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ABSTRACT*

Housing, Wages and UK Labour Markets

There is a considerable literature concerning the effects on labour mobility of imperfections in UK markets for rented housing (such as the 1987 book by Minford et al and several articles by Hughes and McCormick). This paper examines the interaction of labour and housing markets, including the owner-occupied sector, in a more general framework. Our analysis has implications for the behaviour of aggregate wages in the UK and for the relationship between aggregate unemployment and unfilled vacancies, which in part reflects mismatch between jobs and people. Our empirical analysis reveals that lagged values of regional differentials in the ratio of house prices to earnings play an important role in both the wage and the unemployment/vacancies equations. In addition, lagged values of average house prices have a significant 'cost-of- living' effect on wages. Our evidence is consistent with cross- sectional evidence on the effects of tenure structure on mobility; we find some effects from the 1965 and 1974 Rent Acts.

Our analysis suggests a rather different view of the process of wage determination from that suggested by Layard and Nickell (1986). Our evidence suggests that it is changes in, rather than the levels of, unemployment and sectoral mismatch that create greater pressure on wages. This appears consistent with analyses of the roles of insiders and outsiders in wage determination given by Blanchard and Summers (1986) and by Lindbeck and Snower (1987).

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mobility, housing tenure, house prices, sectoral labour markets

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NON-TECHNICAL SUMMARY

Much has been written on why wage inflation responds so little to high rates of unemployment, both in Britain and elsewhere in Europe. Blanchard and Summers have attributed this to hysteresis effects, while Lindbeck and Snower have emphasized the differing roles of insiders and outsiders in the labour force. In the United Kingdom economists have also pointed to the characteristics of UK housing markets as a factor in explaining why wages do not respond to high unemployment. Rates of labour migration are much lower in Britain than in the United States, it is argued, and low labour mobility allows high wage inflation in the South-East to co-exist with high unemployment in other regions. Cross-section evidence reveals an association of low migration rates with the regulation of rents and tenure and with the institution of council housing. Hughes and McCormick (1987) and Minford et al (1987) have used this evidence to argue that unemployment and wage pressure in Britain are higher than they would be with different housing institutions.

This paper examines the interaction between the labour and housing markets in Britain, integrating the owner-occupied sector more fully than in previous research. We explore the effects of this interaction on the behaviour of aggregate wages and for the relationship between aggregate unemployment and unfilled vacancies, which reflects mismatch between jobs and people. Our analysis confirms the importance of housing markets in labour market behaviour.

Our analysis emphasizes the importance of 'sectoral' or segmented labour markets in which labour is immobile, possibly as a result of the operation of the housing market. As a result, one segment of the national labour market may experience unemployment while there are at the same time unfilled vacancies or excess demand in another sector. Economic theory suggests that in such segmented markets, wage behaviour is influenced not only by aggregate excess demand, but also by its sectoral dispersion or 'mismatch'.

We take as our starting point the wage equations developed in recent work by Layard and Nickell. Their work explains employment, wages and the price level for the UK economy, based on a theoretical framework in which monopolistic competition prevails in product markets and at least some firms use normal cost mark-up pricing. In labour markets, the approach gives explicit treatment to bargaining between employers and unions: the level of both the cost of living and of product prices is relevant for wage determination and 'wage push' factors play an important role.

We use annual data from 1958-86 to estimate, first, an equation explaining the behaviour of aggregate wages. The explanatory variables in this equation (whose dependent variable is the real product wage, adjusted for the trend in productivity) include the level and the change in unemployment, a measure of

union power, and a variable capturing changes in mismatch (the absolute change in the employment share of industry and construction). We measure the effects of house prices by means of an index of UK house prices relative to the average wage, adjusted for the proportion of owner-occupiers. We find that this variable enters as a two- year moving average with a two-year lag, suggesting that the cost-of-living effects of house prices take a long time to feed through. We also define a 'regional difference' variable which is a measure of the gap between the house price/earnings ratio in the South-East and the UK average. This operates as a moving average with an average lag of two years. The effects of variations in mobility which arise from changes in housing tenure structure and from changes in the Rent Acts are captured through a mobility index derived from previous work by Hughes and McCormick.

One of the consequences of restricted labour mobility is increased mismatch in the labour market, and this should be reflected in a higher level of aggregate vacancies for a given level of aggregate unemployment. We therefore use annual data from 1958 to 1986 to estimate a second equation, in which unemployment depends on vacancies as well as on the benefit/wage ratio (reflecting 'search' unemployment) and the proportion of new entrants in the labour force. We introduce housing market influences through the same lagged moving average of the regional difference in the house price/earnings ratio and through the index of mobility used in the wage equation. The joint evidence from the two equations is consistent with our theoretical interpretations. The wage equation fits particularly well compared to previous estimates and both equations pass a battery of specification tests and tests of alternative hypotheses with flying colours. It is also clear that the importance of the house price variables is robust to the specification of the final wage equation.

Our incorporation of the effects of house prices and housing tenure suggests very different conclusions concerning the determinants of wage behaviour from those reached by Layard and Nickell, although like Nickell we find evidence of the importance of hysteresis in unemployment. In particular, we find that it is the changes in unemployment and sectoral mismatch, not the levels of these variables, that have the strongest influence on real wages. This is consistent with interpretations of unemployment based on hysteresis or on insider-outsider behaviour. Such interpretations imply that wage pressure is affected by the sectoral dispersion of excess demand *changes*, for the same reasons that changes in (more than levels of) excess demand determine wage behaviour.

We find that union power has an important and strongly significant effect on wage pressure, although in our estimates union density out-performs the theoretically more appropriate union/non-union mark-up. We suspect that this is the result of efficiencies in estimates of the latter for the 1980s. Our estimates of the unemployment/vacancies relationship reveal strong evidence of the role played

by the regional house price/earnings difference and our calculated measure of mobility. We also find that the proportion of young entrants in the labour market and the benefit/wage ratio tend to increase the level of unemployment for any given level of vacancies.

We estimate the contributions of these factors to movements in the wage during the sample period. The level of unemployment and to an even greater extent its rate of change had a major effect on the real wage, though the increase in mismatch in the early 1980s offset the downward pressure on wages to a remarkable degree. The net result was only a very modest downward pressure on the real product wage. Union density also had a major influence on the real manual wage: the increase from the early 1960s to the peak at 1979 accounts for a 3.6% increase in the real wage. This is large, relative to the 2.5% increase in the productivity-trend-adjusted real wage over this period. The recent rises in the house price/earnings ratio and its regional difference imply a 4.4% increase in the real manual wage over the period 1984-8, while the effect on price inflation is even greater, given the feedbacks from wages to prices. The upward pressure of house prices on wages, adjusted for the productivity trend, has been offset by the decline in union density and by persistent high unemployment.

In the long run, relatively high house prices in the South-East benefit the unemployed elsewhere in Britain. These higher prices not only create an incentive to expand the supply of housing in the South-East, but give firms an incentive to locate elsewhere. Our research suggests, however, that the institutional distortions associated with owner-occupation introduce important dynamic distortions into the housing market. There are major tax incentives which favour owner-occupation relative to other financial assets or rented accommodation. These include mortgage interest tax relief and the absence of capital gains tax on principal residences. These distortions, which the abolition of domestic rates will increase, artificially raise the portfolio returns on owner-occupation relative to other assets, with profound implications in economic upswings, especially when these are accompanied by rapid growth in financial liquidity. In such upswings the response of house prices to the growth of income and liquidity results in high own rates of return on owner-occupied housing, which further stimulate demand. Even if other factors did not lead to faster economic growth in the South-East, higher national housing demand tends not only to raise the national house price/earnings ratio but also to widen the South-East's ratio relative to the rest of the UK, because housing supply is less elastic in the South-East. As a result the house price/earnings ratio in the South-East rises relatively in upswings, especially those where financial liquidity is a major factor, as in the early 1970s and in the 1980s.

This leads to a 'mobility trap'. As the relative appreciation of house prices increases, households in the South-East are initially more reluctant to move to

other areas: they would miss out on the further relative appreciation and may therefore be unable to move back to the South-East at a later date. Thus few housing slots are freed for potential migrants to the South-East, tending to increase still further the relative appreciation. Households outside the South-East become increasingly unable to bridge the gap in house prices and so are less inclined to migrate.

As the house price/earnings differential approaches a peak, outward migration from the South-East increases. At the same time, the credit constraint for potential migrants to the South- East reaches a maximum. Also by this time additional new housing in the South-East will have been built. This situation cannot persist and speculative expectations are reversed: the result is a rapid fall, as in 1973-5, of the South-East's premium in the house price/earnings differential. The rapidity of the fall is likely to be influenced by the initial reluctance of households outside the South-East to invest in an expensive asset with a lower or negative prospective rate of return compared with their present housing. The peak and early part of this post-peak phase is likely to be a particularly uncomfortable one for firms in the South-East trying to hold on to or to hire workers and, unless labour demand in the South-East is slackening, is likely to be associated with strong wage pressure there. 1973, for example, saw the largest recorded net outflow of people from the South-East, with further large outflows in 1974 and 1975.

This process eventually leads firms and workers to locate outside the South-East and so relieves unemployment in other regions. In the short run, however, this process can impose significant costs. Wage increases in the South-East, quickly followed by even larger house price increases there, can give workers in the South-East an incentive to leave and, given credit rationing, be relatively ineffective in attracting new workers. Firms may therefore have to bear the brunt of the resource reallocation shifts engendered by this interaction of housing and labour markets.

The fiscal bias in favour of owner-occupation greatly raises the portfolio return to housing relative to that which would prevail in a neutral tax system. Consumer expenditure is influenced by house price increases through wealth effects and the increase in collateral available for borrowing. This tends not only to increase aggregate consumer expenditure and imports but also to increase regional disparities. The greater increase in consumer expenditure in the South-East has regional multiplier effects which feed back through household demand into South-East housing prices. This adds to the overshooting tendencies discussed above. These tendencies have been exacerbated by the liberalization of credit markets in the 1980s and would be reduced by a more neutral tax treatment of owner-occupied housing. Our results emphasize the hazards of liberalizing financial markets while enormous fiscal distortions remain in place.

1. Introduction

Much has been written on why wage inflation is curiously unresponsive to high rates of unemployment, see for example Lindbeck and Snower (1985) and Blanchard and Summers (1986). For the U.K., Layard and Nickell (1985, 1986) have developed a model for wages, prices and employment that develops the mechanisms at work. In the latest version of this model in Nickell (1987), the relative ineffectiveness of high unemployment in curbing real wages is particularly clearly expressed. First, it is the logarithm of unemployment that affects the real wage. This means that an extra 100,000 unemployed are less effective in holding down wage increases the higher is the unemployment rate. Second, the negative effect on wages is substantially offset by the opposite effect of the proportion of those unemployed for over one year. In common with Layard-Nickell, the latest Nickell (1987) version of the model includes in the (real) wage equation a number of other factors: the productivity trend, a measure of change in the sectoral structure of employment, the ratio of benefits to earnings, the union-non union wage mark-up, employer taxes and the ratio of import prices to domestic prices.

Some caution was expressed in Muellbauer (1986) about the possibility of some elements omitted from the Layard-Nickell story. In particular, it was hypothesized there, but without the benefit of any new empirical evidence, that the housing

market may have important effects on the labour market. There is a considerable literature on the effects of the imperfections of U.K. rented housing markets in restricting labour mobility (see Hughes and McCormick (1981, 1985) and the review in Minford et al (1987)) and hence in raising unemployment (see Hughes and McCormick (1987), and Minford et al (1987) for a comprehensive model).

This paper examines the interaction of labour and housing markets, including the owner-occupied sector, more generally. Implications are drawn for the behaviour of aggregate wages in the U.K. and for the relationship between aggregate unemployment and unfilled vacancies, which in part reflects mismatch between jobs and people. Our empirical evidence reveals that lagged regional house price/earnings differentials play an important role in both wage and unemployment/vacancies equations and that lagged average house prices have a significant cost-of-living effect on wages. Our evidence is also consistent with cross-section evidence on the effect of tenure structure on mobility and suggests that changes in tenure structure and the 1965 and 1974 Rent Acts have had important implications for labour markets. Altogether, a radically different view of the process of wage determination emerges from our work compared with Layard and Nickell (1986). Our evidence suggests that _changes_ in unemployment and in sectoral mismatch are more important for wage pressure than are levels. This would appear to be consistent with arguments about the roles of insiders and outsiders in wage determination given by Blanchard and Summers (1986) and Lindbeck and Snower (1985, 1987).

Section 2 reviews the theoretical background on aggregate wage determination in sectoral labour markets. Section 3 provides empirical evidence on wages in the U.K. Section 4 estimates the corresponding unemployment/vacancies trade-off. Section 5 summarizes our empirical results, discusses their interpretation and draws conclusions.

2. Aggregate Wages and Sectoral Labour Markets

(a) The relation between wages, excess demands and the dispersion of excess demands

Hansen (1970) discussed the nature of wage adjustments when there are sectorally distinct labour markets. He concentrated on the response of the proportional rate of change of nominal wages to excess demands, given other determinants such as the rate of change of prices and productivity. Layard and Nickell (1985, 1986) find that for annual data a better formulation of the dependent variable is the deviation of the log real wage from the productivity trend. Let us call this variable w^* and apply Hansen's analysis to it.

