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ABSTRACT

Real Wage Cyclicality of Female Stayers and Movers in Part-Time and Full-Time Jobs*

Based on the British New Earnings Survey Panel Data for 1975-2001, this paper investigates the real hourly wage cyclicality of part-time and full-time females. Relative degrees of wage responsiveness are estimated in respect of job stayers, movers between jobs (involving either retaining part-time or full-time job status or switching from one to the other), and movers within existing jobs (switching between part-time and full-time status within the same job). The work also incorporates separate estimates of the probabilities of changing jobs for the various mover categories. It is shown that distinguishing between private and public sector employment is important to work along these lines.

JEL Classification: J30, J62, E32

Keywords: wage cycles, females, part-time jobs, full-time jobs, stayers, movers

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1 Introduction

Starting with the work of Bils (1985), most longitudinal micro panel studies of cyclical wage behavior have established strong procyclicality in the U.S. (for example, Solon et al., 1994; Shin, 1994) and the U.K.(Hart 2006; Devereux and Hart, 2006). It has also been found that wage procyclicality among job movers exceeds that of stayers. However, these national wage pictures are less than complete since they fail to integrate the quantitatively important role of part-time work. Individuals working part-time, and especially female workers, comprise significant percentages of total employment. Take as an example the year 2001, the last year of the present study. OECD (2004) reports that 15 European Union member countries averaged 30 percent part-time to total employed women (5.9 percent of part-time to total men) while the respective percentages for the U.S. and Canada were 18.0 (8.0) and 27.1 (10.4). Among the highest rates of female part-time employment was the U.K., with comparable figures of 40.3 (8.3).[1]

The importance of embracing part-time employment in the study of wage cyclicality not only stems from the high incidence of part-time working but also from the fact that the micro wage literature emphasises the need to distinguish between job stayers and job movers. Movement between part-time and full-time employment - both between jobs *and* within existing jobs - is a highly significant aspect of total job mobility. Concentrating on female workers in the U.K., this paper provides the first comprehensive assessment of wage cyclicality in the context of both part-time and full-time work. It includes all categories of female stayers and movers. These cover (a) part-time and full-

[1] Australia and Japan were especially high - with respective figures of 41.0 (13.7) and 41.7 (15.8) – since their data are based on actual hours worked rather than numbers of individual observations. See Table 1 for implications of using hours data in order to evaluate the relative importance of part-time work.

time women who retain the same job and status from period to period (*job stayers*), (b) women who change job status (part-time to full-time and *vice versa*) within the same job (*within-job movers*), and (c) women who change jobs, either retaining or switching full-time/part-time job status (*between-job movers*).

Adding part-time to full-time workers in the analysis of wage cyclicality introduces a number of interesting questions. First, does the wage cyclicality of part-time stayers enhance/reduce/ leave unchanged existing national estimates in respect of full-time workers? The wage behavior of job stayers inevitably has a major bearing on total wage cyclicality because stayers account for very high percentages of total employment. Second, in parallel with equivalent full-time findings, is wage cyclicality associated with part-timers changing jobs significantly different from that of part-time stayers? Such job moves may involve retaining part-time status or moving to a full-time job. Third, do the degrees of wage cyclicality associated with part-timers moving to full-time jobs correspond to wage cyclicality of full-timers moving to part-time jobs? Arguments are presented that suggest that we may expect asymmetries between wage changes resulting from these two directions of move. Fourth, compared to stayers, is wage cyclicality affected by moves between full-time and part-time job status (in either direction) *within the same* job? This type of question is unique to this study because the part-time/full-time distinction introduces the notion of job moves within an existing job description. It also turns out to be a quantitatively important question because significant numbers of women move between part-time and full-time job status within their existing companies and job titles.

I attempt answers to these types of question based on the UK New Earnings Survey Panel Data (NESPD) for the period 1975 to 2001. The panel, based on individual-level payroll statistics, comprises a random sample of 1% of British workers in employment. A part-time job is classified in the NESPD as involving less than or equal to 30 basic (i.e. non-overtime) weekly hours. The work here concentrates on changes in basic hourly real wages. As reported above, and shown in detail below, part-time work is overwhelmingly a female activity in the UK labor market. The analysis is based on 79 thousand part-time and 117 thousand full-time women.

2. Classification of part-time and full-time job stayers and movers

I begin by illustrating the full classification of stayers and movers that will feature in the subsequent developments.

