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# Spot wages, job changes, and the cycle

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**Abstract:** This paper makes use of the British New Earnings Survey Panel Dataset between 1976 and 2010. Individual-level pay and hours data are obtained from company payrolls and consist of a random sample of 1% of the entire British male and female labor force. We find that the real wages of both male and female workers who change job titles within companies are significantly more procyclical than job stayers. Wage cyclicality of internal job movers who retain their job titles is the same as that of job stayers. This lends support to the predicted procyclical real wage effects of the Reynolds-Reder-Hall job re-grading hypothesis. On the extensive margin, title changers and title retainers who move jobs between companies exhibit the same degrees of wage cyclicality and these are significantly greater than for job stayers. We argue that our findings are compatible with earlier research that has established the importance of spot market wage setting in Britain.

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## 1 Introduction

Two recent European studies support the notion that the spot market matters most in national wage setting. Workers and firms recontract every period with pay settlements linked directly to the prevailing economic climate. Devereux and Hart (2007) provide empirical evidence for the UK while Kilponen and Santavirta (2010) obtain similar results for Finland. We argue that the spot market fits well with three sources of real wage procyclicality investigated in the recent labor market literature. Two of these are well established in micro longitudinal studies by both European and North American researchers. Real wages of job stayers are significantly procyclical and real wages of job movers are more procyclical than those of job stayers (see Pissarides, 2009, Tables II and III).

The third source of wage procyclicality has gained only limited North American support while receiving little research attention in Europe. Short run market conditions may give rise to scarcities and surpluses of certain skill categories of labor. Employers react through job task re-allocations among existing employees. They undertake internal promotions to meet skill shortages while demotions and layoffs are used to tackle employment surpluses. Such procyclicality of occupational assignments is a feature of the hypothesis of Reynolds (1951), Reder (1955) and Hall (1974) (henceforth RRH). Procyclical internal wage changes may then in part reflect workers moving into jobs commanding higher or lower pay scales. Solon, Whatley and Stevens (1997) find support for the wage cyclicity predictions under the RRH hypothesis. However, their work is limited to two company case studies in the 1920s/30s. Using relatively recent data, Wilson (1997) and Devereux (2000) find no support. One reason for this failure may relate to constraints on wage fluctuations associated with one-sided insurance-type

contracts that have been found to be important in North American labor markets. We argue that in economies where spot wages are dominant, and so real wages are more reflective of current business conditions, internal job re-grading over the cycle may be more likely to impact directly on cyclical real wage behavior.

Our empirical work is based on the British New Earnings Survey Panel Dataset (NESPD) between 1976 and 2010. The NESPD allows us to identify within-company and between-company job moves that involve either a change in 3-digit level occupational classifications or no occupational change. We label such movers, respectively, as job title changers and job title retainers. For both males and females we obtain strong support for expected wage movements under the RRH hypothesis. Internal real wage procyclicality of job title changers is significantly more procyclical than those of job stayers. By contrast, real wage procyclicality of internal movers who retain their existing job titles does not differ from that of job stayers. As for job moves between companies, we find that both job title changers and job title retainers display real wage procyclicality that are both significantly larger than for job stayers and not statistically different from one another.

The NESPD is comprised of highly accurate company payroll data on individuals' job descriptions, wages, and working time. It comprises a 1% random sample of the entire British workforce. We use the national rate of claimant count unemployment as our measure of the cycle and we can see from Figure 1 that our period covers two clear peaks in unemployment (early 1980s and early 1990s) and two clear troughs (late 1980s and mid 2000s) as well as the first three years of the unemployment rises linked to the recent financial crisis.

## 2. Spot wages, implicit contracts, and job changes

In a spot wage market, with current market conditions dominating, we would expect real wages to rise and fall reasonably symmetrically in line with the ups and downs of the cycle. By contrast, wage movements are restricted when insurance-type wage contracts apply (Malcomson, 1999). Risk averse workers may be able to obtain insurance from risk neutral companies against surprise fluctuations in labor income. If such contracts are fully binding on the parties then, while the real wage would be expected to reflect the prevailing business climate at the initial contract negotiation stage, it would be subsequently invariant to idiosyncratic shocks (Baily, 1974; Azariadis 1975). If contracts are not fully binding, implicit contractual agreements between workers and firms necessitate self enforcement (Harris and Holmstrom, 1982; Thomas and Worrall, 1988 and 2007). Suppose that a one-sided implicit contract is non-binding on the worker. Then, in contrast to binding contracts, employers would be willing during post-entry job spells to raise real wages if they become too low relative to market conditions. However, real wages within employer-employee matches would be downwardly rigid. Symmetrically, if the contract is non-binding on the company then real wages would be cut if market conditions otherwise dictated that the worker should be laid off. This would suggest upwardly rigid real wages.

In summary, post entry real wages in a spot market would be strongly correlated with movements in the business cycle, rigid under a binding contract, downwardly rigid under a one-sided contract that is not binding on the worker, and upwardly rigid under a one-sided contract that is not binding on the employer. Following the seminal contribution of Beaudry and

DiNardo (1991), empirical researchers have captured these possibilities by allowing the wage to be, respectively, a function of contemporaneous unemployment, the starting unemployment rate, the minimum rate since the job started, and the maximum rate since the job started.

Using the NESPD with respect to the volatile business cycle period from 1976-2001 (see Figure 1), Devereux and Hart (2007) produce evidence based on simple wage sequencing and on regression analysis that provides support for the relative importance of a spot wage market in Britain. They treat the annual real wage rate as constant if it changes by no more than 1% between successive years. Very few job spells contain constant real wages on this definition. Over 90% of job spells lasting 6 years or more contain both increases and decreases in real wages. Even within spells of 5 years or less, 47% (males) and 41% (females) exhibit real wage rises and falls. In their regression of the full samples of males and females, the current unemployment rate produces the largest real hourly wage responses within job spells, although the minimum rate since the job start is also important. The regression coefficient on the contemporaneous unemployment rate is -0.01 for both men and women. This implies, in line with much European and North American evidence of real wage procyclicality, that a one-point increase in the unemployment rate reduces wages by 1%. The equivalent coefficients on the minimum unemployment rate since the start job start are -0.006 for men and -0.007 for women. The strongest UK support for the influence of implicit contracts is found for professional workers. Even here, however, a roughly equivalent impact of current unemployment cannot be dismissed. At the other extreme, the real wage changes of manual workers are unequivocally dominated by the influence of current market conditions.