Supose that in the ith market

$$w^*_i = \alpha z_i + \beta x_i \tag{2.1}$$

where z_i is excess demand and x_i a combination of other factors such as the wedge between producer and consumer prices and proxies for union pushfulness. Then in aggregate

$$w^* = \alpha z + \beta x \tag{2.2}$$

By aggregation over a sectoral distribution of excess labour demands, one can show, like Hansen, that there exists a relationship between the aggregate z and aggregate unemployment u and σ, the sectoral dispersion of excess demands. This is illustrated in Figure 1 which also shows a similar relationship for aggregate unfilled vacancies v defined as the sum of positive excess demands. Since $z = z(u,\sigma)$ can be written as a decreasing concave function of u and an increasing function of σ, the aggregate wage equation (2.2) becomes

$$w^* = \alpha z(u,\sigma) + \beta x \qquad (2.3)$$

However, it has long been suspected, see Hansen (1958) and Hansen (1970) footnote 8, that a given amount of positive excess demand exerts greater upward wage pressure than the same level of negative excess demand exerts downward wage pressure. This, indeed, is a major concern of the debate about unemployment hysteresis (see Blanchard and Summers (1986), Nickell (1987)) and is a basic feature of insider-outsider models of wage determination (see Lindbeck and Snower (1985, 1987)). Then the relationship of w^* to u will be:

$$w^* = F(u,\sigma) + \beta x \qquad (2.4)$$

The wage response to unemployment will be even more concave than in (2.3) and the response to increases in sectoral dispersion or mismatch σ will be greater than in (2.3).

However, insider-outsider models and empirical evidence suggest that it is not only the levels but also changes in average excess demand z and mismatch σ which affect wage pressure. Then the arguments of (2.4) include $z(u,\sigma)$, $\Delta z(u,\sigma)$, σ, $\Delta\sigma$ which can be approximated by the set of arguments u, Δu, σ, $\Delta\sigma$.[*]

Economies differ, of course, in the degree to which they have sectorally distinct labour markets. Hughes and McCormick (1987), for example, have pointed out the remarkably higher level of regional mobility for manual workers in the U.S. compared with the U.K. and there are also likely to be mobility variations over time. Higher mobility levels should be associated with reduced wage pressure, other things being equal and one might also expect an interaction effect with the level and changes in regional mismatch so that the effect of regional elements of σ and $\Delta\sigma$ on wage pressure would be lower when mobility is higher.

(b) Measuring the dispersion of excess demands and of excess demand changes

Let us now consider the empirical implementation of these ideas. Layard and Nickell (1986) and Nickell (1987) suggest that, empirically, the concavity in the relationship between w^*, the deviation of the log real wage from the productivity trend, and the unemployment rate u is well represented by making w^* linear in $\ln u$, and $\Delta\ln u$ seems the natural way of representing the rate of change effect.

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[*] Strictly speaking, $\Delta\sigma$ is not the change in mismatch but the sectoral dispersion of changes in excess demands.

Measuring σ which represents mismatch, i.e. the sectoral dispersion of excess demands, is difficult. If one knew the form of the unemployment/vacancies trade-off implied by Figure 1, for example $uv = h(\sigma)$ which Hansen (1970) regards as a good approximation, one could use it to obtain a proxy for σ, for example $(uv)^{\frac{1}{2}}$. But even with knowledge of the form of the trade-off, problems arise because of the well-known loops in the short run relationship between observed u and v for which there are various explanations, see for example Hansen (1970) and Holt and David (1966). Also, search theory suggests that vacancies respond to other factors such as unemployment benefit to wage ratios and our empirical evidence in Section 4 below supports this. Furthermore, observed vacancies are known to under-represent true vacancies although correction factors derived by Jackman, Layard and Pissarides (1984) and Roper (1986) can be applied.[*] These are all reasons why one may have doubts about whether an index such as $(uv)^{\frac{1}{2}}$ is an accurate measure of the level of mismatch.

Some of these doubts also apply to attempts by the researchers associated with the Centre for Labour Economics to construct indexes of mismatch from regional, sectoral and occupational data on vacancies and unemployment, see Jackman, Layard and Pissarides (1984), Layard and Nickell (1986),

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[*]   Nevertheless, even with such correction factors, observed official vacancies probably under-represent the upper ends of job markets where private advertising and job agencies play a bigger role. The evidence in the 1980's that higher earners have had above average rates of increases in earnings raises the suspicion that the under-representation of vacancies for higher paid workers in the official statistics on unfilled vacancies has increased.

Jackman and Roper (1987). Stock measures of mismatch, from the evidence in these sources appear to contain surprisingly little variation and to have little empirical success in contributing to the explanation of wage pressure.[*]

In some ways, measures of $\Delta\sigma$ or of shocks which increase mismatch, seem less problematic. Layard and Nickell (1985, 1986) and Nickell (1987) for example, call the absolute change in the proportions of workers in the industrial sector a proxy for mismatch, σ . Their measure or the standard deviation across industries of the change in each industry's employment percentage used by Bean and Gavasto (1988), make much more sense as measures of $\Delta\sigma$.

There is a persuasive theoretical case that a good proxy for the regional difference in demand shocks is the regional difference in the house price to wage ratio. This would be true even in a world of perfectly clearing markets. Suppose for example, in such a world that all housing were privately owned. A positive labour demand shock in one region, given an inelastic short run supply function of houses, drives up local house prices in the short run. It is likely that local house prices will increase relative to local earnings since housing demand is fuelled not only by the higher wages caused by the demand shock but by the new-comers potentially attracted to the locality and since house prices are close to being 'jump variables' like other asset prices. These house price increases also contribute to the regional multiplier effect of

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[*] Though the latter could be in part because wage equations which lack <u>changes</u> in excess demand and <u>changes</u> in mismatch or more precisely, the sectoral dispersion of excess demand changes, are mis-specified.

the original demand shock. There is a wealth effect on local consumer expenditure and, perhaps even more important, a liquidity effect as consumer credit expands on the basis of higher house values as collateral.

With well functioning markets, housing supply eventually responds, partly because of new construction and partly because some residents, especially perhaps the retired, will be induced to realize capital gains and relocate to cheaper housing within the region or elsewhere. Also, with higher wages and housing costs in the locality, there will be a tendency for new jobs to be located and some existing ones relocated where workers and housing are cheaper, until a new equilibrium is reached. Thus, even if the original demand shock is not directly observed, this theory argues that it can be seen indirectly in an increase in the local house price/earnings ratio which, given the adjustment lags, could last for several years. It follows, given the original premise that increases in mismatch cause wage pressure, that even with well functioning housing markets, one would observe a positive association between wage pressure and the regional differential in house prices relative to earnings.

(c) The mobility interpretation of regional house price/earnings differences

However, models of interregional migration provide an alternative interpretation of such an association. Suppose again that there is a well functioning owner-occupied housing market. In a model of discrete choice of location by residents, see for example Greenwood (1975), Clark and van

Lierop (1986) and Harrigan, Jenkins and McGregor (1986), the probability of moves in each direction depends on utility comparisons in which higher earnings at a location encourage moves to that location while higher living costs, including higher house prices, discourage them. Since house prices are only part of the cost of living, such real earnings comparisons would give a higher weight to inter-regional log differences in nominal earnings relative to log differences in house prices.* However, in practice, many households are likely to be credit rationed with their mortgage ration a given proportion of their earnings. Since mortgage advances rarely cover the cost of a house fully, for such households, inter-regional log differences in nominal earnings would have a somewhat lower weight in comparing living standards in different locations than log differences in house prices.

There is some direct evidence on migration consistent with these ideas. Zabalza (1978) studied U.K. school teachers, who would have been less likely to be mortgage credit rationed than average households. For these, the coefficient on log differences in earnings exceeds that on house prices. For a time series of Scottish net migration, on the other hand, Harrigan, Jenkins and McGregor (1986) find the coefficients on log differences of earnings and house prices to be very similar to each other. In preliminary work on net migration for the South East we find a similar result and that the current log (house price/earnings ratio) is by far the most significant explanatory variable of the list of variables examined. This is consistent with a high proportion of

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* More precisely, in the user cost of housing.

households being mortgage credit rationed. On p. 53-4 of the conclusions we spell out the mechanisms of 'the mobility trap' that arises when regional house price/earnings differences are high.

The kinds of equations for migration flows discussed above are, of course, structural equations in a larger system in which earnings and house prices are endogenous. In fact, on the earlier interpretation of regional house price/earnings differences as a proxy for relative regional labour demand shocks, one might well expect a positive association between net migration and the regional house price/earnings differences. This is so because, on this earlier view, the higher migration caused by the relative labour demand shock raises the house price/earnings difference. The finding in time series data, by Harrigan, Jenkins and McGregor (1986) for Scotland and by ourseves for the South East of a highly significant negative association and of no strong role for differences in rates of unemployment or of vacancies which, one might have thought, would be associated with relative labour demand shocks, is not encouraging for the view that regional differences in house price/earnings ratios are only proxies for regional differences in labour demand shocks.

In fact, we have evidence that changes in aggregate demand for housing in the UK alter regional differences in house price/earnings ratio. We suspect that because planning controls bite more fiercely in the South East, the supply elasticity of housing land is lower in the South East than elsewhere. Even a homogeneous increase in national housing

demand because of an increase in financial liquidity or the growth of real incomes will then raise house prices/earnings ratios by more in the South East than elsewhere.

(d) The cost of living interpretation of regional house price/earnings differences

So far, we have placed considerable weight on non-linearities in the response of the real wage to excess demand and changes in excess demand as an explanation for why σ and $\Delta\sigma$ are likely to be important determinants of wage pressure. It is rather plausible that a related phenomenon governs the role of the cost-of-living/producer price wedge which may interact with excess demand. The latter seems likely to take the form of a larger effect on wage pressure from an increase in the wedge in markets with greater excess demand for labour than in markets with smaller or negative excess demand. Regional variations in producer prices are likely to be small. Variations in housing costs are a major ingredient of regional variations in the cost of living. Also house prices are correlated with land prices more generally and the latter are likely to be an ingredient in the cost of locally provided retail and other services. Thus regional house price differences are likely to capture rather well regional differences in the cost-of-living/producer price wedge.

Thus, we have three interpretations of the regional difference in the house price/wage ratio in an aggregate wage equation. The first is as a proxy for regionally differentiated labour demand shocks. The second is as a negative incentive for interregional mobility. The third is

as a proxy for regional differences in the wedge. If the second and third interpretations are valid, we might also expect a positive interaction effect between this variable and a direct measure of the regional difference in labour demand shocks.

(e) Tenure structure, mobility and wages

Let us now turn to other aspects of housing. Minford et al (1987) review the very substantial body of research on housing tenure and labour mobility. These studies suggest that council house tenants are by far the least mobile and tenants in the private furnished sector, which is less subject to control by the 1965 and 1974 Rent Acts, are the most mobile. Hughes and McCormick (1981), studying the 1973 General Household Survey, find this to be confirmed even when controlling for socioeconomic characteristics of households. One can have some reservations about these findings. For example, 1972-3 experienced the pre-1988 peak of the house price/wage ratio in London and the South East. One imagines that pressure on council accommodation in London and the South East must have been intense and mobility particularly low. Indeed, their sample contains only seven migrant council tenants in all of Great Britain. These are rather few observations on which to estimate the effects of the socioeconomic variables. But even with a larger sample, as in the study of Scottish housing by Robertson (1979), one would expect sample selection bias to remain a problem resulting in an overestimate of the immobility caused by the institution of council housing. To the extent that council housing is

housing of last resort, for any measured socioeconomic characteristic, one would expect those with lower economic motivation, poorer health and those who have experienced more than their share of bad luck to be more likely to find themselves in council accommodation. Since such individuals are also less likely to be employable and mobile, part of the association of council house tenure with unemployment and immobility is probably due to this selection bias. However, we have little doubt that only a part is thus explainable[*].

The greater the barriers to mobility, the greater the segmentation of labour markets and the greater is wage pressure, especially for unbalanced growth in labour demand. A mobility index can be derived from Hughes and McCormick's (1981) estimates (see their Table 7) of the predicted rates of migration associated with different tenure groups, weighted by the proportion of households in each group.[**] If we standardize on owner-occupiers,

MOB = (proportion of owner-occupiers + 0.31 proportion of council tenants + 3.20 proportion of furnished tenants + 1.23 proportion of private unfurnished tenants)

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[*] There is evidence, see Minford et al (1987) p. 111-2, and Hughes and McCormick (1985) that, given the desire to migrate, frustrated migrants are particularly prevalent in the council house sector. Although self selection bias could still be a problem, it is likely to be smaller than in the context of the explanation of successful migration.

[**] However, instead of a relative migration rate of 0.16 associated with council house tenure, we have used double that figure. Preliminary work by Hughes and McCormick on Labour Force Survey data suggests that the 1973 GHS data did understate the regional mobility of council tenants, perhaps by a factor of 2.