Figure 1 Stayer/mover classification

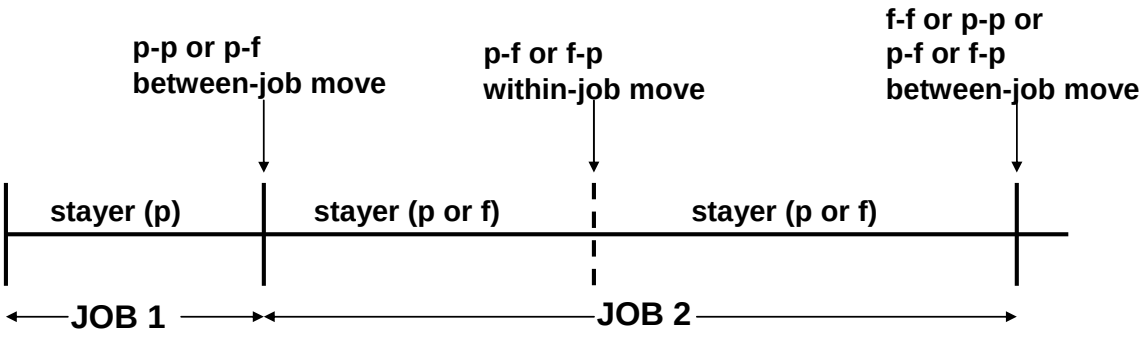


Figure 1 represents two complete job spells of a given individual. During her tenure in job 1, she remains as a part-time job stayer (*p*). What are her possible options at the end of job 1? At the point of between-job change – i.e. moving from job 1 to job 2 – two possibilities arise. She may chose either to remain in part-time employment (denoted as a $p - p$ move) or to switch from part-time to full-time employment (a $p - f$ between-

job move). As a result, for the first period of job 2, she is either (again) a part-time stayer or becomes a full-time stayer (*f*). Some way through job 2, she may have the opportunity to realise a within-job change in employment status. This could be a $p - f$ or a $f - p$ within-job move depending on prior status. She then would become an *f*- stayer or a *p*-stayer. Taking these various potential change sequences together, a change of job at the end of job 2 involves four distinct possibilities. Two of these represent unchanged job status ($p - p$ or $f - f$ moves) and two changed status ($p - f$ or $f - p$ between-job moves). In all, therefore, we have exhaustively identified eight categories of stayers and movers: these comprise two types of stayer (*p* or *f*), two types of within-job mover ($p - f$ or $f - p$) and four types of between-job mover ($p - p$ or $f - f$ or $p - f$ or $f - p$).

For any two consecutive periods, the classification in Figure 1 defines four states that are either unequivocally part-time (i.e. *p* and $p - p$) or full-time (*f* and *f* - *f*). The remaining four states are transitional – i.e. $p - f$ and $f - p$ for within- and between- job moves. Notwithstanding, it is useful to classify these transitional movers as either part-time or full-time and this is conditioned simply by their status in the first of any two consecutive periods. So, a within/between $p - f$ job mover is classified as a part-time individual while an equivalent $f - p$ mover is a full-time individual.

Let M_t denote a binary variable indicating that a job move has taken place at time *t*. From the foregoing we distinguish among six different categories of move, such that

$$(1) \quad M_t = \sum_{i=1}^{3} M_{pit} + \sum_{i=1}^{3} M_{fit} \quad (i = 1,2,3)$$

Table 1 Numbers of female and male stayers/movers observations: NESPD, 1975 - 2001

Females	Observations	(% obs.)	(% hours)	Males	Observations	(% obs.)	(% hours)
PART-TIME							
S_{pt}	275,726	(27.7)	(17.3)	S_{pt}	22,781	(1.6)	(0.8)
M_{p1t}	19,739	(2.0)	(2.3)	M_{p1t}	5,132	(0.4)	(0.4)
M_{p2t}	22,661	(2.3)	(1.4)	M_{p2t}	2,067	(0.1)	(0.1)
M_{p3t}	9,408	(0.9)	(1.1)	M_{p3t}	3,170	(0.2)	(0.2)
Total p/t	327,534	(32.9)	(22.1)	**Total p/t**	33,150	(2.4)	(1.5)
FULL-TIME							
S_{ft}	566,289	(56.8)	(66.8)	S_{ft}	1,206,302	(87.0)	(88.0)
M_{f1t}	18,119	(1.8)	(1.4)	M_{f1t}	5,291	(0.4)	(0.2)
M_{f2t}	78,319	(7.9)	(9.3)	M_{f2t}	140,310	(10.1)	(10.2)
M_{f3t}	6,505	(0.6)	(0.4)	M_{f3t}	2,341	(0.2)	(0.1)
Total f/t	669,232	(67.1)	(77.9)	**Total f/t**	1,351,244	(97.6)	(98.5)
Total (p/t + f/t)	996,766	(100.0)	(100.0)	**Total (p/t + f/t)**	1,387,394	(100.0)	(100.0)