Also based on the NESPD between 1976 and 2001, Devereux and Hart (2006) establish that real wage changes of job stayers are strongly procyclical. This is unsurprising given their spot market findings. Like other researchers, they also find that between-company job movers exhibit incrementally greater wage procyclicality. How does this outcome fit with an underlying spot wage market? Hagedorn and Masovskii (2009) define spot wages as depending on prevailing business conditions and on 'idiosyncratic productivities'. Job match quality and expected wages are positively associated with the number of per-period job offers a worker receives. During recessionary periods job offers resulting from on-the-job search are relatively hard to come by in contrast to boom periods when search produces a larger sample of offers from which to choose. Workers who are forced to leave companies during recessions, due to layoff and redundancy, may find it difficult to find alternative work that maintains previous wage levels. Workers who seek better job opportunities during booms will experience increased probabilities of improved match qualities and associated improved pay settlements.

If employers and workers are willing flexibly to adjust pay in relation to the ups and downs of the cycle then this may extend to another potentially important influence on the cyclicity of internal job movers' real wages. Raising real wage rates within a company during boom periods may fail to attract adequate numbers of job applicants given general short-term labor scarcity combined with increasing labor demand among competing companies. Skill shortages may especially feature. The RRH hypothesis in respect of the cyclicity of job assignments addresses this issue. Employers meet labor shortages by lowering hiring standards, largely through internal promotions. Trainable workers are up-graded from lower to higher skilled jobs that command higher pay scales. A decision to undertake such labor

adjustments would depend on weighing up the payroll costs of general wage increases that are sufficiently high to fill job vacancies against those of lowering the quality of job matches due to job up-grading.<sup>1</sup> During contractionary phases, excess labor supply allows employers to raise their hiring standards and reduce their in-house training requirements with workers down-graded from higher to lower paying job categories. In effect, down-graded workers would receive lower pay linked to the reduced marginal product resulting from the lower-level task requirements in the new job. Then procyclical up-grading and down-grading of job assignments produces procyclical wage effects among internal job movers. During a cyclical upturn in a spot wage market, all workers would expect to receive wage increases linked to strengthening business conditions. Additionally, up-graded workers would receive wage increments resulting from job promotions to higher occupational pay scales. The real wage procyclicality of internal job movers would exceed that of job stayers. Symmetric downward pressures on wages would apply during a downturn.

To date, empirical investigations of the real wage cycle predictions arising from the RRH hypothesis have produced limited support. Solon, Whatley and Stevens (1997) test the hypothesis via case studies of the Ford and Byers companies in the US between the early 1920s and early 1930s. At Ford, there is little evidence of within-job wage cyclicity and this

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<sup>1</sup> Job up-grading and down-grading involve several short-run costs to the employer. In the first place, job match quality is reduced through job movers being over- or under- qualified in their new job grades. As Solon, Whatley and Stevens (1997) point out, even if within-job wages were unchanged, job up-grading would mean that wages in terms of labor input per quality unit will rise. Second, up-grading will require additional training expenditures in order for internal movers to gain proficiency in the higher skill requirements of their new jobs. Third, layoff costs are incurred in respect of low skilled workers who are displaced by down-graded colleagues (see Devereux, 2002).



contrasts with findings of quite strong wage procyclicality resulting from changes in workers' job assignments. This finding is most in line with the maintained assumption under the RRH hypothesis.<sup>2</sup> At Byers, both within-job wage movements and wage movements resulting from job re-assignments are found to contribute significantly to overall wage procyclicality. This finding is the variant of the RRH hypothesis argued here to be most reflective of a spot wage market. For both companies, there is a significant positive gap between overall wage cyclicality and that of job stayers alone, consistent with the RRH hypothesis. By contrast, Wilson (1997) also analyses pay and other micro data from the records of two U.S. companies, one covering the period 1982-1994, the other 1969-1988. She finds no differences in the pay cyclicality of internal job movers compared with job stayers. Based on US data from the Panel Study of Income Dynamics (PSID) for 1981-1992, Devereux (2000) obtains wage outcomes that are broadly consistent with Wilson.

One explanation of the modest support for wage responses compatible with the RRH hypothesis relates to the fact that North American research findings lean more towards a prominent role for insurance-type contracts in which employees are protected against fluctuations in labor income. Grout (1984) points out the greater importance of spot wages in the UK compared to the US where binding employer-union contracts are more prevalent. More

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<sup>2</sup> Marginal product linked to job characteristics is emphasized by Thurow (1975). The labor market is characterised by competition among individuals for job opportunities. What matters is the inherent marginal product of the job, not of the worker. A necessary condition is that eligible workers for a given job must be trainable to the level of achieving its marginal product. In effect, 'workers compete with each other for openings for which scale wages are already established' (Hall, 1974). Implicitly, this view is compatible with intra-job wage rigidity with wage cyclicality predicated on job re-assignments.

importantly, the dominant finding is that one-sided implicit contracts that are non-binding on the employee are the principal type of contractual relationship.<sup>3</sup> We might expect that this type of implicit contractual arrangement would be most prevalent among workers in higher skilled jobs since there would be incentives for employers to protect themselves against potential losses of firm-specific human capital investments (see Macleod and Malcomson, 1993 and Malcomson, 1999).

Devereux (2000) finds no evidence that within-firm real wage procyclicality among job title changers is greater than among those reporting no changes in titles. He offers an explanation linked to the theory of firm-specific human capital. In normal times, workers with high specific skills share rents with employers. During recessionary periods, employers downgrade some of these workers as a form of labor hoarding. Layoffs take place among workers with low capital specificity. But job downgrading involves lower pay scales and employers run the risk of losing sunk investments due to job quits. An implicit contract may involve employers temporarily reducing their own rent shares in order to maintain the real wages of down-graded workers. They may calculate that the short-term costs associated with sub-optimal job matches are outweighed by the long-term gains associated with the retention of skilled workers' labor services in respect of future periods of improved business conditions. In such a scenario, procyclical job re-grading does not necessarily imply procyclical real wages.

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<sup>3</sup> Support for the original Beaudry and DiNardo (1991) findings is provided by Grant (2003) for the US' and by McDonald and Worswick (1999) for Canada. Using the PSID between 1974 and 1991, Shin and Shin (2008) show that the pattern of procyclical real wages in the US for this period appears to be most consistent with an implicit contract explanation of wage formulation.