This makes clear the respective migration rates of the
different groups in 1973. This index would suggest that, in
terms of mobility, roughly speaking, the decline in the
private rented sector has been considerably offset by the rise
in owner occupation (abstracting from variations in house
price/wage ratios by region). The council housing sector has
been the most stable, its share drifting up from about 27% in
1961 to around 32% in 1978 and drifting down since then. This
mobility index reaches its low point around 1980 but with the
declining share of council tenancy, has been increasing since
then.

However, this mobility index suffers from major defects,
the most serious of which is that it ignores the changes that
resulted from the 1965 and 1974 Rent Acts. There had long
been rent and tenure controls within the unfurnished sector.
What the 1965 Rent Act did in this sector was to set up new
machinery for rent and tenure regulation with 'fair rents' set
by rent tribunals. The rent levels set were not as grossly
far below market rents as were controlled rents. The 1974 Act
aimed to extend this machinery of regulation to furnished
accommodation, though property (whether furnished or not) with
a resident landlord was largely relieved from regulation.

This suggests that a mobility index which takes tenure
structure and the Rent Acts into account could be defined as
follows:

$$MOBR = MOB + (\theta_1 PCU + \theta_2 PRU + \theta_3 PUU$$
$$- \theta_4 PUU \times pre\ 1965\ dummy - 1.23)\ PU - \theta_5 \times post\ 1974\ dummy \times PF$$

where PCU = proportion of unfurnished tenants with controlled
             rents

       PRU = proportion of unfurnished tenants with regulated
             rents

       PUU = proportion of unfurnished tenants with
             unregulated, uncontrolled rents

       PU = proportion of all households who are unfurnished
             tenants

       PF = proportion of all households who are furnished
             tenants

and $\theta_i > 0$ all i . Also the inequalities $\theta_1 < \theta_2 < \theta_3$,
where the θ_i are directly interpretable as migration rates,
indicate that controlled tenants are less mobile than
regulated tenants who are less mobile than unregulated,
uncontrolled tenants.

However, it seems likely that the 1965 Rent Act reduced
mobility even in the unregulated unfurnished sector because of
the ever present threat of creeping regulation which would
have reduced many unregulated rents below genuine free market
levels. Thus, the pre-1965 migration rate in the uncontrolled
unfurnished sector was $\theta_3 + \theta_4$ which fell to θ_3 as a
result of the 1965 Act. The 1974 Rent Act would have had a
similar effect on furnished accommodation so that the post-
1974 migration rate for furnished tenants was $3.2 - \theta_5$.
Indeed, in orders of magnitude one would expect θ_4 and θ_5
to be similar.

We also have a restriction on θ_1, θ_2 and θ_3. In 1973, PCU = 0.295, PRU = 0.19, PUU = 0.515 so that $0.295\theta_1 + 0.19\theta_2 + 0.515\theta_3 = 1.23$. Note that in 1973, MOBR = MOB which is the Hughes and McCormick estimate. On p. 36-37 below we explain how the θ's can be estimated.

Minford et al (1987) argue for what, in some respects, is a more sophisticated version of this mobility index. They attempt to estimate the gap between actual and free market rents in the different tenure groups and assume that relative migration rates are not merely proportional to but equal to the ratios of actual to free market rents in the different tenure sectors. Making a similar assumption for council tenants, they construct regional mobility indices for 1963-1979 based on this gap and on regional variations in council house tenancy. They try to explain regional unemployment rates with these indices together with regional unionization rates, measures of production relative to national production and the national unemployment rate in a time series/cross-section context. Though there is cross-section support for their theory, the effect of the mobility indices singularly fails to explain changes over time, see their Table 1, p. 19.[*]

The difficulties in measuring mobility are real enough. It may be, for example, that council mobility schemes, see Minford et al (1987), Appendix D, have had a varying impact

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[*] One wonders whether the cross-section effect picks up mainly variations in the proportions of households in council houses. If so, there could be some reverse causation with the unemployed drifting into the available council accommodation. Alternatively, the old industrial areas where unemployment is now above average, may simply have inherited above average stocks of municipal housing.

over time. It is also possible that the major cuts in the council house building programme in the 1980's and lengthening council house waiting lists may have reduced mobility among council tenants. Also, there is some uncertainty over the impact of the 1980 Housing Act which introduced two new types of contracts, 'shorthold' and 'assured' tenancies with reduced security of tenure with the aim of revitalizing the private rented market. However, the evidence, see Minford et al (1987), Ch. 2, suggests that this aim has not, by the mid 1980's been achieved, though even before 1980 an increasing amount of new letting outside the Rent Acts under licence agreements or simply at 'black-market' rents seems to have been taking place, see Minford et al (1987), p. 102-5.

3. Empirical Evidence on Aggregate Wages

(a) The Layard-Nickell model

The basic structure to which we add our hypotheses about the effects of house prices and housing tenure is the Layard-Nickell model (1985, 1986) as further developed by Nickell (1987). This is a three equation system explaining employment, wages and the price level for the U.K. economy from the mid 1950s to 1983. It is based on a theoretical framework in which monopolistic competition prevails in product markets and at least some firms use normal cost mark-up pricing. In labour markets, explicit recognition is given to bargaining between employers and unions. This means that the level of both the cost of living and of product prices is relevant for wage determination and wage push factors play an important role.

We now summarise the latest version of the model for annual data expressed in logarithms. Labour demand, assumed equal to employment, is specified as a function of employment lagged one and two years, the capital stock, the lagged real product wage and of detrended aggregate demand which combines competitiveness, fiscal policy and world trade. The price equation specifies the GDP deflator relative to the wage as a function of the lagged dependent variable, wage surprises modelled as second differences of the current and lagged nominal log wage, the ratio of the capital stock to the aggregate labour force as a measure of productivity trends, the effective tax rate on profits and the lagged ratio of import prices to the final expenditure deflator. In the wage equation the dependent variable is the real product wage faced by firms. The measure of trend productivity is the same as in the price equation and its coefficient is subject to cross-equation restrictions. The other variables were summarized on p. 1 above.

There are two variants of the labour market activity variables which, according to Nickell (1987), yield satisfactory equations - see columns 2 and 3 in Table 1 of Nickell (1987). In his col. 2 a distributed lag of log unemployment appears with a maximum lag of 3 years. In his col. 3, current log unemployment is augmented by the proportion of unemployment over 52 weeks which, having a positive coefficient, offsets the negative effect of unemployment. Both equations represent the effect of unemployment hysteresis.

Our version of the latter equation estimated for 1958-1986 is shown in Table 1 column (i). The dependent variable w^* is the real product wage adjusted for a productivity trend.

$$w^* = [\ln W + 1t - \ln \overline{P} + \nu \ln (Pm/\overline{P}) - 1.07 \ln (K/L)]$$

where W = male manual earnings corrected for overtime, $\overline{P}$ = final expenditure deflator, ν = import share, Pm = import price index, K = gross U.K. capital stock at mid-year, L = labour force. Thus, the first two terms measure the after tax labour cost, the next two measure the value added deflator, and the last term measures the productivity trend. The coefficient 1.07 is estimated as such by Layard and Nickell (1986) and Nickell (1987) and is mainly determined by the cross-equation restrictions in their full model. As they demonstrate, the estimate is robust to a wide range of specification changes in the wage equation. We imposed it primarily so as not to have to carry the burden of a three or four equation system with its cross-equation restrictions and an expanded list of instruments. t-tests of the restriction show it to be easily satisfied for each of the specifications of the wage equation we present.

The Nickell equation has a reasonably straightforward interpretation. The log transformation of the unemployment rate, $\ln u$, is consistent with the argument for concavity in the response of wages to unemployment discussed in the previous section. The ratio of long term unemployment,

u_{52}/u , suggests that high unemployment is less effective in holding down wages when much of it is long term. The real import price, $v\ln(Pm/\overline{P})$, and labour tax, lt , terms are part of the wedge between producer prices relevant for firms and consumer prices relevant for workers. The rate of change of real import prices and the labour tax term are, however, not significant in this sample. Here, as elsewhere in Table 1, we have included a 1980 dummy. This represents the unprecedented increase in 1979-80 in indirect taxation, which ought to be part of a temporary wedge effect and is not explicitly modelled by Layard and Nickell. The benefit to wage ratio, BW , is relevant for wage bargaining or for labour supply as it represents alternative opportunities for the unemployed. Union power, $\ln Up$, needs no discussion. The change in mismatch as measured by the absolute change in the ratio of employment in industry and construction to total employment looks somewhat out of place, though Layard and Nickell call it 'mismatch'. It makes better sense in the framework sketched in the previous section where both levels and changes in excess demand and so in mismatch play a role. It is also more consistent with Nickell (1987), Table 1, column 2 which suggests that there are rate of change effects in the unemployment rate.

(b) Variations on the Nickell wage equation

Such effects are confirmed in our Table 1, column (ii) which incorporates the three year rate of change of unemployment and represents the levels effect as a two year moving average. The change in mismatch here is also a two

TABLE 1

Real product wage equations estimated by IV for 1958-1986

	(i)	(ii)	(iii)	(iv)
* lnu	-0.092 (4.0)	-	-	-
* M_2lnu	-	-0.031 (1.4)	-0.029 (2.4)	-0.022 (3.1)
* Δ_3lnu	-	-0.058 (5.7)	-0.058 (3.9)	-0.065 (7.3)
* u_{52}/u	0.161 (2.0)	0.008 (0.1)	-	-
* lt	0.157 (0.8)	0.129 (0.6)	-	-
$\upsilon ln(Pm/\overline{P})$	0.612 (2.8)	0.444 (2.2)	0.357 (1.7)	0.076 (0.5)
$\Delta\upsilon ln(Pm/\overline{P})$	0.090 (0.5)	-0.080 (0.4)	-0.074 (0.4)	0.079 (0.6)
* DMM	0.048 (3.3)	-	-	-
* M_2DMM	-	0.065 (5.1)	0.064 (2.5)	0.054 (3.8)
* BW	0.265 (1.9)	-	-	-
M_2BWA_{-1}	-	0.268 (2.2)	0.263 (2.5)	0.023 (0.3)
* $lnUp$	0.038 (3.4)	-	-	-
M_2lnUD_{-1}	-	0.026 (0.4)	0.087 (1.8)	0.108 (3.8)
$\Delta_2w^*_{-1}$	-	-	0.074 (0.5)	-0.110 (1.6)
DDW^*_{-1}	-	-	-0.142 (0.9)	-0.134 (1.4)
$\Delta ln(P^*/\overline{P})_{-1}$	-	-	0.052 (0.9)	0.043 (1.3)
$D80$	0.007 (0.4)	0.001 (0.1)	0.001 (0.1)	0.014 (1.8)
M_2HPW_{-2}	-	-	-	0.202 (3.1)
M_3RD_{-1}	-	-	-	0.487 (3.1)
SE	0.0139	0.0104	0.0105	0.0056
$\overline{R}^2$	0.7283	0.8483	0.8486	0.9559
$SSE \times 100$	0.3678	0.1965	0.1885	0.0473
DW	1.719	1.727	1.749	2.318
no. of observations	29	29	29	29
no. of instruments	17	18	17	18

<u>Notes</u>: M_3 indicates a 3 year moving average i.e.
$M_3 x_t = \frac{1}{3}(x_t + x_{t-1} + x_{t-2})$, M_2 a 2 year moving average and
$\Delta_i x_t = x_t - x_{t-i}$. u = male unemployment rate, u_{52}/u =
share of long term unemployment in total unemployment, lt =
labour tax rate, ν = share of imports, Pm = import price
index, $\overline{P}$ = final expenditure deflator, DMM = 'Δ mismatch' =
absolute change in employment share of industry and
construction, BW = benefit/wage ratio, BWA = adjusted
benefit/wage ratio, Up = union/non-union wage mark-up, UD =
union density, $DDW^*_{-1} = \Delta w^*_{-1}$ until 1979 and zero thereafter,
P^* = world price level so that $P^*/\overline{P}$ measures competitiveness,
HPW = weighted, normalized ln (HP/W) where HP = index of
U.K. house prices, RD = weighted, normalized South East/U.K.
difference in ln (HP/WN) where WN = earnings of non-manual
males. Dependent variable
$w^* = \ln W - \ln\overline{P} + lt + \nu \ln(Pm/\overline{P}) - 1.07 \ln(K/L)$ where W =
male manual wage, K = mid year capital stock, L = labour
force.

year average. The joint effect of these changes is a
considerable improvement in fit.

There are two more specification changes in column (ii)
requiring comment. The Layard-Nickell measure of the
benefit/wage ratio BW soars from 0.458 in 1980 to 0.544 in
1983, its all time peak, at a time when policy was not
becoming notably more generous to the unemployed. It is very
plausible that the increase in the male unemployment rate from
8.7% to 17.2% in these three years was associated with higher
benefits because a larger fraction of the unemployed had
contributions records or commitments which made them eligible
for higher benefits. This can be demonstrated more formally
by the very significant unemployment effect found when fitting
by instrumental variables BW as a function of u , a dummy for
the 1965-1970 period of Labour government and a post 1966
dummy to take account of the introduction of Supplementary
Benefits (and, to a lesser extent, the earnings related
supplement). Interestingly, replacing u by its lagged value
gives a coefficient and t-statistic which are only marginally
lower, confirming that causation is not running in reverse.
The adjusted series is defined by BWA = BW - 0.39 u which
adjusts for this measurement error and we use its lagged two
year moving average.