Part-time defintions
S_{pt} : p -stayer;
M_{p1t} : $p - f$ within-job mover;
M_{p2t} : $p - p$ between-job mover;
M_{p3t} : $p - f$ between-job mover.

Full-time definitions
S_{ft} : f -stayer;
M_{f1t} : $f - p$ within-job mover;
M_{f2t} : $f - f$ between-job mover;
M_{f3t} : $f - p$ between-job mover.

where *p* denotes a part-time worker and *f* a full-time worker, each defined over three categories of move. Definitions of the six mover categories together with two job stayer categories, S_{pt} and S_{ft} are given in Table 1. A stayer is defined as an individual observed in period *t* who is in the same job and has the same part-time or full-time status as in period *t*-1. The table gives relative frequencies of observations in the complete data set used here for each of these classifications. It also provides the comparable male data comparisons.

From Table 1 we find that one-third of total female observations are part-timers in sharp contrast to 2.4% of males (denoted in columns headed % obs.). Males are excluded from the subsequent analysis because of the small numbers of male part-timers (see also Figure 2) and the related fact that there are relatively small numbers of observations of part-time male job movers. Strictly speaking defining the incidence of part-time work based on numbers of observations overestimates its total contribution to total employment because part-timers work fewer hours than full-timers. For both females and males, Table 1 also shows part-time and full-time stayers and movers defined in terms of the proportion of hours worked in each group of observations divided by total hours over all observations (denoted % hours). On this definition, part-time females account for 22.1% of total female employment in the NESPD while part-time men drop to 1.5% of total male employment.

Of all part-time female observations, 84% are stayers and this compares closely to 85% stayers among full-time females. Of part-time movers, there are almost as many observations of *p* – *f* within-job moves as *p* – *p* moves. Each of these mover groups involve over twice as many observations as *p* – *f* between-job movers. As for full-time

movers, *f* – *f* job moves clearly predominate. Again, however, the importance of within-job moves is apparent. Thus, *f* – *p* within-job moves are almost three-times more frequently than *f* – *p* between-job moves.

3 Stayers, movers and wage cyclicality

The evaluation of wage and job cyclicality over full-time and part-time workers embraces four areas of interest. First, what is the comparative degree of wage cyclicality among *p*- stayers and *f*- stayers? Second, do wage changes associated with changes in job status within-jobs exhibit different degrees of cyclicality compared to wage changes among job stayers? Third, do hourly wage changes connected with between-job moves display differences compared to job stayers? Fourth, are the propensities to move jobs themselves sytematically related to the cycle?

Wage changes and the cycle

Hart (2006) and Devereux and Hart (2006) analysed the full-time NESPD data. Two strong facts emerged in relation to both females and males. First, the wages of both *f* - stayers and *f* – *f* movers are strongly procyclical. Second, wages of *f* – *f* movers displayed significant incremental increases in cyclicality compared to *f*- stayers. Would we expect comparable findings in relation to *p*- stayers and *p* – *p* movers?

We might anticipate downward pressures on full-time wages within firms if during recessionary periods – and perhaps due to turnover and other fixed costs - actual employment stocks exceed desired employment. Similarly, towards cyclical peaks, upward wage movements may reflect a shortfall of actual to desired employment levels. Freisen (1997) identifies complementarities in employment adjustments between full-

timers and part-timers. Dynamic labor demand specifications using U.S. data from the Current Population Survey, reveal that disequilibrium in full-time employment slows down the rate of adjustment of part-time employment. This may indicate corresponding directions of wage pressures over significant parts of the cycle for *p*- stayers and *f*- stayers.