### 3 Job moves and job titles

The NESPD allows us to distinguish between two types of job moves that take place both within and between companies. First, moves that involve a change in job title as defined by a 3-digit occupation re-classification. Second, moves in which existing job titles are retained. The latter account for roughly one-third of male and female job moves in our data (see Table 1). This distinction carries potentially interesting wage cyclicity implications, especially in respect of differences between intra- and inter-company moves.

Job up-grading and down-grading under the RRH hypothesis is almost certainly dominated by internal moves that involve job title changes. Re-grading consists of workers who are promoted or demoted into higher or lower skill-level jobs.<sup>4</sup> Internal moves under the same job title represent a change in (at least some) job tasks but are unlikely to require significantly higher or lower skill inputs. In this event, increased wage procyclicality of internal movers due to changes in occupational pay scales is likely to be more apparent among title changers compared to title retainers.

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<sup>4</sup> Many movements between pairs of 3-digit occupations are not easily identified by job title changes alone as representing up-grades or down-grades. But there are some clear examples based on titles. In the unemployment cycle from 1982 to 1991 (see Figure 1), for example, our data records 24 cases of clerks up-graded to supervisors during periods of falling or constant unemployment and 16 cases in the opposite direction during rises in unemployment. Equivalently, there were 20 cases of promotion from sales person to marketing and sales managers and 8 cases in the opposite direction. But, inevitably, there are also cases of demotions occurring during improved market conditions and promotions during worsening conditions. Wage changes associated with job moves would be expected more accurately and comprehensively to signal changes in job task and skill requirements.

What about between-company job moves? As the business climate picks up, title changers, on average, would be expected to move to higher skilled jobs commanding higher pay scales. During a downturn, job scarcity may force redundant workers to down-grade into less skilled, lower paying jobs. But why would individuals move between companies, incurring associated moving costs, while retaining the same job description and title? While there is a range of possibilities that are not directly linked to wages<sup>5</sup>, such moves during a cyclical upturn are likely to appeal to high ability workers who do not wish to change their occupational job tasks but who seek to realize their 'true' marginal products by joining more productive companies. To a potential new employer, such moves offer strong job match quality and low transaction costs. Match quality is more assured if there are similarities or commonalities in task requirements between new and old jobs. Training expenditures are minimized. The risks associated with uncertainty over performance in respect of new task requirements are low. In a cyclical downturn, laid off workers may be forced to seek work under the same occupational job description in less productive, less well paying, companies. This would especially be the case among low skilled workers who offer prospective employers relatively narrow ranges of job task options.

#### **4. Data**

Our estimation consists of combining individual payroll data with national claimant count unemployment rates over the period 1976 to 2010. Unemployment rates are shown in

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<sup>5</sup> Examples include job moves involving (a) a contemporaneous move by a spouse or partner, (b) a desired change in residential location, (c) the attainment of a better work environment.

Figure 1.<sup>6</sup> The NESPD comprises a 1% random sample of the entire British workforce. All individuals are allocated a National Insurance (NI) number on reaching the minimum school leaving age and the NESPD sample is selected on the basis of a given pair of digits within the NI number sequence. Employers are legally required to fill in a short questionnaire on sampled individuals that relates to a specific week in April. The wages and hours data provided by employers are taken directly from company payrolls and are considered to be very accurate. Concentrating on full-time males and females, we use the standard hourly wage as our pay measure, defined as “gross weekly earnings divided by normal basic hours for employees whose pay for the period was not affected by absence.” We deflate this measure using the Retail Prices Index. To avoid outliers, we excluded the top and bottom wage percentiles. Re-estimation with hourly real earnings (including overtime pay and hours) produced no substantive differences to our results.

An important strength of the NESPD is that it is jobs based. Employers are asked to indicate whether the employee has remained in the current job for more than 12 months, thereby allowing us to distinguish between job stayers and job movers. Employers provide the employee’s full job title, including job rank or grade, as well as a short description of the work involved. On the basis of the collected information, jobs are classified by the Office for National

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<sup>6</sup> Each annual rate in Figure 1 is centered on the previous October. Wage agreements in Britain typically cover a 12-month period. The NESPD payroll data are collected in April of each year and so refer to settlements occurring between April and May of the previous year. October of the previous year is the ‘representative’ mid point.

Statistics into standard 3-digit occupation codes.<sup>7</sup> The NI identifier allows individuals to be tracked from employer to employer and by geographical location through time.

For most of our study period, the NESPD does not allow us directly to separate job movers into intra- and inter- company movers. In order to make this separation, we adopt the procedure earlier carried out by Devereux and Hart (2006). We classify a between-company job mover as someone whose job move involves (a) a change in geographical location and/or (b) a change in 1-digit industrial classification<sup>8</sup> and/or (c) a move between public and private sector employment. We have two variations of criterion (a): we use either moves across regional boundaries that define 12 British standard regions or moves across boundaries separating 97 geographical areas. If none of (a) or (b) or (c) applies to a given job move, then the individual is classified as an intra-company job mover. We are able to check the accuracy of our estimated internal/external mover distinctions because, from 2002, the Office for National Statistics in its Annual Survey of Hours and Earnings (ASHE) provides company markers in respect of the individuals recorded in our data. Comparisons of actual and estimated outcomes are shown in Table 2 for 2002-2010. This reveals that our simple methodology predicts correctly with well over 80% accuracy for both internal and external movers and for both genders. It turns out that our estimates are essentially unaffected if we chose 12 or 97 regions as part of the determination on the internal/external job move

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<sup>7</sup> The 3-digit occupation classifications were changed in 1991 and 2002. In our subsequent job mover regressions that concern job title changers and job title retainers we drop these two years from the analysis.

<sup>8</sup> The 1-digit industrial classification was changed in 1982 and 1996. In regressions incorporating the identification of within- and between-company job moves we drop these two years from the analysis.

dichotomy. Accordingly, we show results (i.e. background statistics and regressions) only with respect to incorporating the 97-areas rule.<sup>9</sup>

Table 1 reports the total NESPD observations for males and females and the average percentage shares of job stayers and movers for 1976-2010. Respective percentage shares of stayers, movers, internal movers, and external movers within total male and female observations correspond closely. For both genders, there are roughly equal shares on within- and between-company movers.<sup>10</sup> Table 1 also shows the estimated annual shares of male and female job movers sub-divided into those who changed or retained their job titles. Roughly two-thirds of movers – i.e. total, within-company and between-company job movers - changed job title. As for the wage construct used in the regressions - the change in the log of the real wage - the notable feature is that the average real wage changes of all categories of male and female job movers are more than twice as large as for their respective job stayers, though with larger standard deviations.

