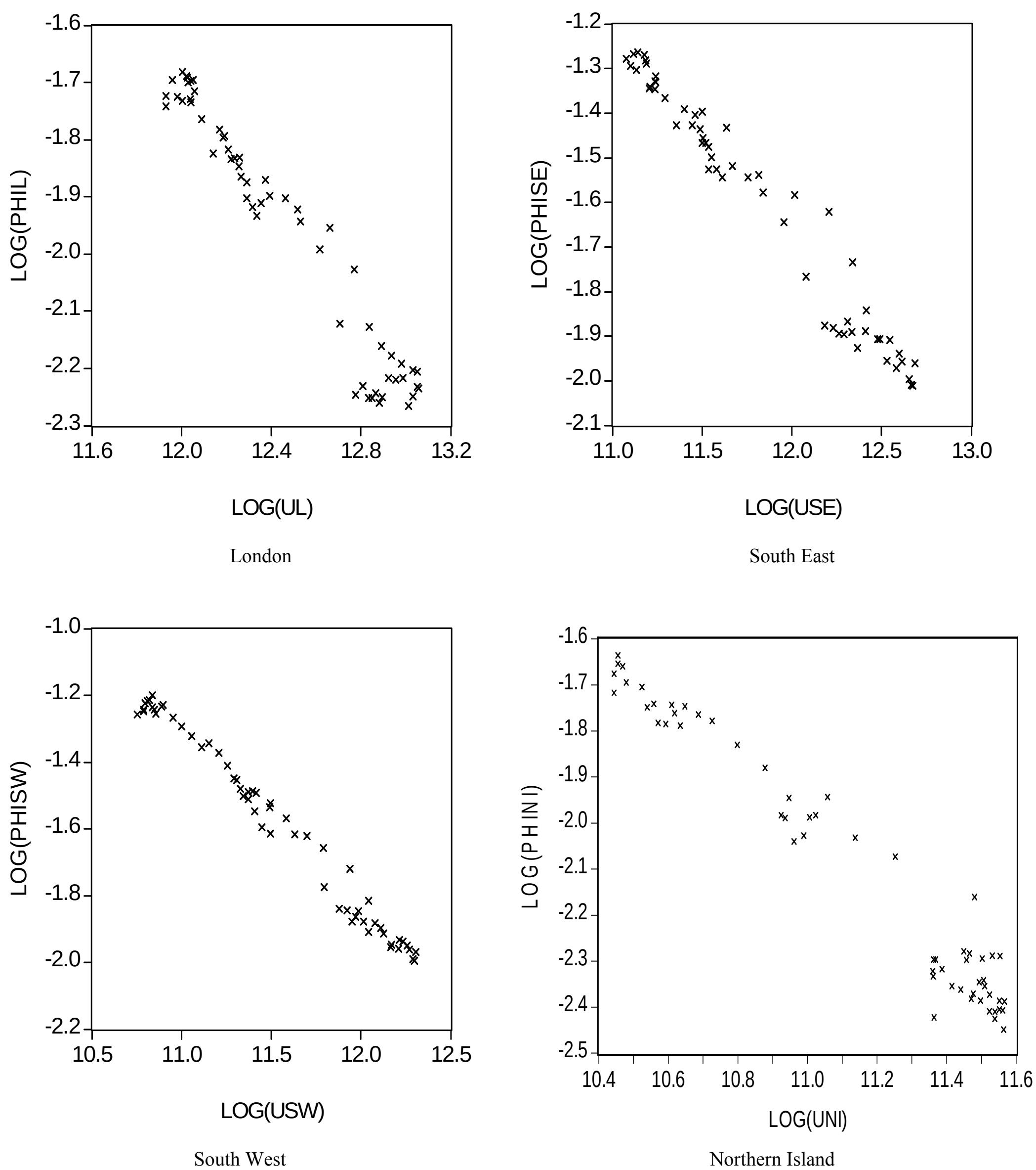

Figure 9. Scatter diagram for the logarithm of ϕ (vertical axis) against the logarithm of U (horizontal axis): 1989:1 – 2003:4.

Rearranging (6) to give an expression for $\Delta\phi/\phi$ and then substituting that expression into equation (5), gives

$$\frac{\Delta U}{U} = \frac{\Delta IN}{IN} - \beta \frac{\Delta U}{U}$$

which may be rearranged to give an expression for the proportionate change in the unemployment between the beginning and end of the contraction (ie between the beginning of the recession and the beginning of the recovery) as:

$$\frac{\Delta U}{U} = \left[\frac{\Delta IN}{IN}\right] \times \left[\frac{1}{1+\beta}\right] \qquad (7)$$

In what follows the term ($1/(1 + \beta)$), which expresses the link between the percentage change in inflow and unemployment, will be referred to as the 'Inflow Multiplier'. Note that if $0 \geq \beta \geq -1$, the 'Inflow Multiplier' (i.e. $1/(1 + \beta)$) on the RHS of (7) will be greater than 1. Econometric work (which we discuss below) is consistent with the notion that the elasticity of ϕ with respect to unemployment (β) is indeed in the range $0 \geq \beta \geq -1$. As a result, $\Delta U/U$ will exceed $\Delta IN/IN$, and this is the reason for our use of the term 'Inflow *multiplier*' in this context.