Would we expect wage cyclicality of *p* – *p* movers exceed that of *p*- stayers, in like manner to *f*- *f* movers and *f* - stayers? It is difficult to reach an unequivocal answer. For example, Devereux and Hart (2006) suggest that implicit contracts between the firm and full-time job stayers may tend to blunt stayers' cyclical wage effects compared to a greater recourse to the spot market in the case of job movers. Further, Hart (2006) argues the case for similar relative effects resulting from rent sharing between the firm and full-time job stayers. These lines of reasoning are likely to apply less forcibly to part-timers. For example, lower hiring and training investments in part-time workers (see Montgomery, 1988) will detract from perceived gains to be derived from rent and risk sharing. In other respects, however, there are reasons for anticipating that *p* – *p* movers may experience greater procycality than *p*- stayers. As with their full-time counterparts, relatively productive part-timers are more likely to seek and achieve internal job promotions and improved outside job offers during business cycle expansions. During recessionary periods, less productive part-timers may be more prone to suffer wage cuts.[2]

What about changes in job status among existing part-timers who remain in the same job? One existing piece of evidence points towards the possibility of strong wage

[2] Downward wage adjustments in Britain are not at all uncommon (see Nickell and Quintini, 2003).

procyclicality among $p - f$ within-job movers. Using an Upjohn Institute employer survey for 1996, Houseman (2001) reports evidence that part-time work is used partly as a screening device for regular full-time job positions. Since part-time contracts may involve less employment protection, then it could be cost effective to the employer to observe workers' abilities and work performances while working part-time and subsequently offer full-time employment to the more productive individuals. To the extent that promotions to full-time jobs are likely to occur mainly during expansionary phases of the cycle, and given that promotion is conditioned by productive performance, then $p - f$ within-job moves may well be associated with strong procyclical wages. It is also possible that part-timers are employed as a form of labor hoarding. During slack economic conditions, the firm may hire and train more than the usual numbers of part-timers per period. This provides a relatively cost effective way of creating a given potential employment stock. Then, during an upturn in economic activity, the firm has the ability to increase total working hours by converting part-time into equivalent full-time jobs. This has the added advantage of reducing search and hiring costs during tight labor market conditions. In this instance, wage cyclicality at the point of $p - f$ job change would reflect entry into a relatively tighter product/service demand regime.

For different reasons, we might also expect strong wage procyclicality to be evident among p - f between-job movers. As mentioned above, more productive workers are likely to realise wage gains due to job promotions and successful outside job search activities during expansions. Some of these types of movers will involve simultaneously conversion from part-time to full employment.

Wage cyclicality associated with changing job status in the $f - p$ direction, either within- or between-jobs, may well entail *lower* wage cyclicality than that accompanying $p - f$ movers. There are a number of major reasons for suspecting that many female $f - p$ moves occur for reasons that are, at best, weakly connected with the business cycle. Marriage/co-habitation, child rearing[3], re-entry into education, and substituting greater household (and leisure) activity during middle age are obvious examples.[4] But, of course, arguments do not run completely in one direction. For example, Houseman (2001) reports that employers are more likely to agree to requests for a switch from full-time to part-time work if they involve valued employees. Such accommodation may be especially forthcoming during periods of high demand when losses of strategic workers may be especially costly.[5] In fact, to avoid the risk of losing workers completely at such critical times, firms may offer increased hourly wages in order partially to offset losses in wage income.

In their analysis of full-time wage cyclicality, Devereux and Hart (2006) argue that three dichotomies of the panel data are worth exploring. These are separations into (a) private and public sectors, (b) covered and uncovered by a collective bargaining agreement, and (c) young and old age groups. There are good reasons for investigating these disaggregations in relation to part-time employment. Take as an example $p - f$

[3] Child rearing is particularly linked to women in their 20s and 30s. The rise in part-time employment between women's mid 20s and mid 30s in the NESPD is illustrated in Figure 3 and linked to job move propensities in Figures 4 and 5 (see Section 5).

[4] Although similar arguments may apply to $p - f$ moves. For example, separation and divorce may force some part-time women to seek full-time employment due to significantly worsened personal economic conditions.