Given our interest in cyclical effects, we show in Table 3 some comparative data characteristics for periods during which the national rate of unemployment is declining or constant ( $\Delta U \leq 0$ ) and periods when it is rising ( $\Delta U > 0$ ). The male and female percentages of job movers are slightly higher during falling unemployment than rising. There is a higher incidence

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<sup>9</sup> As a further robustness check, we estimate the regressions contained in Table 5 – in which we separate between- and within- company movers – for the period 2002-2010 using our indirect method of choosing movers and using the ASHE exact identifiers. There are no significant differences between estimated coefficients in the two sets of regressions.

<sup>10</sup> However, this overall share-equality between internal and external movers does not generally capture year-on-year outcomes. Between 1976 and 1995, internal movers comprised 53% of all movers and after 1995 they made up 43%.

of male and female title changers' share of all job movers when unemployment is rising. Ages of job movers in up and down directions, whether or not a title change is involved, is symmetric and somewhat younger for women compared to men (early 30s compared to mid-30s). The incidence of male manual workers involved in title changes is relatively high, comprising 45% of all title changers when unemployment is constant or falling and 51% when it is rising. The manual female percentages are much lower, at 16% and 19% respectively. Professional workers who change job titles account for 27% of all male title changers in both directions, with females at 20/21%. We also show in Table 3 the average percentile positions in the NESPD wage distribution of our four mover categories – i.e. internal and external movers who either change or retain job titles. For most mover categories, average wages between up- and down-phases of the cycle fall in the same 5-percentile bands. However, we can't rule out some degree of compositional effects in the case of internal job movers who change job title. For both genders, when unemployment is rising the average wage of movers lies in an adjacent lower band than when unemployment is constant or falling.

## **5 Empirical framework**

### *Decomposition of total wage cyclicality*

We divide job movers into four mutually exclusive and exhaustive categories. These are  $M_1$  = within-company movers who retain the same job title,  $M_2$  = within-company movers who change job titles,  $M_3$  = between-company movers who retain the same job title,  $M_4$  = between-



company movers who change job titles. Let  $P_{Mj}$  ( $j = 1, \dots, 4$ ) be the respective proportions of the four categories.

We adopt the empirical approach of Solon, Whatley and Stevens (1997) and Devereux and Hart (2006). Define job stayers as those employees who remain in the same job in period  $t$  compared to period  $t-1$ . Let  $E(\Delta \ln W_S)$  be the expected wage growth of stayers. Let  $E(\Delta \ln W_{Mj})$  ( $j = 1, \dots, 4$ ) be the expected wage growth of job movers. Then, overall expected wage growth,  $\Delta \ln W$ , is given by

$$(1) \quad E(\Delta \ln W) = [1 - (\sum_{j=1}^4 P_{Mj})]E(\Delta \ln W_S) + \sum_{j=1}^4 P_{Mj}E(\Delta \ln W_{Mj})$$

$$= E(\Delta \ln W_S) + \sum_{j=1}^4 P_{Mj} E(\Delta \ln W_{Mj} - \Delta \ln W_S).$$

We proxy the business cycle by the change in the national unemployment rate,  $\Delta U$ .

Then, differentiating (1) with respect to  $\Delta U$  gives

$$(2) \quad \frac{\partial E(\Delta \ln W)}{\partial(\Delta U)} = \frac{\partial E(\Delta \ln W_S)}{\partial(\Delta U)} + \sum_{j=1}^4 P_{Mj} \left[ \frac{\partial E(\Delta \ln W_{Mj} - \Delta \ln W_S)}{\partial(\Delta U)} \right] + \sum_{j=1}^4 \left[ \frac{E(\Delta \ln W_{Mj} - \Delta \ln W_S) \partial P_{Mj}}{\partial(\Delta U)} \right].$$

Wage growth is conditioned by three influences: (i) cyclical wage responses of job stayers, (ii) incremental effects of the cyclical wages of job movers relative to job stayers, and (iii) the cyclicity of the rate of job changing. We can re-express (2) in terms of the contributory shares of (i)-(iii), thus

$$(3) \quad \frac{\partial E(\Delta \ln W)}{\partial(\Delta U)} = [1 - (\sum_{j=1}^4 P_{Mj})] \left[ \frac{\partial E(\Delta \ln W_S)}{\partial(\Delta U)} \right] + \sum_{j=1}^4 P_{Mj} \left[ \frac{\partial E(\Delta \ln W_{Mj})}{\partial(\Delta U)} \right] +$$

$$\sum_{j=1}^4 \left[ \frac{E(\Delta \ln W_{Mj} - \Delta \ln W_S) \partial P_{Mj}}{\partial(\Delta U)} \right].$$

### Estimation

Estimation of (2) is conducted by the well-known two-step regression approach, first introduced in Solon, Barsky, and Parker (1994), to overcome the problems associated with estimating wage effects disaggregated to the level of the individual arising from national-level changes in unemployment rates (Moulton, 1986).

For individual  $i$  at time  $t$ , the step-one regression is expressed

$$(4) \Delta \ln w_{it} = \alpha A_{it} + \sum_{t=1}^T \beta_{0t} D_t + \sum_{t=1}^T \sum_{j=1}^4 \beta_{jt} M_{jit} D_t + \epsilon_{it}$$

where  $w_{it}$  is the real standard hourly wage rate,  $A_{it}$  represents a cubic in age<sup>11</sup>,  $D_t$  denotes a binary variable equal to 1 if the observation is from year  $t$ ,  $M_{jit} D_t$  represents interactions between the mover identifiers and the time dummies,  $\epsilon_{it}$  is an error term.