An analogous problem affects the Layard-Nickell measure
of the union/non-union mark-up which experiences its largest
one year jump in 30 years from 0.058 in 1979 to 0.128 in 1980
and to 0.147 in 1981. This is wildly implausible and is
explainable by problems arising in the construction of the

mark-up.* Given these problems, we have used log union density, $\ln UD$, in its stead. This peaks in 1978 and then declines to about its 1970 level by 1986. It appears to us a less implausible proxy for union power and it enters the wage equation as a lagged two year average.

In column (iii), we have also dropped the long term unemployment ratio and the labour tax rate and have introduced three new variables. One is the two year rate of change in the lagged dependent variable, $\Delta_2 w^*_{-1}$. This has a negative feedback role which we interpret as follows. An upward shock to nominal wages results in a short run increase in the real wage but as prices adjust with a lag, the real wage then tends to drop back over the following two years, other things being equal. Similarly, an upward shock to the price level results in an initial fall in the real wage, followed by a recovery after nominal wages adjust. By the same token, we should expect to find negatively autocorrelated residuals to the extent that $\Delta_2 w^*_{-1}$ imperfectly measures these shocks.

An analogous variable we interpret as the incomes policy feedback term DDw^*_{-1}. This is defined as Δw^*_{-1} up to and including 1979 and zero thereafter. The logic behind it is that income policies, which have been pervasive in the post-war period until 1979 have a temporary negative feedback

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* It is based on a union density coefficient in annual cross-sections of manual wages by SIC groups. However, the effects of differences in skill and age across these groups are measured from the 1971 Census which will have become increasingly unrepresentative, especially after the shake-out of 1980-82. With a widening earnings distribution in the 1980's, we suspect that union density may be picking up skill and experience effects thus biasing upward the estimated union mark-up.

effect. Thus, an increase of real wages substantially above the productivity trend, has typically been followed by income policies coming on and slowing real wage growth. Conversely, temporarily successful incomes policies have tended to be followed by bouts of more rapid growth. The third variable is $\Delta \ln(P^*/\overline{P})_{-1}$ which is a measure of last period's competitiveness shock. The argument here is that an improvement in international competitiveness because, for example, of Sterling's depreciation tends to directly reduce competitive pressure on firms to pay moderate wage increases. This is an effect which operates in addition to the unemployment reducing effect of such a competitive improvement.

(c) Wage equations with house price and mobility effects

In Table 1, column (iv) we have included our two house price/earnings ratios. The first of our house price/earnings ratios, HPW , has a conventional wedge interpretation.

$$HPW_t = po_t (\ln(HP/W)_t - \ln(HP/W)_{61/2})$$

where po is the proportion of households who are owner occupiers and HP is a mix adjusted index of U.K. house prices and the 61/2 subscript indicates the average value for 1961/2. We take this as the 'normal' value and thus normalize HPW . HPW enters as a 2 year moving average and at a 2 year lag, suggesting that the cost of living effects of house prices take a long time to feed through.

The second of these variables, RD , is defined as follows:

$$RD_t = po_t\left[(\ln(HP_{SE}/WN_{SE})_t - \ln(HP_{SE}/WN_{SE})_{61/2}) - \right.$$

$$\left. (\ln(HP/WN)_t - \ln(HP/WN)_{61/2}) \right]$$

where the SE subscript refers to the South East and WN is average male non-manual earnings. WN is more representative of the upper part of the earnings distribution than its manual equivalent. The regional difference RD is thus a measure of the gap between the house price/earnings ratio in the SE and the U.K. average and is weighted and normalized like HPW . Figure 2 shows how the current values of HPW_t and RD_t have varied between 1955 and 1987. In column (iv), RD enters as a lagged three year moving average. The improvement in fit compared with column (iii) is dramatic.

So far, we have not incorporated the effects of variations in mobility that come from changes in the tenure structure and from the effects of the two Rent Acts. Section 2 explained how such a measure which we call MOBR was constructed. It also plays an important role in our equation relating unemployment to vacancies which is discussed in Section 4 where the estimation of the θ parameters in the mobility index is explained. Table 2 shows estimates for wage equations estimated jointly with an unemployment/vacancies equation by three stage least squares with the non-linear cross-equation restrictions on the θ parameters imposed.

The equation standard error, adjusted R-squared and the (absolute) t-statistics are adjusted for degrees of freedom to make them comparable with those in Table 1.

Column (a) of Table 2 shows the full sample estimates which show a negative mobility effect on wages with a t-ratio of 2.8. In this specification, the replacement ratio and the level of real import prices were insignificant and so omitted. The two house price/earnings effects with t-ratios of 7.0 and 6.2 are quite precisely determined. Of our explanatory variables, the least precisely estimated effect is that of the previous year's competitiveness shock with a t-ratio of 1.7.

Column (b), Table 2 shows the estimates when dummies for 1980-86 are included. The associated parameters measure the forecast residuals when the model is estimated up to 1979 and the t-ratios reveal any significant deviations. This specification performs well and the point estimates of the parameters are all within one standard error of those shown in column (a). This is so even for the unemployment levels effect whose pre-1979 range of variation is much lower than over the full sample.

Column (c) shows the results when, instead of dummies for 1981-86, dummies for 1973-5 are included. Note that the peak regional house price/earnings differential occurred in 1972. Given the effect of a three year moving average lagged one year, the dummies for 1973-5 thus remove the effect of this spike in the data. This was also the period of the first oil shock and so taking out these observations is a stringent test of the parameter stability of the model. The model survives this test extremely well: the 1973-75 dummies are quite

TABLE 2

Stability tests for selected real product wage equation

	(a)	(b)	(c)	(d)
* $M_2 lnu$	-0.022 (6.7)	-0.023 (1.9)	-0.024 (4.0)	-0.024 (5.7)
* $\Delta_3 lnu$	-0.074 (15.5)	-0.077 (10.6)	-0.075 (11.7)	-0.075 (12.2)
* $M_2 DMM$	0.056 (4.5)	0.065 (7.4)	0.058 (6.9)	0.056 (7.1)
$M_2 lnUD_{-1}$	0.10 (6.1)	0.10 (2.1)	0.11 (4.4)	0.12 (5.6)
$\Delta_2 w^*_{-1}$	-0.14 (2.9)	-0.15 (2.1)	-0.13 (2.2)	-0.13 (2.1)
DDW^*_{-1}	-0.20 (3.5)	-0.23 (3.2)	-0.22 (3.1)	-0.22 (3.0)
$\Delta\nu ln(Pm/\overline{P})$	0.12 (2.1)	0.14 (1.9)	0.14 (1.0)	0.12 (1.6)
$\Delta ln(P^*/P)_{-1}$	0.04 (1.7)	0.05 (1.3)	0.05 (1.5)	0.04 (1.4)
$M_2 HPW_{-2}$	0.23 (7.0)	0.22 (5.3)	0.23 (4.5)	0.23 (5.4)
$M_3 RD_{-1}$	0.60 (6.1)	0.50 (3.6)	0.58 (3.2)	0.60 (4.8)
$M_3 MOBR_{-1}$	-0.060 (2.8)	-0.057 (1.8)	-0.064 (1.7)	-0.052 (1.6)
se	0.004628	0.004887	0.005010	0.004071
$\overline{R^2}$	0.9698	0.9662	0.9645	0.9702
SSEx100	0.03427	0.03104	0.03264	0.02321
DW	2.53	2.66	2.54	2.04
no. of observations	29	29	29	27
no. of instruments	19	25	22	20
D73	-	-	0.003 (0.2)	-
D74	-	-	-0.004 (0.3)	-
D75	-	-	0.001 (0.0)	-
D80	0.015 (2.6)	0.014 (1.8)	0.015 (2.3)	0.012 (1.7)
D81	-	-0.006 (0.6)	-	-
D82	-	-0.006 (0.7)	-	-

(Table 2 continued)

	(a)	(b)	(c)	(d)
D83	−	−0.004 (0.3)	−	−
D84	−	−0.004 (0.3)	−	−
D85	−	0.001 (0.0)	−	−
D86	−	−0.003 (0.2)	−	−

Notes: see Table 1.

* indicates endogenous variable

insignificant and all the parameter estimates are easily
within one standard error of the full sample estimates. It is
worth noting that the international competitiveness effect,
though not very precisely determined, is very stable across
all three samples.

According to the theory sketched in section 2, there
should also be interaction terms with regional differences in
labour demand shocks. The best such measure that we have been
able to discover is $\Delta^2 \ln(N_{SE}/N)$, the rate of acceleration of
the log ratio of employment in the South East to U.K.
employment. Experimenting with lags of this variable and in
interaction with our two mobility related variables produced
only the trace of an effect, not significantly different from
zero.

Although parameter stability and theory consistency are
excellent for the Table 2, column (a) to (c) specification of
the wage equation, one might at first sight be concerned over
the negative residual autocorrelation. While an LM test for
first order autocorrelation is insignificant, combined first
and second order negative autocorrelation are clearly present,
with the partial second order autocorrelation coefficient
somewhat larger than the first. Our interpretation is that we
have a moving average error structure of the form
$\varepsilon_t - \frac{1}{2}(\varepsilon_{t-1} + \varepsilon_{t-2})$ where ε_t is a white noise disturbance.
This corresponds to the idea that an unexplained nominal wage
shock initially raises the real wage but that, over the
following two years, prices adjust to eliminate the real
effect. The effect of an initial nominal price shock is

parallel. The residual autocorrelation, strictly speaking, makes invalid our t-1 instruments used in computing the estimates in columns (a) to (c). However, in such a well fitting equation, the biases in the parameter estimates should be small. In column (d) we report the results of re-estimating the model for 1960-1986 using an iterative procedure. In this we subtract $\frac{1}{2}(e_{t-1}^{(i)} + e_{t-2}^{(i)})$, where $e^{(i)}$ is the residual at the ith iteration, from the right hand side of the wage equation at the (i+1) th estimation of the system. One can show that this produces consistent estimates of the ε's if one starts the iterations with a consistent estimate of the parameter vector. We do not, but as noted above, the bias is unlikely to be large. This conjecture is supported by the fact that this iterative procedure quickly converges, that no trace of residual autocorrelation remains in the transformed equation and by the similarity of the parameter estimates in column (d), based on the 10th iteration, and those in column (a), despite the fact that column (d) is based on a slightly shorter sample.

(d) Alternative hypotheses

We also examine a number of alternative hypotheses. One possibility which has been suggested to us is that a high regional difference in the house price/earnings ratio and a high average house price/wage ratio is merely a symptom of private sector liquidity and that it is this which drives up real wages. However, including lags at t-1 , t-2 and t-3 of real PSL2 in the specifications in Table 1 and Table 2 including house price variables produced nothing significant

even with the most parsimonious form of a real PSL2 effect. However, the rate of change of real PSL2 has important effects on house prices. So it is not surprising that there are significant lagged real PSL2 effects on wages when house prices are omitted from the wage eqution.

It can be argued that the house price/wage variables are a proxy for inflationary expectations which also drive wage demands. A sensitive indicator of inflationary expectations is the consols yield. Let us posit that the consols yield equals a constant real interest rate plus the expectation of inflation over an appropriate horizon plus a factor depending on the U.S. long bond yield. This generalizes the traditional 'Fisher equation'. If we enter lags at $t-1$, $t-2$ and $t-3$ of the U.K. consol yield and the U.S. long bond yield into the specifications in Table 1 which exclude house price/wage ratios, we find a strongly significant effect in the form Δ_2 consol yield$_{-1}$. However, this becomes totally insignificant in the context of Table 2.

Finally, Carruth and Oswald (1986) have suggested profits as 'the missing variable' in the Layard-Nickell model. Using a modified form of the Layard-Nickell model they find a significant positive coefficient on $\ln(RP/K)_{t-2}$ where RP is real company profits and K is the capital stock. We could find no significant effects. Given the identification problem in separating productivity from profit rates, this does not surprise us greatly and does not mean that profits are irrelevant to wage bargaining.

4. Empirical Evidence on Unemployment and Job Vacancies

One of the consequences of restricted labour mobility is
increased mismatch in the labour market and this should be
reflected in a higher level of aggregate vacancies for a given
level of aggregate unemployment. Before the mid 1960s there
seems to have been a fairly stable trade-off in the U.K.
between unemployment and vacancies: as unemployment fell so
job vacancies generally rose, though anti-clockwise loops in
the u-v relationship suggest the presence of some short-run
dynamics. Beginning in the second half of the 1960s, it
appears that major outward shifts in the u-v relationship took
place, generating much controversy about the causes.