The discussion thus far ought to have alerted the reader to two things: First, that for modelling purposes it is more sensible to assume that the 'elasticity of the outflow rate with respect to unemployment' is constant over time than it is to assume that the 'outflow rate' itself is constant over time. Second, in order to fully understand differences in regional unemployment using a 'flows approach' we need to examine inter-regional differences in the size of the 'Inflow Multiplier' and not merely the size of the inflow.

We proceed now to look at estimates of the size of the outflow elasticity (β) and the implied values of the inflow multiplier ($1/ (1 + \beta)$) for the regions of the United Kingdom.

4. ECONOMETRIC ESTIMATES OF THE OUTFLOW ELASTICITY AND IMPLIED VALUES OF THE INFLOW MULTIPLIER

We have seen that the magnitude of the elasticity of ϕ with respect to U (i.e. β) determines (together with IN) the severity of recessions as measured by the extent of the rise in unemployment we observe over the course of the recession. It is important then to establish the value of this elasticity. This can best be achieved by an econometric study.

Consistent with the 'log-linear' approach, we express the (long run) relationship between ϕ and U as $\phi_t = e^{\alpha} U_t^{\beta}$ which implies that:

$$LN(\phi_t) = \alpha + \beta LN(U_t) \qquad (8)$$

We estimate an Error Correction Model (ECM) for each region using quarterly seasonally adjusted data. Our sample period is 1989:1-2003:4. We also include a dummy explanatory variable (DV) so as to allow for a rise in the outflow rate following the introduction of the Jobseeker's Allowance scheme in late 1996.[14] The ECM is of the linear in logs form:

$$\Delta PHI = \lambda(PHI(\text{-}1) - (\alpha + \beta UR(\text{-}1) + \gamma DV(\text{-}1))) + \sum \zeta(i)\Delta UR(i) + \sum \theta(i)\Delta PHI(i)$$

where i indicates the length of the lag and Δ indicates a first difference in the variable concerned. As would be expected given the scatter diagrams reported in Figure 3 there was no difficulty obtaining robust estimates of β. Estimated values of β and their standard errors are given in the first two data columns of Table 3. [15]

Table 3. Estimates of the elasticity of the outflow rate with respect to unemployment and the implied values of the inflow multipliers: 1989:1 – 2003:4

Region	β	*Std. error*	*Implied Inflow Multiplier*
Northern Ireland	-0.611	0.074	2.571
Scotland	-0.592	0.058	2.451
North East	-0.634	0.073	2.732
North West	-0.515	0.026	2.062
York. & Humb.	-0.534	0.035	2.146
Wales	-0.602	0.047	2.513
West Midlands	-0.576	0.039	2.358
East Midlands	-0.501	0.025	2.004
East	-0.474	0.019	1.901
London	-0.490	0.041	1.961
South East	-0.456	0.021	1.838
South West	-0.481	0.018	1.927
United Kingdom	-0.503	0.028	2.012

Reading down the first data column we see that the elasticity appears to be consistently higher (meaning that it is more elastic, more negative) in the north than in the south (including London). This implies that for the same percentage increase in unemployment, the outflow rate (ϕ) will fall further in northern

[14] "[W]ith the introduction of Jobseeker's Allowance a range of measures was introduced to encourage more successful job search, and checks to ensure that claimants were fulfilling the eligibility criteria were increased" (Machin, 2004, p 62). This led to a sustained increase in the outflow rate, in part due to a reduction in the maximum duration (and level) of 'benefits' and in part to tighter eligibility requirements and more thorough checks - see Sweeney and McMahon (1998) for details.

[15] The p-values for all of the estimates of β are less than 0.00. All of the other parameters have expected signs ($\alpha > 0$, $0 < \lambda < 1$ and $\gamma > 0$). The residuals in every regression are stationary (using an ADF test) with no evidence of drift or structural change.

regions than in southern regions.

Now that we have estimates of β it is possible to compute the implied value of the inflow multiplier (i.e. $1/(1 + \beta)$) for each region. These are given in the third data column of Table 3. We notice that the inflow multipliers are greater in the north than in the south. This implies that for the same percentage increase in inflow the level (and rate) of unemployment will rise further in northern regions than in southern regions. Further research is warranted into the causes of these differences which are presumably related not only to the efficiency of 'matching' (Lazar, 1977) but to demographics, inter-regional migration and the propensity for an unemployed person to leave the labour force.