In step-two we have

$$(5) \hat{\beta}_{kt} = \gamma_{k0} + \gamma_{k1} \Delta U_t + \gamma_{k2} Year_t + \mu_{kt} \quad (k = 0, \dots, 4).$$

where  $Year_t$  is a time trend and  $\mu_{kt}$  is an error term. Comparing with the decomposition presented in equation (2), the estimated  $\gamma_{k1}$ 's in (5) give the cyclical responses of the real wages of job stayers ( $\gamma_{01}$ ) and the four incremental wage effects related to job movers ( $\gamma_{11}, \dots$ ,

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<sup>11</sup> Our data set (see next Section) does not include work experience and so we use age in its place.

$\gamma_{41}$ ). We estimate (4) by OLS and (5) by weighted least squares (WLS) with the weight given by the number of individuals observed in a given year.

As for the last expression in (2), relating to the rate of job moves, we again use the two-step approach. Using the mover dummies  $M_{jit}$  ( $j = 1, \dots, 4$ ), we estimate the linear probability model<sup>12</sup>

$$(6) M_{jit} = \delta A_{jit} + \sum_{t=1}^T \eta_{jt} D_t + \mu_{jit}$$

using WLS, with the second stage given by

$$(7) \hat{\eta}_{jt} = \lambda_{j0} + \lambda_{j1} \Delta U_t + \lambda_{j2} Year_t + \omega_{jt}.$$

## 6 Job title changers, job title retainers, and real wage cyclicity

Equation (2) expresses the decomposition of the business cycle effects on expected total real wage growth. The first two right-hand-side terms refer to wage changes of job stayers and job movers and these are estimated via equations (4) and (5). We begin by showing age-corrected plots of real wage changes of job stayers, job movers who change job titles, and job movers who retain job titles against the change in the national unemployment rate. These are derived from the first stage estimates of the regression shown in equation (4) and shown in

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<sup>12</sup> We use a linear probability model to allow us to retain the two-step approach in both wage change and job change equations. We have verified that – within a single equation specification containing robust standard errors and allowing observations within any year to be correlated – probit estimates yield very similar marginal effects.

Figures 2a and 2b.<sup>13</sup> Real wage movements of all three groups of males and females are strongly procyclical. Job movers who change job titles and those retaining job titles display very similar movements and these appear to be more pronounced in several sub-periods than those of job stayers. The two mover groups display stronger procyclical reactions to the recession of the late 1980s as well as to the marked and prolonged recovery that started towards the mid-1990s. Table 4 shows the second stage estimated semi-elasticities of hourly real wage changes and rate of job changes in relation to unemployment changes. These are obtained, respectively, from equations (5) and (7). A one point decrease in the rate of unemployment is associated with a 1.2% real wage increase for male stayers and a 1.1% increase for female stayers. Real wage procyclicality of both types of job movers display positive and significant incremental real wage effects compared to job stayers. However, the added incremental wage effects for title changers are roughly double those of title retainers. Based on equation (3) we can decompose the contribution of these estimates to overall wage growth. Given that job stayers constitute about 90% of the total NESPD observations (see Table 1), their contribution unsurprisingly dominates. Over 13% of the total contribution derives from the real wage cyclicity of job movers with title changers comprising a slightly greater share for males and title retainers slightly greater for females. The last expression in equation (2) relates to the effects of the rate of job changing on expected total wage growth. Estimating equations are given by (6) and (7). From the last two rows in Table 4, we find that these make small but

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<sup>13</sup> The two breaks in the mover graphs are due changes in occupational classifications – see footnote 7.

significant procyclical contributions to overall wage cyclicality. Job changes that also involve job title changes have the greater impact.

In order to test for possible cyclical wage effects of job assignments under the RRH hypothesis, we need additionally to distinguish between intra- and inter-company job moves. Initially, we examine the internal/external mover dichotomy without distinguishing between moves involving or not involving job title changes. Figures 3a and 3b show the real wage movements of male and female job stayers, intra-company job movers, and inter-company job movers.<sup>14</sup> Real wage procyclicality is evident for all three groups. As with the mover categories in Figures 2a and 2b, the real wages of within-and between-company job movers are more strongly procyclical than those of job stayers. These graphical impressions are confirmed by the regression results are shown in Table 5. Both intra- and inter-company job moves involve significantly greater procyclical wage effects compared to those of job stayers. For men, between-company mover real wage procyclicality is considerably stronger than the within-company equivalents. As for the influence of the rate of job changing, within-and between-company changes display roughly comparable effects.

In Table 6, we combine the title change/retain distinction of Table 4 with the intra-/inter-company distinction of Table 5. Our intra-company job mover results provide support for real wage procyclicality of internal job title changers being significantly larger than that of job stayers. From row 3 we find significant incremental effects of title changers relative to stayers.

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<sup>14</sup> The two breaks in the mover graphs are due changes in industrial classifications – see footnote 8.

For both males and females, adding the estimated incremental coefficient to the equivalent job stayer estimate produces the outcome that a one point reduction in unemployment is associated with a 1.7% increase in the real wage of internal job movers who change job titles. These results are broadly in line with the findings of Solon, Whatley and Stevens (1997).<sup>15</sup> However, we provide substantial added value because the estimates here are derived from a very large and comprehensive panel of a national workforce. In contrast, from row 2 we find that male and female internal job movers who retain job titles display real wage procyclicality that is not significantly different from job stayers.

In line with earlier studies, we also find that inter-company real wage procyclicality among job movers is significantly higher than among job stayers. The new finding provided in Table 6 is that this well-known outcome derives from both job movers who change job titles and those who retain job titles. Male inter-company title changers display a semi-elasticity of -2.4 and females -1.7. For title retainers moving between companies, the respective elasticities are -2.1 and -1.6. In the case of title retainers, this constitutes a significant difference compared to their equivalents who change jobs within the company.

Finally, and in general, the rate of job changing contributes quite modestly to overall wage procyclicality.

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<sup>15</sup> More particularly, our results support the Byers' company findings of these authors given significant procyclicality of both stayers' and internal title changers' real wages.

## 7. Concluding remarks

Based on recent research, we argue that the British labor market is strongly influenced by spot market wage setting with real wages responding flexibly to the prevailing macroeconomic climate. Overall, we find that Britain over the past 35 years has experienced highly pro-cyclical real wages with respect to job stayers, internal job movers and external job movers. In line with most earlier micro longitudinal studies, we establish that job stayers contribute substantially to strong overall real wage procyclicality. Also in line with previous research we find that, relative to job stayers, markedly higher real wage procyclicality is associated with job moves between-companies. This is true whether or not individuals' job moves involve a change in job title. However, the distinction between retaining or changing job titles among job movers within the same company does make a difference. Internal job movers who do not change their 3-digit occupation classifications exhibit the same degree of wage procyclicality as job stayers. Internal job movers whose occupations are re-classified experience significantly stronger real wage procyclicality than job stayers. This is consistent with the wage-related predictions of the RRH job re-grading hypothesis. This result differs from recent North American studies where no such wage effects are established.