As far as the theory of the u-v relationship and shifts
in it is concerned, there are two main strands in addition to
Holt and David's (1966) clarification of how vacancies fit
with stocks and flows more generally in the labour market. In
one strand, discussed in section 2 above, the u-v relationship
is a consequence of aggregation across sectoral labour markets
in various states of excess demand and excess supply. Reduced
labour mobility, an increase in the shocks to which individual
sectors of the economy are exposed and shifts in demography
are then all elements in increased mismatch and so in u-v
shifts. In the other strand of the literature, associated
with Phelps (1970) and finding a most systematic expression in
Pissarides (1985), vacancies and unemployment are seen as a
consequence of the imperfect information held by individual
agents. Workers search for jobs and firms search for workers

to fill particular job slots. The longer that searching, unemployed workers hold out for a satisfactory offer of a job package embodying wages and other conditions, the larger the number of aggregate vacancies and unemployed workers which can co-exist. One possible cause of an outward shift in the u-v relationship would be an increase in the ratio of unemployed benefits to wages since this would enable an unemployed worker to search longer in the hope of finding a satisfactory offer.

No doubt there are elements of truth in both strands in the theoretical literature. As far as controversies about the behaviour of vacancies in the U.K. are concerned,[*] another important ingredient has been the question of systematic measurement errors in the vacancy and unemployment statistics. It is believed that officially recorded vacancies represent only about one third of total vacancies. Jackman, Layard and Pissarides (1984) have suggested a method of estimating the proportion by measuring the average of the ratios of vacancy inflows to separations (i.e. the number of workers leaving jobs) and vacancy outflows to engagements. As long as the ratio of durations of official and unofficial vacancies does not alter, the adjusted vacancies series that results is at least proportional to true total vacancies. Following Layard and Nickell (1986), we use an adjusted vacancies series. Similarly, we use their unemployment definition which refers to prime aged men and has been adjusted for the many definitional changes that have taken place since 1979.

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[*] These controversies, as well as the basics of the theoretical background, are well reviewed by Roper (1986).

Chart 3 displays the empirical relationship between ln u and v for 1955-1986. We choose lnu since visually its relationship with v approximates linearity more closely than does the relationship of u and v .* The graph suggests that the much discussed outward shift in the u-v curve around 1966-8 did indeed take place. There seem to have been further shifts in the mid 1970s and since 1981. Subject to these shifts, there is some evidence of anti-clockwise loops.

Estimates of our model are given in Table 3, whose columns are labelled similarly to those of Table 2. These are the 3SLS estimates corresponding to those in Table 2, and the equation standard errors and t-ratios have been corrected for degrees of freedom. The loops are reflected in the lagged values of v and lnu . M_3YO_t is a moving average of YO_t , the change between t and t+1 in the number of people in the population aged 20-24 deflated by the labour force as defined by Layard and Nickell (1986). Somewhat analogous variables were used by Foster (1974) and Bewley (1979) on the hypothesis, clearly supported here, that increased flows of inexperienced and often unskilled young people into the labour force increase unemployment without reducing vacancies by very much. The moving average of the lagged adjusted benefit/wage ratio BWA is also significant, supporting the search hypothesis discussed above.

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* Empirical evidence using the Box-Cox transformation tends to confirm this.

The housing variables enter in the form of the same
lagged moving average of the regional difference in the house
price/earnings ratio which appears in the wage equation and
the same index of mobility MOBR based on the prevailing
housing tenure structure and incorporating the effects of the
Rents Acts. Let us examine the estimation of the parameters
in MOBR in detail. As explained on p. 15-16 above, for the
five θ_i parameters we have one exact and one approximate
equality restriction and a number of inequality restrictions.
The parameters θ_4 and θ_5 are associated with pre-1965 and
post-1974 dummies respectively and given the risk in aggregate
time series of picking up spurious effects though dummies, we
decided to impose the restriction $\theta_4 = \theta_5$. This means that
the reduction in mobility in the unregulated, uncontrolled
parts of the unfurnished and furnished sectors caused by the
two Rent Acts is assumed to be the same in each sector. The
point estimate is 1.5. This implies that the relative
migration rate of 3.2 before the 1974 Rent Act in the
furnished sector fell to 1.7 as a result of the Act.

It is highly implausible that in the uncontrolled,
unregulated unfurnished sector, migration would have been
greater than in the unregulated furnished sector i.e.
$\theta_3 + \theta_4 \doteq 3.2$. In the event, this restriction proved to be
binding and so we imposed it. Since $\theta_4 = 1.5$, this gives
$\theta_3 = 1.7$. We know that $0.295\theta_1 + 0.19\theta_2 + 0.515\theta_3 = 1.23$ in
order to reproduce the 1973 estimate of a relative migration
rate in the unfurnished sector of 1.23. The point estimate
of θ_2 is 0.8 but is very imprecisely determined with a
standard error of 0.6. $\theta_2 = 0.8$ implies $\theta_1 = 0.69$ which

seems to us a little high, implying little difference between the migration rates in the regulated (θ_2) and the controlled (θ_1) unfurnished sectors. A value of $\theta_2 = 1$ implies $\theta_1 = 0.55$ and that seems to us more plausible. Since $\theta_2 = 1$ is easily acceptable statistically, we imposed this restriction. Given all these restrictions, the effect of the mobility index as a whole on the u/v trade off is quite precisely determined with a coefficient of -2.02.

Figure 4 gives a visual impression of the contribution of this mobility index and of the other determinants of the position of the u/v curve using the Table 3, col. (d) estimates. The position of the u/v curve adjusted for loops can be defined as $\ln u + 27.8v + 8.3v_{-1} - 0.49 \ln u_{-2}$ and this is shown in panel (a). Panel (b) shows the contribution of the mobility index, $-2.02\, M_3 MOBR_{-1}$. Note the declining effect (i.e. increasing mobility) from 1958-1965 as the controlled unfurnished sector shrank and owner occupation expanded, followed by a substantial reversal after the 1965 Rent Act. The slight increase in estimated mobility since 1983 seems to be the result of the declining share of the council house sector. Panel (c) shows the contribution of the regional house price/earnings difference $13.0\, M_3 RD_{-1}$. In the early 1960's this offsets the mobility increases resulting from housing tenure changes. The expansion of owner occupation was then accompanied by substantial increases in RD . Panel (d) shows the effect of demographic change as measured by $26.6\, M_3 YO$. Since the late 1960's, it and RD have dominated the position of the u/v curve, according to our estimates. Note the trough in 1972-3 in the entry of young

TABLE 3

The unemployment/vacancies trade-off for 1958-1986. Dependent
variable is lnu

	(a)	(b)	(c)	(d)
* v	-27.9 (35.1)	-26.6 (16.8)	-26.7 (20.4)	-27.8 (32.6)
v_{-1}	-8.1 (13.3)	-7.9 (9.6)	-8.1 (8.1)	-8.3 (10.1)
lnu_{-2}	0.48 (30.6)	0.42 (6.4)	0.48 (27.6)	0.49 (27.8)
M_3YO	26.9 (14.4)	22.9 (4.12)	23.8 (8.3)	26.6 (13.0)
M_3BWA_{-1}	0.69 (2.68)	0.47 (1.3)	0.31 (0.8)	0.70 (2.50)
M_3RD_{-1}	12.9 (20.0)	11.2 (6.5)	13.8 (15.7)	13.0 (17.9)
M_3MOBR_{-1}	-2.04 (17.4)	-2.01 (15.5)	-2.21 (13.0)	-2.02 (12.7)
θ_4	1.50 (50.4)	1.42 (15.7)	1.48 (44.3)	1.51 (45.1)
se	0.02617	0.02590	0.02617	0.02784
$\overline{R}^2$	0.9989	0.9989	0.9989	0.9989
SSE	0.01302	0.00872	0.01096	0.01318
DW	2.30	2.81	2.13	2.27
no. of observations	29	29	29	27
no. of instruments	19	25	22	20
D73	-	-	0.003 (0.2)	-
D74	-	-	-0.004 (0.3)	-
D75	-	-	0.001 (0.0)	-
D80	-0.10 (3.4)	-0.07 (1.7)	-0.09 (2.3)	-0.10 (3.1)
D81	-	0.05 (1.0)	-	-
D82	-	0.06 (0.9)	-	-
D83	-	0.05 (0.6)	-	-
D84	-	0.06 (0.7)	-	-
D85	-	0.10 (1.0)	-	-
D86	-	0.14 (1.3)	-	-

Notes: u = male unemployment rate, v = adjusted vacancy rate, YO = new labour market entrants/labour force, BWA = adjusted benefit/wage ratio, RD = weighted, normalized South East/U.K. differences in $\ln(HP/WN)$ where WN = earnings of non-manual males, HP = house price index, MOBR = mobility index based on housing tenure and Rent Act provisions.

M_i denotes moving average of order i .

* indicates an endogenous variable

people into the labour market with peaks in the late 1960's
and in the early 1980's. In 1987 and 1988 a further decline
in the entry of young people will partly offset the strong
upward shift in the u/v curve coming from RD. The variations
in the benefit/wage ratio, also shown in panel (d), were a
relatively minor influence.

One surprising feature of our results is the absence of a
significant effect from the change in mismatch which was quite
strong in the wage equation. We suspect that, in part, this
may be a consequence of shocks in wages and in demand. Such
shocks have a more immediate influence on vacancies than on
unemployment so that an upward wage shock or a negative demand
shock drives down vacancies faster than it pushes up
unemployment, resulting in a temporary <u>negative</u> unemployment
residual. Evidence for this view comes from the negative
correlation of residuals from the u/v equation with residuals
from the wage equation and with labour demand shocks such as
the rate of acceleration of world trade. If such shocks also
increase the change in mismatch, it would be hard to pick up a
positive effect from the change in mismatch. The biggest of
these shocks occurred in 1980 when the biggest increase in
indirect taxation in the post war period, large public sector
wage settlements, a tight monetary and so competitiveness
squeeze and tight fiscal policy all coincided. We have
included a 1980 dummy to pick up this effect in the u/v
equation but even this is not sufficient to give a
significantly positive effect from the change in mismatch.
Nevertheless, the evidence from LM tests of residual
autocorrelation and the stability tests shown in Table 3 are
satisfactory.

5.   Summary and Discussion

(a)   A summary of the empirical findings

The account of wage determination which arises from our work is strikingly different from that in Layard and Nickell (1986) though it supports the emphasis on unemployment hysteresis in Nickell (1987). The main points can be summarized as follows.

(1)   The deviation of the real product wage from the productivity trend is more responsive to changes than to levels of unemployment, though there is a significant levels effect. This is consistent with hysteresis and most accounts of insider-outsider theory.

(2)   Given our sectoral labour markets framework, it follows that if changes in excess demand are important then so will be changes in mismatch, or more precisely, the sectoral dispersion of excess demand changes. This is precisely what our evidence indicates.

(3)   On mobility, we have evidence that wage pressure is related to an index of mobility based on the tenure structure of housing derived from Hughes and McCormick's (1981) cross section evidence and from the effects of the two Rent Acts. However, in the last 20 years, variations in the lagged regional house price/earnings difference have been quantitatively more important.

(4) It is probable that the regional house price/earnings difference also represents the greater power of workers in areas of higher labour demand to obtain compensation for the higher local cost of living. It may also, in part, be a proxy for regional differences in labour demand shocks.

(5) However, there are two strong pieces of evidence to suggest that this proxy role is unimportant and that the mobility factor is important. One is the decisive role of the regional house price/earnings difference in determining net regional migration. The other is the important role of macroeconomic variables such as income growth, liquidity growth, interest rates and demographics relative to regionally specific labour demand variations in determining the regional house price/earnings differences.

(6) Average house prices in the U.K. appear to be a significant part of the 'wedge' between the cost-of-living and producer prices. However, our evidence suggests that Layard and Nickell (1986) and Nickell (1987) have overestimated the real raw material price and labour tax components of the wedge. The former we find has only a temporary effect and the latter none at all.

(7) We find union power to have an important and strongly significant effect on wage pressure, though empirically union density out-performs the theoretically more

satisfying union/non-union mark-up. We suspect that this is because of deficiencies in estimates of the latter in the 1980s.

(8)   We find negative feedbacks from the lagged two year rate of change of the real wage and before 1980 from the lagged one year rate of change. We interpret the latter as an incomes policy effect, being consistent with the notion that incomes policy, abolished in 1979, only had transitory effects. The former, we argue reflects the lagged response of wages to price shocks and prices to wage shocks which also appears as a negative feedback to unexplained real wage shocks in the previous two years.

(9)   We find traces of a direct effect from international competitiveness on real wages.

A visual impression is given in Figure 5 of the quantitative contribution of the different terms, to the dependent variable, w^* shown in panel (a). w^* is the manual wage deflated by a price deflator for value added and is adjusted for trend productivity growth. Note that vertical distances in Figure 5 when multiplied by 100 give percentage deviations of w^* and that each panel is on the same scale. Panel (b) shows the combined effect of the level and rate of change of unemployment and of the change in mismatch weighted by their respective coefficients estimated in Table 2, column (d). Panel (c) illustrates the effect of union density and the mobility index and panel (d) that of the combined effect

of the two house price/earnings measures. The level of
unemployment and, even more so its rate of change had a major
effect on the real wage though the increase in mismatch in the
early 1980s offset the downward pressure to a remarkable
degree. The net result was only very modest downward pressure
on the productivity trend adjusted real product wage.
Similarly, union density is a major influence on the real
manual wage: the increase from the mid 1960's to the peak at
1979 implies a 3.6% increase in the real wage. The recent
increases in the house price/earnings measures shown in Figure
2 imply a 4.4% increase in the real wage over the period 1984-
1988. But the decline in union density and an unemployment
level which still remains high, have offset much of this
upward pressure. However, the speed of the decline in
unemployment in 1987 and 1988 will negate some of this offset.