5. CONCLUSION

We have enquired into the relationship between the inflow into and the outflow from unemployment on the one hand and the equilibrium level of unemployment on the other. When we examined the way in which the outflow rate varied with unemployment we found that, although the outflow rate itself was not constant over time, it was reasonable to assume that the elasticity of the outflow rate with respect to the unemployment (β) was constant over time. This allowed us to derive an expression linking the percentage change in inflow with the percentage change in the number unemployed between turning points in the business cycle. The expression linking the two was named the 'inflow multiplier'. It was shown that the size of the inflow multiplier varies directly with the size of β.

Econometric work using data for the UK regions revealed that the elasticity of the outflow rate with respect to unemployment (β) differed across regions and tended to be more elastic in the north than the south implying that the inflow multipliers are higher in the north than in the south. It is appropriate then to conclude that, with respect to the outflow rates and elasticities, there appears to be no new economic geography in the UK. If there has been a reversal of the north-south divide, it must have its origins on the inflow, not the outflow, side of the labour market.

REFERENCES

Audas, R. and Mackay, R. (1997) A tale of two recessions, *Regional Studies,* 31(9), pp. 867-874.

Balakrishnan, R. and Michelacci, C. (2001) Unemployment dynamics across OECD countries. *European Economic Review,* 45(1), pp. 135-165.

Bell, B. and Smith, J. (2002) On gross worker flows in the United Kingdom: evidence from the Labour Force Survey. Working Paper No 160. Bank of England: London.

Burda, M. and Wyplosz, C. (1994) Gross worker and job flows in Europe. *European Economic Review,* 38(6), pp. 1287-1315.

Burgess, S. (1994) Matching models and labour market flows. *European Economic Review,* 38(3), pp. 809-816.

Dixon, R., Freebairn, J. and Lim, G. (2003) Why are recessions as deep as they are? *Australian Journal of Labour Economics,* 6(1), pp. 37-64.

Dixon, R. and Mahmood, M. (2006) Hans Singer's model of the severity of recessions. *Cambridge Journal of Economics,* 30(6), pp. 835-846.

Fothergill, S. (2001) The true scale of the regional problem in the UK. *Regional Studies,* 35(3), pp. 241-246.

Green, A. (1986) The likelihood of becoming and remaining unemployed in Great Britain. *Transactions of the Institute of British Geographers,* New Series 11(1), pp. 37-56.

Lazar, F. (1977) Regional unemployment rate disparities in Canada: some possible explanations. *Canadian Journal of Economics,* 10(1), pp. 112-129.

Machin, A. (2004) Comparisons between unemployment and the claimant count. *Labour Market Trends,* 112(2), pp. 59-62.

Martin, R. (1997) Regional unemployment disparities and their dynamics. *Regional Studies,* 31(3), pp. 237-252.

Martin, R. and Sunley, P. (1999) Unemployment flow regimes and regional unemployment disparities. *Environment and Planning A,* 31(3), pp. 523-550.

Singer, H. (1939a) The process of unemployment in the Depressed Areas (1935-1938). *Review of Economic Studies,* 6(3), pp. 177-188.

Singer, H. (1939b) Regional labour markets and the process of unemployment. *Review of Economic Studies,* 7(1), pp. 42-58.

Sweeney, K. and McMahon, D. (1998) The effect of Jobseeker's Allowance on the claimant count. *Labour Market Trends,* 106(4), pp. 195-203.

APPENDIX: THE EXACT RELATIONSHIP BETWEEN THE PROPORTIONATE CHANGE IN *U* AND THE PROPORTIONATE CHANGES IN ϕ AND *IN*

The equilibrium level of unemployment will be:

$$U = \frac{IN}{\phi} \tag{A1}$$

It must be true that

$$U + \Delta U = \frac{IN + \Delta IN}{\phi + \Delta\phi}$$

The above may be written as:

$$U\left(1+\frac{\Delta U}{U}\right) = \frac{IN\left(1+\frac{\Delta IN}{IN}\right)}{\phi\left(1+\frac{\Delta\phi}{\phi}\right)} \tag{A2}$$

Dividing both sides of (A2) by (A1), yields:

$$1 + \frac{\Delta U}{U} = \frac{1+\frac{\Delta IN}{IN}}{1+\frac{\Delta\phi}{\phi}}$$

Subtracting 1 from each side gives:

$$\frac{\Delta U}{U} = \frac{1+\frac{\Delta IN}{IN}}{1+\frac{\Delta\phi}{\phi}} - 1 = \frac{1+\frac{\Delta IN}{IN}}{1+\frac{\Delta\phi}{\phi}} - \frac{1+\frac{\Delta\phi}{\phi}}{1+\frac{\Delta\phi}{\phi}} = \frac{1+\frac{\Delta IN}{IN}-1-\frac{\Delta\phi}{\phi}}{1+\frac{\Delta\phi}{\phi}}$$

$$= \frac{\frac{\Delta IN}{IN}-\frac{\Delta\phi}{\phi}}{1+\frac{\Delta\phi}{\phi}}$$

Provided $\Delta\phi/\phi$ is small, the denominator will be approximately equal to 1 in which event this expression collapses to equation (5) given in the text.