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**Table 1 Descriptive statistics, NESPD 1976-2010**

	<b>Men</b>	<b>Women</b>
<b>Total observations</b>	1,791,605	905,994
<b>Job stayers % share of total observations</b>	91.6	90.5
<b>Job movers % share of total observations</b>	8.4	9.5
<b>Internal movers % share of total observations</b>	4.2	5.1
<b>External movers % share of total observations</b>	4.2	4.4
<b>Title changers % of all job movers</b>	67.1	61.9
<b>Title changers % share of internal moves</b>	63.2	57.8
<b>Title changers % share of external moves</b>	71.0	66.8
<b>Average age (median age)</b>	40.4 (40)	37.7 (37)
<b><math>\Delta \ln W</math>: stayers (standard deviation)</b>	0.025 (0.139)	0.033 (0.120)
<b><math>\Delta \ln W</math>: internal title changers (standard deviation)</b>	0.061 (0.196)	0.080 (0.170)
<b><math>\Delta \ln W</math>: internal title retainers (standard deviation)</b>	0.063 (0.189)	0.075 (0.158)
<b><math>\Delta \ln W</math>: external title changers (standard deviation)</b>	0.074 (0.271)	0.090 (0.233)
<b><math>\Delta \ln W</math>: external title retainers(standard deviation)</b>	0.072 (0.223)	0.079 (0.193)

**Table 2 Intra-company and inter-company job moves: estimated and actual, 2002-2010**

	Correctly estimated internal movers/total actual internal movers (% correct)		Correctly estimated external movers/total actual external movers (% correct)	
	Men	Women	Men	Women
<b>12 regions, 1-digit industry, public/private sector</b>	5897/6881 (85.7)	4339/4916 (88.3)	15648/18100 (86.5)	10049/11920 (84.3)
<b>97 regions, 1-digit industry, public/private sector</b>	5547/6881 (80.6)	4151/4916 (84.4)	16218/18100 (89.6)	10391/11920 (87.2)

**Table 3 Job movers and unemployment changes: 1976 - 2010**

	Men		Women	
	$\Delta U \leq 0$	$\Delta U > 0$	$\Delta U \leq 0$	$\Delta U > 0$
<b>Unemployment change</b>				
<b>All job movers as a percentage of all individuals</b>	8.8	8.1	10.0	8.9
<b>Movers who change job title as a percentage of all movers</b>	64.5	70.3	61.0	63.1
<b>Average age of movers who change job title</b>	34.9	35.5	31.6	31.6
<b>Average age of movers who retain their job title</b>	36.1	35.4	32.7	31.7
<b>Manual workers who change job title as a percentage of all job title changers</b>	44.6	51.2	15.5	18.9
<b>Professional workers who change job title as a percentage of all job title changers</b>	26.9	26.8	21.3	20.3
	<b>Percentile range in total wage distribution</b>			
<b>Internal movers, same job title</b>	60-65	60-65	60-65	60-65
<b>Internal movers, changed job title</b>	55-60	50-55	50-55	45-50
<b>External movers, same job title</b>	65-70	65-70	65-70	60-65
<b>External movers, changed job title</b>	50-55	50-55	50-55	50-55

**Table 4 Job stayers and job movers with retained or changed titles: 1976-2010**

	MEN		WOMEN	
	Coefficient on $\Delta U_t$	% of total wage cyclicity	Coefficient on $\Delta U_t$	% of to total wage cyclicity
	<b>REAL WAGE CHANGES</b>			
<b>Job stayers</b>	-1.230 (0.284)**	83.4	-1.057 (0.306)**	80.3
<b>Job movers: retained job titles</b> <i>(incremental effects)</i>	-0.315 (0.128)*	5.4	-0.372 (0.124)**	7.5
<b>Job movers: changed job titles</b> <i>(incremental effects)</i>	-0.842 (0.140)**	7.7	-0.654 (0.136)**	6.7
	<b>RATE OF JOB CHANGING</b>			
<b>Retained job titles</b>	-0.003 (0.001)**	1.4	-0.004 (0.002)*	2.4
<b>Changed job titles</b>	-0.006 (0.002)**	2.1	-0.008 (0.002)**	3.1
<b>Step 1 observations</b>	1,802,517		912,129	
<b>Step 2 observations (same job, job moves)</b>	35, 33		35, 33	

**Notes:** Robust standard errors in parenthesis. Results refer to step 2 of 2–step estimation. \*\* statistically significant at the .01 level, \* statistically significant at the .05 level, two-tail test. Job mover regressions have two fewer observations in step 2 because of changes in occupational classifications (see Footnote 8).