In the unemployment/vacancies trade-off we find
supporting evidence on the role of the regional house
price/earnings differential and the measure of mobility based
on housing tenure. We also find positive effects from the
proportion of young entrants in the labour market and from the
benefit to wage ratio, as predicted by search theory. See
Figure 4 above for a visual display of the main determinants
of the position of the u/v curve. Since the late 1960's these
have been the regional difference in the house price/earnings
ratio and the rate of inflow of young people into the labour
force.

The joint evidence from the two equations is consistent
with our theoretical interpretations. We have also subjected
these equations to a battery of specification tests and tests

of alternative hypotheses. They pass these tests remarkably well. This is so even for the wage equation which fits so well compared with earlier work in the field. It is also clear that the importance of the house price variables is robust to the removal of the various elaborations and sophistications embodied in the final wage equation.

(b) The validity of our interpretation

Let us turn now to the issue of the validity of our interpretation of these results. In our research on the determinants of UK house prices, see Muellbauer and Murphy (1988), we find that the house price/wage ratio in the steady state depends on real personal disposable income, the stock of owner occupied housing, on after tax real interest rates and on the steady state growth rates of per capita real disposable income and of real personal sector liquidity. In the dynamics we also find evidence for an increased liquidity response after 1981 and a response to the entry of the banks into the mortgage market which, after 1981, effectively ended mortgage rationing. There are also demographic and net external migration effects, and a negative response to past overshooting of house prices relative to nominal income. We also find evidence of extrapolative expectations in that the lagged real own rate of return (house price inflation minus the tax adjusted interest rate) has a positive effect on current house price increases.

There are similar factors at work on the difference between the South East and the U.K. in the house price/non-manual male earnings ratio. In the dynamics, similar

aggregate demographic and external net migration effects, a
liquidity effect, a response to the entry of the banks into
the mortgage market, a positive response to the aggregate
current and lagged real own rate of return in housing and a
negative response to past overshooting of aggregate house
price relative to nominal income are present. There is also a
differential labour demand shock effect but it explains only a
small part of the variance, despite our searching long and
hard for variables that would enhance the size of this effect.

These results amply demonstrate the role of <u>aggregate</u>
housing demand variables in explaining regional differences in
house price/earnings ratios. Direct evidence on migration by
Zabalza (1978), the work on Scottish migration by Harrigan,
Jenkins and McGregor (1986) and our own preliminary
investigations of net migration for the South East further
supports our mobility interpretation of the regional
difference in the house price/earnings ratio. It is therefore
very hard to accept the proposition that regional differences
in house price/earnings ratios are <u>merely</u> symptoms of
regionally differentiated labour demand shocks. This is not
to say the latter play no role, however.

Some sceptics have suggested to us that recorded regional
net migration flows are so small in relation to the mismatch
between vacancies and unemployment that variations in mobility
can have little impact on the unemployment - vacancies trade-
off and on wage pressure. Such sceptics therefore doubt the
mobility interpretation of the regional house price/earnings
differential and of our mobility index which incorporates the
changing tenure structure and the effects of the Rent Acts.

As far as the wage equation is concerned, we have already noted that theory is confirmed by empirical evidence suggesting that changes in both unemployment and mismatch are more important than stocks of these in generating wage pressure. This means that migration flows do not have to be huge to have important consequences. Since 1961, peak net migration occurred in 1973 when there was a net loss of 69,000 people from the South East. Given the tightness of the South East labour market at the time, it is plausible indeed that this outflow would have contributed significantly to short term wage pressure and regional mismatch.* Furthermore, it is plausible that the types of workers whose mobility is restricted by regional house price differentials are the more skilled and more highly paid. Not only do these have a bigger weight in the wage index but they may also be of greater strategic importance in determining the pattern of pay increases.

Another objection to the argument of the sceptics is the excessively homogeneous notion of labour and of jobs implicit in it. Efficient matches of people with jobs will often suggest the move of a particular person from the South East to a particular vacant job outside the South East even if, on the average, there is a higher job vacancy rate in the South East. In other words, the gross migration flows in each direction are also important and these are large relative to stocks of vacancies. Also we suspect that the house price differential between London and the South-East and the U.K. average is a

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* Though, as noted below, part of it was surely due to jobs shifting outside the South East because of higher costs and labour shortages faced by firms there.

good proxy* for within region differentials between areas of more and less buoyant labour demand and therefore has a bearing on within as well as between region mobility.

However, let us consider some alternative explanations of our empirical results. We have already discussed one in detail and dismissed it as the dominant explanation: that the regional house price/earnings differential is merely a symptom of regional differences in labour demand shocks. Another was discussed in Section 3: that the regional house price/earnings differential is just a proxy for shocks to inflationary expectations. A measure of such expectations derived from consol yields contributes nothing significant relative to our equations. Also, if inflationary expections are the driving force, it seems odd that shocks at an average lag of two years should drive up _real_ wages: why are prices, which are often believed to be more flexible, not more responsive than wages to these changes in expectations?

A third alternative possibility is that London and the South East are a kind of leading sector in the process of wage settlements and that widening house price differentials are merely a proxy for widening wage differentials. This is immediately shot down by our finding a _negative_ coefficient on the regional wage ratio both in the unemployment-vacancies relationship and in the real wage equation when we enter lags of it and of the regional house price ratio separately. This

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* It can, in any case, be regarded as a proxy for a more general measure of regional house price dispersion. For 1968-1983, the standard deviation of log house prices across regions correlates very highly with the log difference of house prices in the South East relative to the U.K.

is consistent with our mobility interpretation. However, we have already argued for an alternative version of this line of thought based on the idea that house prices exert pressure on wages through a cost of living effect which operates first in London and the South East. The fact that average U.K. house prices appear to have a cost of living role gives credence to this as an element in the story.

A fourth alternative story not so far discussed goes like this. We know that house prices in London and the South East tend to lead the U.K. average. A widening differential signals more general house price inflation which, with a lag, is associated with an increase in house building activity nationally. The increased activity reduces unemployment among construction workers and drives up their earnings which are part of the over-time corrected measure of wages we are modelling. One could argue that this effect should operate fully through the unemployment rate which is already part of the model. But there is a counter argument. It seems plausible that a major part of the 'black economy' is linked to the construction and renovation of private housing. Thus, it might be argued, when this activity picks up, a larger proportion of the registered unemployed are in fact working, though illicitly. The unemployment statistics then overstate true unemployment. There could also be a related effect on wages more generally if one regards earnings in this part of the black economy as being an important part of the effective reservation wage of job seekers in the formal economy. On this interpretation, our empirical models and forecasts could be perfectly valid, though the policy conclusions would be different.

Almost by definition, this interpretation is difficult to follow up further since direct statistics on the black economy do not exist. The best hope of distinguishing this from the labour mobility hypothesis is in investigating the evidence on labour mobility directly.

(c) How housing and labour markets interact

Let us then try to summarize our views about the implications of the structure of U.K. housing markets for labour markets, mismatch and wage pressure. First, we agree with the case strongly argued by Hughes and McCormick, Minford and others that the absence of a rented sector ruled by freely undertaken contracts is a major explanation of the low rates of labour mobility in the U.K., especially among manual workers, in comparison for example with the U.S. We suspect, that the system of allocating council houses similarly restricts mobility though its role may sometimes have been overstated by neglecting the function of council housing as housing of last resort for households who are of little significance for the functioning of labour markets.

As far as the owner-occupied housing market is concerned, let us acknowledge at the outset the allocative role of house prices in the long run. Then, relatively higher house prices in the South East create an incentive for a greater housing supply to be forthcoming there and for households to locate elsewhere. Higher wages in the South East partly, according to our research, a (lagged) consequence of higher house prices, give firms an incentive to locate elsewhere. We agree

therefore with Patrick Minford[*] that, in the long run, high house prices and wages in the South East "are the Liverpool unemployed's best friend". However, we believe that there are important dynamic distortions with long lasting consequences akin to unemployment hysteresis, which are caused by the various institutional distortions surrounding owner occupied housing. There are major tax incentives which favour it compared with other financial assets and with supplying or buying rented accommodation. These include mortgage interest tax relief, the absence of capital gains tax on the household's main residence and the weak link of property taxes to market values, a link now to be broken altogether with the abolition of domestic rates. The other institutional distortion is planning or zoning controls, though these are present in virtually all countries and can be defended on other grounds.

Important implications follow from these institutional distortions. First, we agree with the authoritative assessment of Holmans (1987), that the decline of the rented sector owes as much or more to the institutional distortions favouring owner occupation than to the institutions of rent and tenure control in themselves. Second, these distortions artificially raise the portfolio returns on owner occupation relative to other assets with profound implications in economic upswings, especially when these are accompanied by rapid growth in real financial liquidity. Before 1982 and

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[*] Personal communication.

outside the 'Barber Boom' or 'Competition and Credit Control' period in 1970-73, the aggregate supply of mortgages was effectively rationed, keeping some control on the often insatiable demand for these tax advantaged portfolio returns.

In economic upswings in which liquidity grows strongly, the response of U.K. house prices to growth of income and liquidity results in high own-rates of return in owner occupied housing which further stimulates demand. Even in the absence of exogenously more rapid economic growth in the South East, as undoubtedly experienced in much of the 1980's, a greater national housing demand tends not only to raise national house price/earnings ratios but to widen the South East's ratio relative to the rest of the U.K. We suggest this is because housing supply is less elastic in the South East than elsewhere. Both elements have cost of living implications for wage pressure but, we believe, also have mobility implications for labour market mismatch, for the level of unemployment at given vacancies and for wage pressure.

We see the 'mobility trap' caused by an upswing in aggregate housing demand and the resulting relative appreciation of house prices as follows. As the relative appreciation gathers pace, households in the South East initially will become more reluctant to move to other areas. This is because they would miss out on the further relative appreciation they expect and fear that they may not be able to bridge the house price gap should they subsequently wish to return to the South East. Thus, relatively few housing slots

are freed for potential migrants to the South East. This tends to increase the relative appreciation further. As it continues, households outside the South East become increasingly unable to bridge the gap between whatever equity stake they may already have in housing and the price of a house in the South East.

As the house price/earnings differential approaches a peak, outward migration from the South East increases. At the same time, the credit constraint for potential migrants to the South East reaches a maximum. Also, by this time, additional new housing in the South East will have been built. This situation cannot persist and it becomes increasingly vulnerable to adverse shocks to housing demand. In due course, a rapid fall, as in 1973-5, of the South East's premium in the house price/earnings differential takes place as speculative expectations reverse. The rapidity of the fall is likely to be influenced by the initial reluctance of households outside the South East to invest in an expensive asset with a lower or negative prospective rate of return compared with their present housing. The peak and the early part of this post-peak phase is likely to be a particularly uncomfortable one for firms in the South East trying to hold on to or to hire workers and, unless labour demand in the South East is slackening off, is likely to be associated with strong wage pressure there. We think it no coincidence that 1973 saw a 25 year peak net outflow from the South East of 69,000 and that large outflows also occurred in 1974 and 1975.

It would be quite wrong, however, to regard these outflows as entirely perverse. It seems likely that a substantial part of these moves was the result of firms altering the pattern of job location, reacting to high wages, labour shortages and the high cost of land in the South East. Whether the outflows are household led or firm led, eventually, the situation stabilizes at a more normal regional house price/earnings differential. However, we regard the cost in economic dislocation, job mismatch and inflationary pressure of this kind of dynamic process as large. In the short run, it can distort the allocative function of wage changes. Wage increases in the South East, quickly followed by even larger house price increases there, can, perversely, give labour in the South East an incentive to leave the South East and, given credit rationing, be relatively ineffective in attracting new workers. This suggests that firms have to bear the brunt of the resource allocation shifts engendered by this interaction of housing and labour markets. The way housing markets currently operate is likely to deny many of the incentive and flexibility benefits of the renewed trend to localized pay bargaining.

(d) Policy conclusions

To reiterate, the central problem, as we see it, is the fiscal bias in favour of owner occupation which greatly raises the portfolio return to housing compared with that which would prevail in a neutral tax system. The consequences reach beyond labour markets. It is hard to deny that consumer

expenditure is influenced by house prices, partly because of the wealth effect and partly, especially with the liberalization of consumer credit in the 1980's, because of the credit released by being able to borrow on the basis of housing collateral. There are therefore implications for aggregate consumer expenditure and imports which have their own inflationary implications. However, we suspect that these consumer expenditure effects also have implications for regional dynamics. We have argued that an increase in aggregate housing demand tends to result in greater short run house price increases in the South East. The greater increase in consumer expenditure which results there has, we suspect, a regional employment multiplier effect which feeds back, via a greater increase in housing demand in the South East, onto house prices in the South East.