**Table 5 Job stayers and job movers within and between companies: 1976-2010**

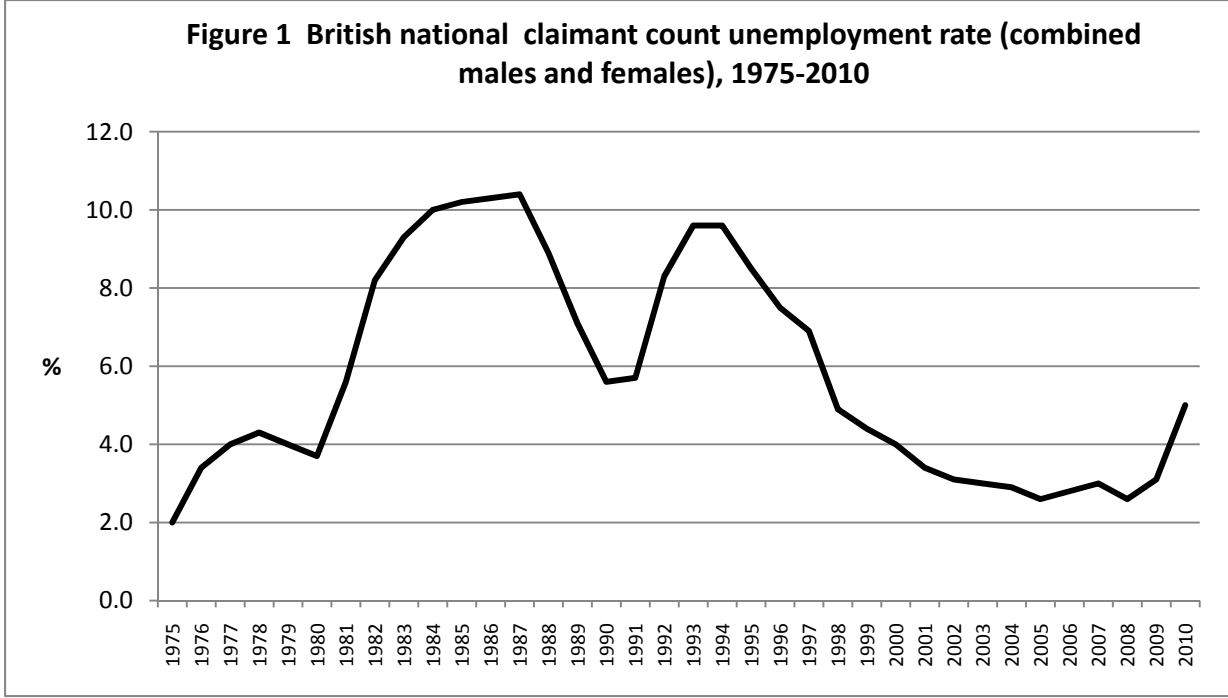
	MEN		WOMEN	
	Coefficient on $\Delta U_t$	% of total wage cyclicity	Coefficient on $\Delta U_t$	% of to total wage cyclicity
	<b>REAL WAGE CHANGES</b>			
<b>Job stayers</b>	-1.228 (0.284)**	84.5	-1.055 (0.306)**	81.4
<b>Job movers: same company</b> <i>(incremental effects)</i>	-0.350 (0.112)**	3.5	-0.533 (0.125)**	4.7
<b>Job movers: new company</b> <i>(incremental effects)</i>	-1.103 (0.140)**	9.4	-0.632 (0.154)**	9.2
	<b>RATE OF JOB CHANGING</b>			
<b>Same company</b>	-0.005 (0.003)	0.9	-0.006 (0.004)	1.43
<b>New company</b>	-0.006 (0.003)*	1.8	-0.007 (0.003)**	3.3
<b>Step 1 observations</b>	1,803,570		912,997	
<b>Step 2 observations (same job, job moves)</b>	35, 33		35, 33	

**Notes:** Robust standard errors in parenthesis. Results refer to step 2 of 2–step estimation. \*\* statistically significant at the .01 level, \* statistically significant at the .05 level, two-tail test. Job mover regressions have two fewer observations in step 2 because of changes in industrial classifications classification (see Footnote 9).

**Table 6 Job stayers, job movers with retained and changed job titles, and moves within and between companies: 1976-2010**

	MEN		WOMEN	
	Coefficient on $\Delta U_t$	% of wage cyclical	Coefficient on $\Delta U_t$	% of wage cyclical
	<b>REAL WAGE CHANGES</b>			
<b>Stayers</b>	-1.229 (0.284)**	84.0	-1.054 (0.306)**	81.0
<b>Internal movers: retained job titles</b> <i>(incremental effects)</i>	-0.050 (0.156)	1.5	-0.296 (0.159)	2.5
<b>Internal movers: changed job titles</b> <i>(incremental effects)</i>	-0.504 (0.128)**	3.5	-0.669 (0.130)**	4.4
<b>External movers: retained job titles</b> <i>(incremental effects)</i>	-0.911 (0.140)**	1.9	-0.571 (0.193)**	2.0
<b>External movers: changed job titles</b> <i>(incremental effects)</i>	-1.160 (0.177)**	5.3	-0.623 (0.194)**	4.2
	<b>RATE OF JOB CHANGING</b>			
<b>Internal: retained job titles</b>	-0.002 (0.001)	0.7	-0.003 (0.002)	1.0
<b>Internal: changed job titles</b>	-0.003 (0.002)	0.9	-0.004 (0.003)	1.7
<b>External: retained job titles</b>	-0.001 (0.001)	0.5	-0.002 (0.001)*	0.7
<b>External: changed job titles</b>	-0.005 (0.002)*	1.8	-0.005 (0.002)**	2.6
<b>Step 1 observations</b>	1,791,581		905,984	
<b>Step 2 observations (same job, job moves)</b>	35, 31		35, 31	

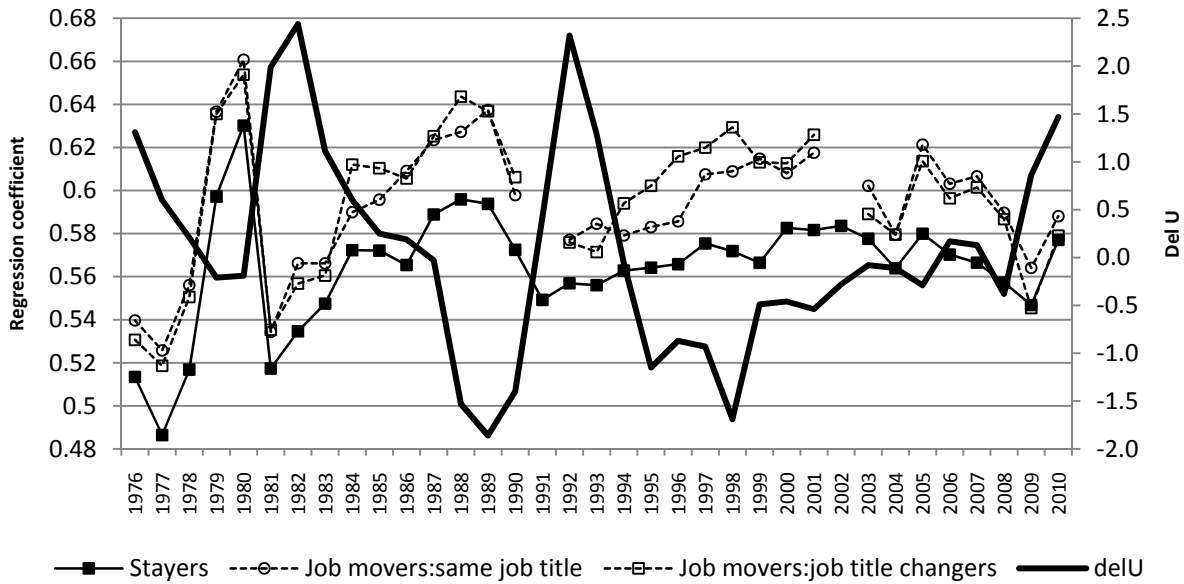
**Notes:** Robust standard errors in parenthesis. Results refer to step 2 of 2–step estimation. \*\* statistically significant at the .01 level, \* statistically significant at the .05 level, two-tail test. Job mover regressions have four fewer observations in step 2 because of changes in the occupational and industrial classifications (see Footnotes 8 and 9).