These various tendencies to overshooting have been exacerbated by the liberalization of credit markets in the 1980's and would, we believe, be reduced by a more neutral tax system. We suspect, therefore, that part of the South East boom in the middle to late 1980's is a short term phenomenon made possible by tax distortions. This is not to deny, of course, such factors as the relative decline of manufacturing and the prospective increase in European economic integration as important factors in explaining relatively more rapid growth in the South East. There can be little doubt, however, that a more neutral tax system would ameliorate the economic pressures from these tendencies and result, especially in the short and medium run, in more balanced economic development.

References

Bean, C.R. and A. Gavasto (1988), "Outsiders, capacity shortages and unemployment in the U.K.", Centre for Labour Economics, working paper no. 1058, London School of Economics.

Bean, C.R., P.R.G. Layard and S.J. Nickell (1986), "The rise in unemployment: a multi-country study", Economica, 53, supp. p. S1-22.

Bewley, R.A. (1979), "The dynamic behaviour of unemployment and vacancies in Great Britain 1958-1971", Applied Economics, 77, 303-308.

Blanchard, O. and L. Summers (1986, "Hysteresis and the European unemployment problem", Cambridge, Mass: MIT Press, NBER Macroeconomics Annual.

Bruno, M. and J. Sachs (1985), The Economics of Worldwide Stagflation, Oxford: Basil Blackwell.

Carruth, A.A. and A.J. Oswald (1987), "Wage inflexibility in Britain", Oxford Bulletin of Economics and Statistics, 49, 59-78.

Clark, W.A. and W.F. Van Lierop (1986), "Residential mobility and household location modelling", in P. Nijkamp (ed.) Handbook of Regional and Urban Economics, vol. 1, Amsterdam: North Holland.

Foster, J.I. (1974), "The relationship between unemployment and vacancies in Great Britain (1958-72): Some further evidence", in Laidler, D. and Purdy, D.L. (eds.), Inflation and Labour Markets.

Greenwood, M. (1975) "Research on internal migration in the U.S.: a survey", Journal of Economic Literature, 13, 397-433.

Hansen, B. (1958), The Economic Theory of Fiscal Policy, London: Allen and Unwin.

Hansen, B., (1970), "Excess demand, unemployment, vacancies and wages", Quarterly Journal of Economics, 83, 1-23.

Harrigan, F.J., J. Jenkins and P.G. McGregor (1986), "A behavioural model of migration: an evaluation of neo-classical and Keynesian alternatives", Discussion Paper 42, Fraser of Allander Institute, University of Strathclyde.

Hendry, D.F., (1984), "Econometric modelling of house prices in the U.K." in D.F. Hendry and K.F. Wallis (ed.), Econometrics and Quantitative Economics, Oxford: Basil Blackwell.

Holmans, A.E. (1987), Housing Policy in Britain: A History, London: Croom Helm.

Holt, C.C., and M.H. David (1966), "The concept of job vacancies in a dynamic theory of the demand for labour" in Universities - NBER, The Measurement and Interpretation of Job Vacancies.

Hughes, G.A. and B. McCormick (1981), "Do council housing policies reduce migration between regions?", Economic Journal, 91, p. 919-39.

Hughes, G.A. and B. McCormick (1985), "Migration intentions in the U.K.", Economic Journal, 95, Conference Papers Supplement, p. 113-123.

Hughes, G.A. and B. McCormick (1987), "Housing markets, unemployment and labour market flexibility in the U.K.", European Economic Review, 31, 615-641.

Jackman, R., R. Layard and C. Pissarides (1984), "On vacancies", London School of Economics, Centre for Labour Economics, Discussion Paper 165, (revised).

Jackman, R. and S. Roper (1987), "Structural unemployment", Oxford Bulletin of Economics and Statistics, 49, 9-36.

Layard, P.R.G. and S.J. Nickell (1985), "The causes of British unemployment", National Institute Economic Review, 111, p. 62-85.

Layard, P.R.G. and S.J. Nickell (1986), "Unemployment in Britain", Economica, 33, supp. p. S121-170.

Lindbeck, A. and D. Snower (1985), "Explanations of unemployment", Oxford Review of Economic Policy, 1, Summer, p. 34-59.

Lindbeck, A. and D. Snower (1987), "Union activity, unemployment persistence and wage-employment ratchets", European Economic Review, 31, 157-167.

Minford, P., M. Peel and P. Ashton (1987), "The Housing Morass", Institute of Economic Affairs, London.

Muellbauer, J. (1986), "Productivity and competitiveness in British manufacturing", Oxford Review of Economic Policy, vol. 2, Autumn, i-xxv.

Muellbauer, J. and A. Murphy (1988), "The determination of house prices in the U.K. and in the South East", in preparation.

Pissarides, C.A. (1985), "Short-run equilibrium dynamics of unemployment, vacancies and real wages", American Economic Review, September.

Robertson, G. (1979), Housing Tenure and Labour Mobility in Scotland, Scottish Economic Planning Dept., Edinburgh.

Roper, S. (1986), "The economics of job vacancies", London School of Economics, Centre for Labour Economics, Discussion Paper 252.

Sheppard, D.K. (1971), The Growth and Role of U.K. Financial Institutions, 1880-1962, London: Methuen and Co.

Todd, J.E., M.R. Bone and I. Noble (1982), The Privately Rented Sector in 1978, Office of Population Censuses and Surveys, Social Survey Division, H.M.S.O.

Zabalza, A. (1978), "Internal labour mobility in the teaching profession", Economic Journal, 88, 314-330.

Data Appendix

HP, HP$_{SE}$ House prices

From 1968 Q2 we used the mix-adjusted Department of the Environment series of second-hand house prices based on a 5% sample of building societies. Before 1968 Q2 we used mix-adjusted indices of second-hand house prices kindly provided by the Nationwide Building Society. These are on a mortgage advances basis while the DOE series are on a completions basis and so lag behind. To splice the two series together both for the U.K. and the SE/UK log ratio, we fitted quarterly regressions for 1968 Q2 to 1975 Q4 and used these regression to project the DOE series back to 1954.

RWN   Non-manual male earnings in SE relative to U.K.

In April of each year and refers to weekly earnings. For 1970-1986 from New Earnings Surveys. Before 1970, derived from fitted value in a regression on the weekly manual male earnings ratio (for April, from Historical Abstract of British Labour Statistics (HABLS) and Department of Employment Gazette (DEG), and other variables. The standard error for this regression of lnRWN for 1971-1986 was 0.0019. The manual male earnings ratio is available back to 1960. The 1958 Census of Production suggests a value the same as that for 1962. We interpolated 1959 and projected the manual male earnings ratio for 1954-1957 on the basis of a regression, s.e. = 0.0055, fitted for 1959-1986.

YO New labour market entrants

The change in the number of U.K. residents aged 20-24 between t+1 and t divided by the average labour force over t-1 , t and t+1 . Source: Annual Abstract of Statistics, labour force defined as in Layard and Nickell.

MOBR Mobility index

See p. 14-16 above for precise definition. Tenure proportions in the MOB component came from the Family Expenditure Survey. PCU, PRU, PUU for 1963-1981 were kindly supplied by Paul Ashton of Liverpool University. PCU before 1963 was based on interpolations of figures in Todd, Bone and Noble (1982) and PRU after 1981 was based on our own interpolation of data in Housing and Construction Statistics, Table 11.5

UD Union density

U.K. union membership relative to employees in employment, from DEG.

N_{SE}/N Ratio of employees in South East relative to Great Britain

Source: DEG Historical supplement, 1975 DEG, HABLS.

v   Adjusted vacancies

   This uses a new series of the adjustment factor   λ
computed by Stephen Roper and Jonathan Haskel. This differs
somewhat from the series used in Layard and Nickell.

BWA Adjusted benefits/wage ratio, see p. 23-24.

HPW Log house/price wage ratio, weighted and normalized see
p. 26 for precise definition.

RD Regional difference in house price/non-manual earnings
ratio weighted and normalized. See p. 26 for precise
definition.

u Male unemployment rate

   As in Layard and Nickell (1986) but from 1982 derived
from estimates provided by the Unemployment Unit which adjust
the figures for the many redefinitions which have taken place.

RPSL Real private sector liquidity (PSL2) at year end.

   Source: Economic Trends Annual Supplement from 1963.
Before 1963, this series was spliced to 'total quasi-money',
see Table (A) 3.3, p. 183), Sheppard (1971).
   The remaining variables are just as in Layard and Nickell
(1986), updated appropriately. See notes to Table 1 for
explanation of their names.

Lists of instruments used

<u>Table 1</u> col (i): constant, $\ln u_{-1}$, $(u_{52}/u)_{-1}$, DMM_{-1}, $BW(-1)$, $\Delta v \ln(Pm/\overline{P})$, $v\ln(Pm/\overline{P})$, $(\ln Up)_{-1}$, lt_{-1}, DDW^{*}_{-1}, w^{*}_{-1}, $\Delta \ln N_{-1}$, $\ln(P^{*}/\overline{P})_{-1}$, AD_{-1}, $\Delta \ln WE_{-1}$, $\Delta \ln RSPL_{-1}$, $D80$

where N = UK employment, AD= adjusted public sector deficit, WE = volume indicator of world exports as in Layard and Nickell (1986).

col (ii): as col (i) plus $\ln u_{-2}$ and with $(\ln Up)_{-1}$ replaced by $M_2 \ln UD_{-1}$ and $BW(-1)$ replaced by $M_2 BWA_{-1}$.

col (iii): as col (ii) without $(u_{52}/u)_{-1}$, lt_{-1} and adding $\Delta \ln(P^{*}/\overline{P})_{-1}$.

col (iv): as col (iii) plus $M_2 HPW_{-2}$ and $M_3 RD_{-1}$.

<u>Table 2 and Table 3</u> col (a): constant, $M_2 \widehat{\ln}u$, $\Delta_3 \widehat{\ln}u$, $M_2 \widehat{D}MM$, $\hat{v}$, $\ln u_{-2}$, v_{-1}, $M_3 YO$, $M_3 BWA_{-1}$ $M_3 RD_{-1}$ $M_2 HPW_{-1}$, $M_2 \ln UD_{-1}$, $\Delta_2 w^{*}_{-1}$, DDW^{*}_{-1}, $\Delta v \ln(Pm/\overline{P})$, $\Delta \ln(P^{*}/P)_{-1}$, $D80$ and two instruments which capture the part of $M_3 MOBR_{-1}$ which is independent of θ_4 and the part which is dependent on θ_4. $M_2 \widehat{\ln}u_2$ $\Delta_3 \widehat{\ln}u$, $M_2 \widehat{D}MM$ and $\hat{v}$ are fitted values obtained from fitting with a subset of instruments in Table 1, col (iv).

For col (b) and (c) the relevant dummies are added to the instrument set.

For col (d), the instrument set also includes $\frac{1}{2}(e_{-1} + e_{-2})$ where e is the wage equation residual from the previous iteration.

Note that we include $\Delta v \ln(Pm/\overline{P})$ as an instrument. The argument for doing so is that variations in it are dominated by exogenous shocks. Replacing it by its fitted value leads to some deterioration in parameter stability in Table 2, col (b) and (c) but otherwise very little change.
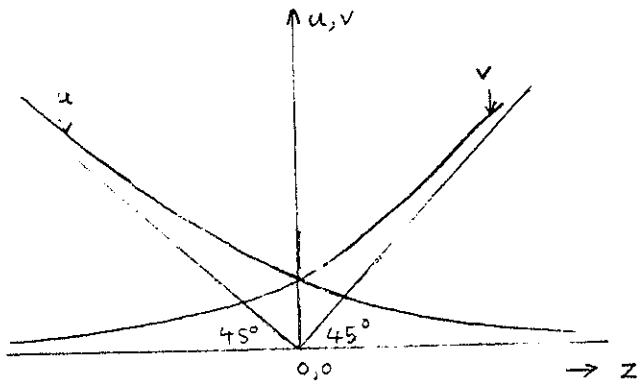
Figure 1: the relation between unemployment, vacancies and aggregate excess demand

Note that reducing sectoral dispersion σ brings the u,v curves closer to their asymptotes.