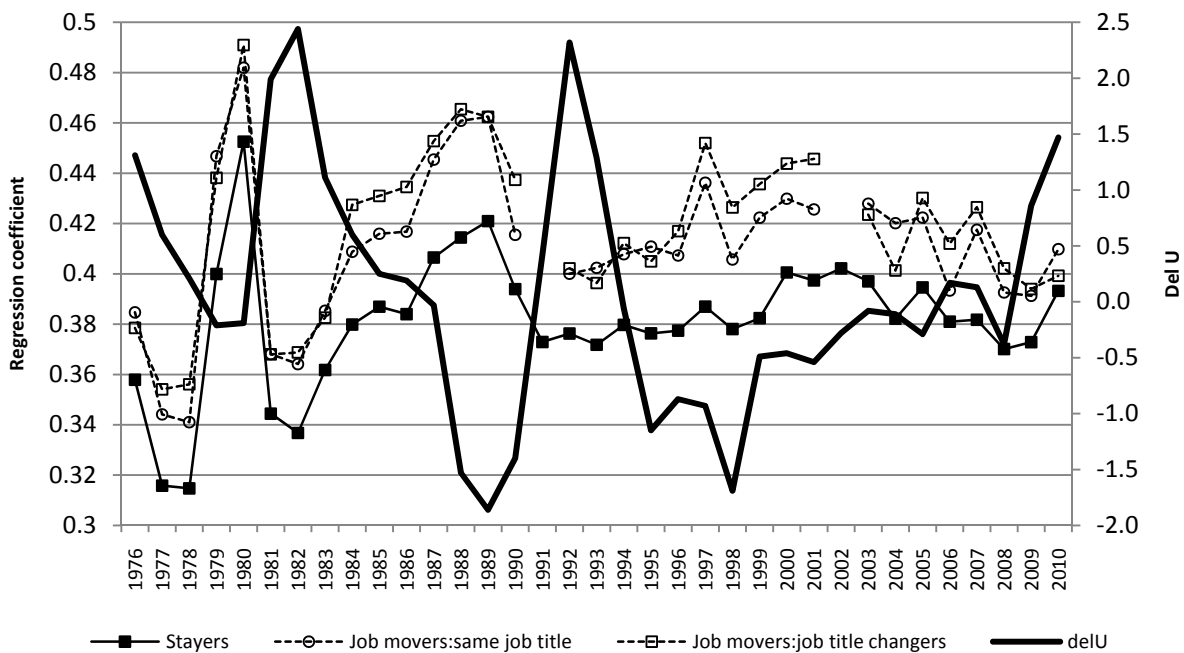
**Source:** Office for National Statistics



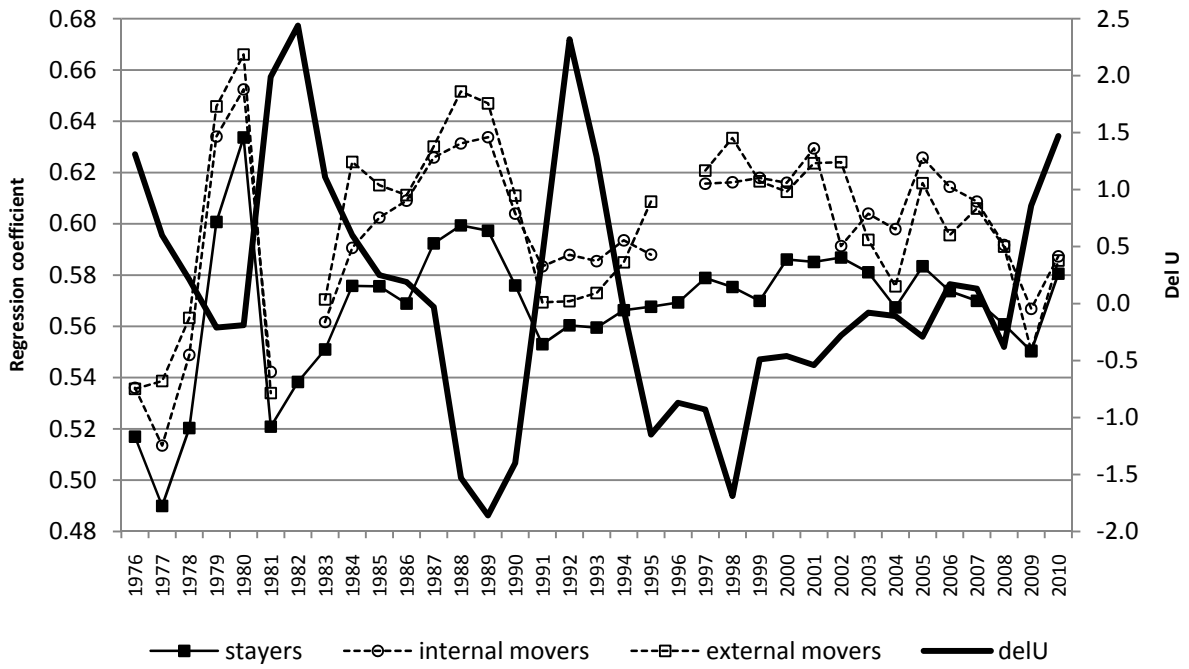
**Figure 2a Real wage changes of male job movers, job title changers, and job title retainers: 1976-2010**



**Figure 2b Real wage changes of female job movers, job title changers, and job title retainers: 1976-2010**



**Figure 3a Real wage changes of male job stayers, internal job movers, and external job movers: 1976-2010**



**Figure 3b Real wage changes of female job stayers, internal job movers, and external job movers: 1976-2010**