Figure 2 : the house price/wage ratio and the regional house price/earnings difference.   In logs, weighted by owner-occupancy.
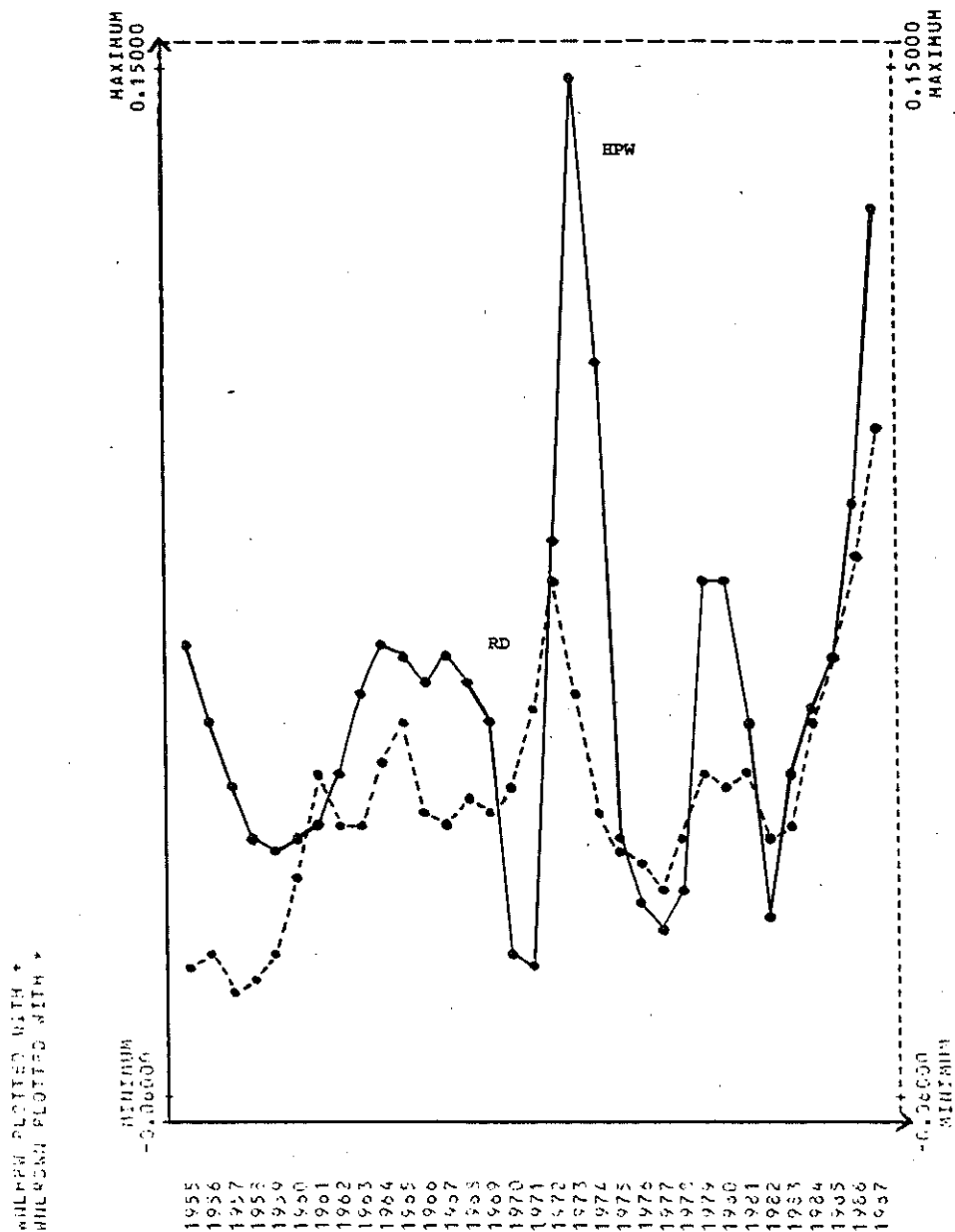
Figure 3 : the trade-off between the log unemployment rate and the adjusted vacancy rate.
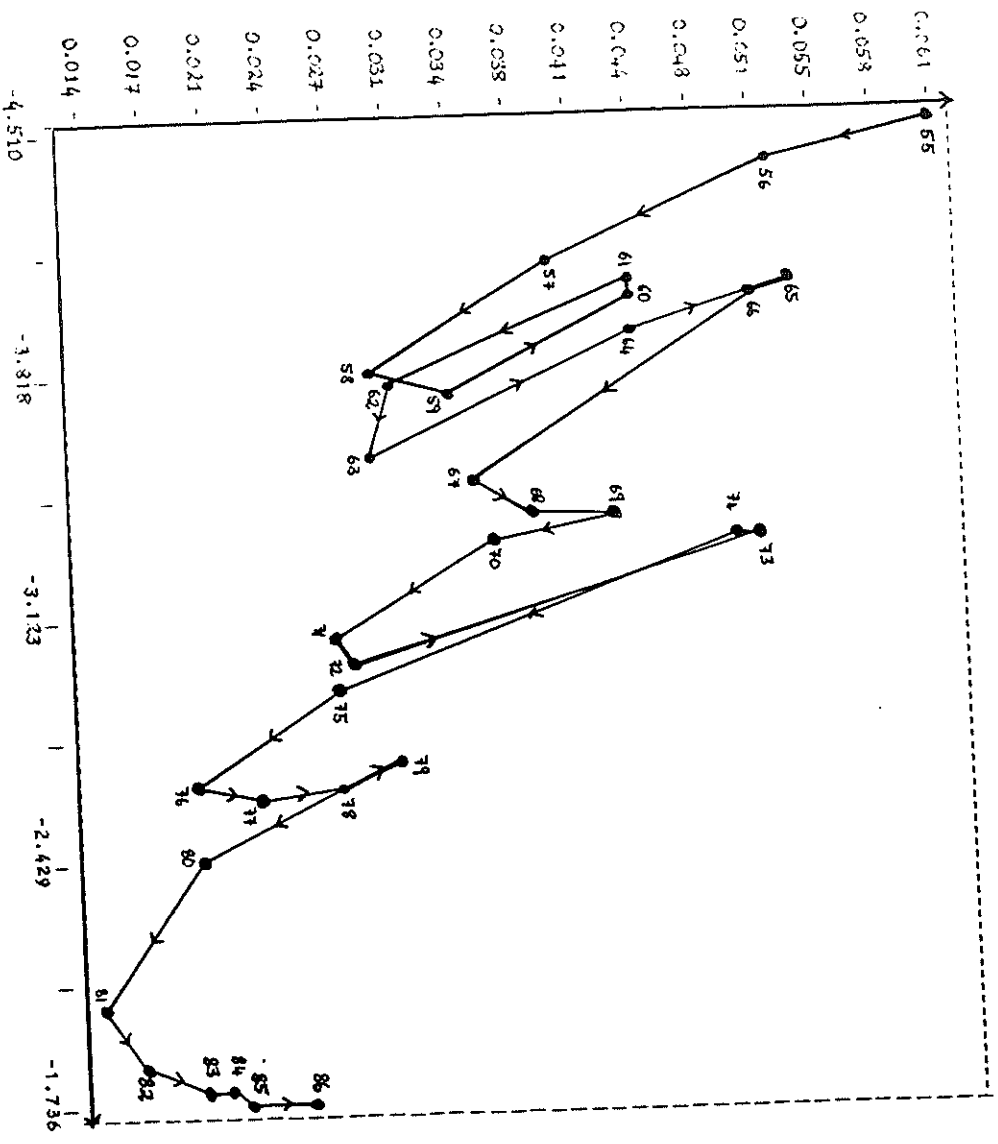
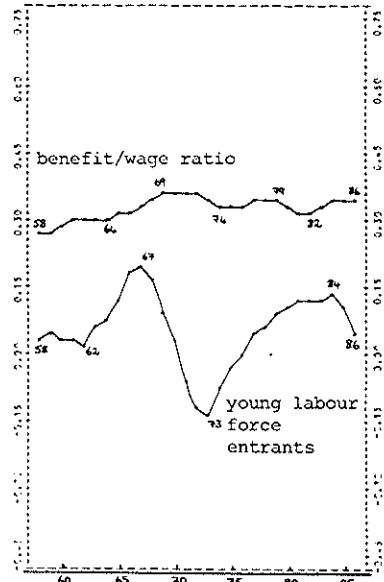Figure 4 : the unemployment/vacancies locus and its main determinants
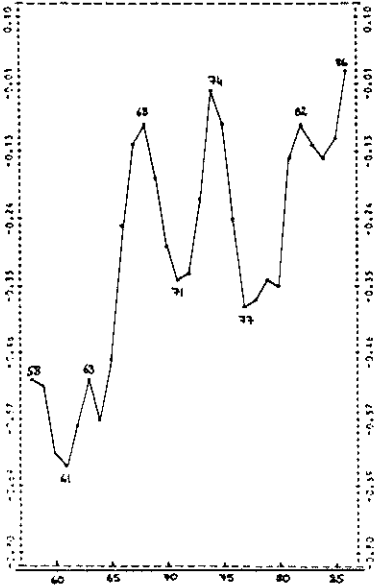
(a) The position of the u/v curve
    corrected for short run loops
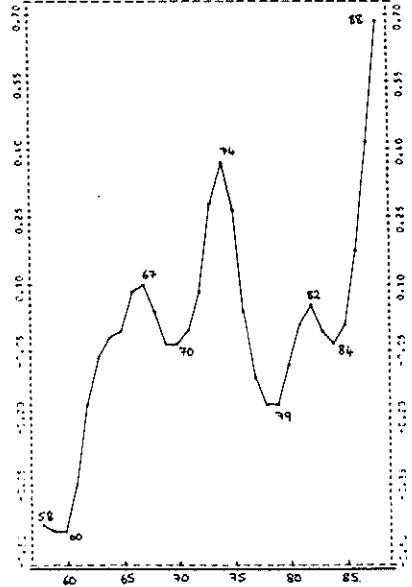
(b) The u/v effect of the lagged
    regional difference in the
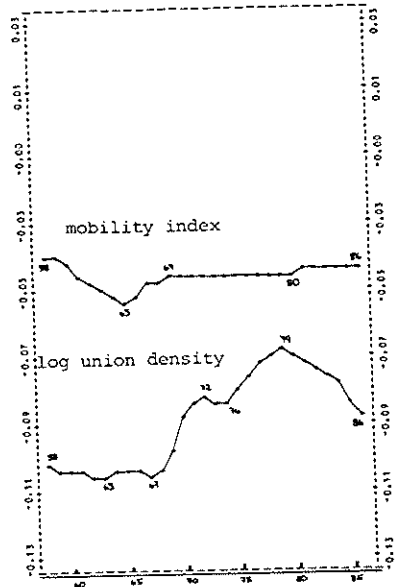   house price/earnings ratio
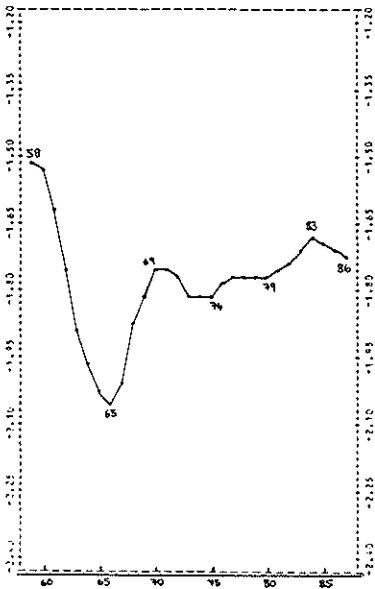
(c) The u/v effect of the mobility index

(d) The u/v effect of the benefit/wage
    ratio and of the proportion of young
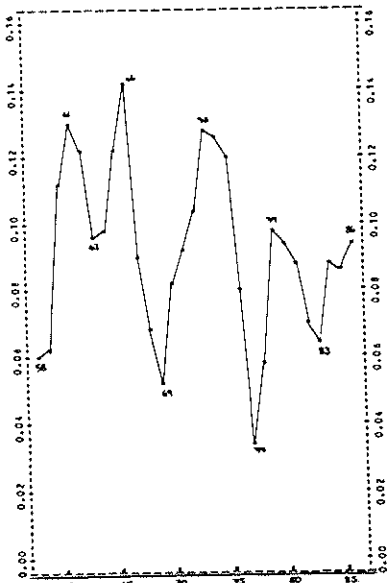   labour force entrants

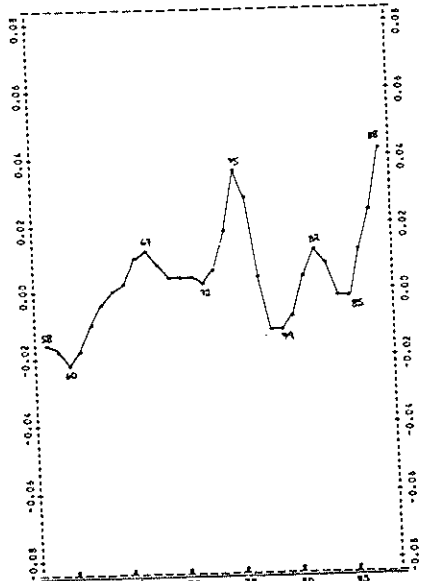Figure 5 : the real product wage and its main determinants
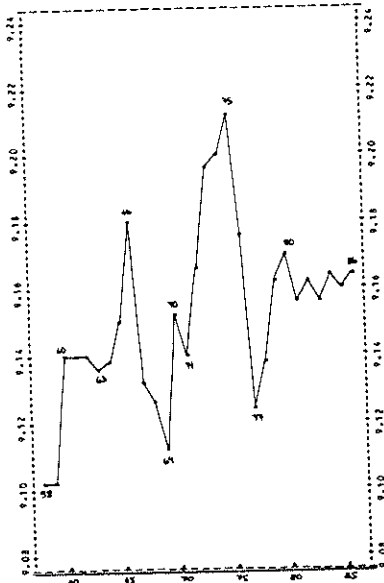
(a) Log real product wage corrected
for productivity trend

(b) The wage effects of the mobility
index and of log union density

(c) The combined wage effect of log
unemployment, its 3 year rate of change, and

(d) The combined wage effect of the
lagged house price/wage ratio and its
regional difference