[5] If a quit threat occurs from a full-time employee in whom the firm has incurred significant sunk costs in firm-specific capital, an agreement to switch to part-time employment may offer the chance of minimizing potential investment losses.

within-job moves that result from on-the-job screening while initially working part-time. It seems reasonable to expect that the private sector may be in a better position to make use of part-time work along these lines. Public sector employment rules and regulations, combined with far greater recourse to collective bargaining (see Table 2), may well limit practices such as the temporary and strategic use of part-time during a performance-assessment period. In other words, the public sector is more likely to provide part-timers with employment protection and other employment conditions that match full-time equivalents. Further, to the extent that part-time work is used during periods of screening, it seems reasonable to expect *a priori* that younger employees would be most affected. Returns to screening would be likely to be negatively related to labor market experience and tenure.

Job moves and the cycle

Job moves in the NESPD are recorded if they take place either within or between firms. In their earlier study, Devereux and Hart (2006) attempt to distinguish between these two types of move. They find that the probability of such moves, and especially those involving inter-firm mobility, are procyclical. The definitions of job move in the present study are somewhat different. First, a move is recorded within the *same* job if a change in (full-time/part-time) job status is recorded. Second, as in the original NESPD data, a between-job move is recorded here if it occurs either internally or externally. Thus, no attempt is made here to estimate whether or not between–job move has occurred within a given company or between companies.

There are reasonably strong grounds for suspecting that both within- and between-job moves are procyclical. Increased economic activity associated with upturns of

business cycles are likely to lead to more promotion opportunities within existing firms and more outside job opportunities in outside firms. It is clearly important to account for the effects of prevailing business conditions *both* on wage increments linked to job changes as well as on propensities of job changes themselves.

4 Data

The New Earnings Survey Panel Data (NESPD) is based on payroll statistics covering one percent of all British employees. Data are collected once each year, with questions relating to a specific week in April. The NESPD starts in 1975 and the work here covers the period 1975 to 2001. Information is obtained directly from employers rather than, as with most household data sets, from individual responses. It is a legal requirement to complete the survey questionnaire. The NESPD is a panel data set with inclusion in the sample predicated on the last two digits of an individual's National Insurance (NI) number. Since all individuals are issued with a NI number, the statistics represent a random sample taken from the entire population. Individuals can be tracked from region to region and employer to employer given that they are identified through their NI numbers. The legal status of the questionnaire combined with the fact that it is kept short, ensure both a high response rate and an accurate record.

Attention is confined to part-time and full-time workers holding single jobs. The wage measure used here is "gross weekly earnings excluding overtime divided by normal basic hours for employees whose pay for the survey period was not affected by absence." The are two advantages of using basic hourly wages.[6] First, it facilitates strict pay

[6] One concern is that employers may report hours worked inaccurately and this would bias estimates based on hourly rates. Hart and Devereux (2006) provide fairly strong evidence that this is unlikely to be a major problem.

comparisons between part-timers and full-timers. The use of average weekly earnings is problematic because overtime working is less prevalent among part-timers. Second, in any event, Hart (2006) and Devereux and Hart (2006) find that adding overtime in the measurement of full-time pay makes no significant difference to the NESPD estimates of wage cyclicality. Wages are deflated by the British Retail Price Index, an index similar in design to the U.S. Consumer Price Index (CPI). The NESPD includes information on age, sex, occupation, industry, and geographic location of individuals (but not education or race). The panel also records whether an individual is working in the private or public sector and also whether she is covered by a collective bargaining framework. The samples consist of 117 thousand full-time and 79 thousand part-time women. It is not possible to calculated an individual's work experience and so age is used as a regressor instead.

A very significant advantage of NESPD for the current type of research is that the data are job-based. A part-time job is defined as involving less than or equal to 30 hours per week, exluding meal breaks and overtime hours. The exception is teachers for whom 25 replaces 30 weekly hours in the definition of what constitutes part-time work. Between one April census and the next, a very clear distinction is provided between job stayers and job movers. A question in the Survey records whether an employee has remained in a given part-time or full-time job within the company for more than 12 months or less than 12 months. This information allows us accurately to identify job movers, defined as individuals who have *either* changed jobs within the same company *or* changed companies.[7] Additionally, the Survey records if an individual has changed from part-time

[7] The job-change question is detailed. It requires employers to submit the employee's full job title as well as her rank or grade. Additionally, it requests a short description of the job tasks carried out by the employee.

to full-time or from full-time to part-time job status while working within a given job description.

There are three major sets of reasons for using NESPD in the present study. First, it comprises an extremely large panel that covers a long period of time. Second, it is based on official payroll data collected for tax purposes and, therefore, relatively very accurate. Third, it is job-based and so provides excellent detail on job stayers and job movers. There is, however, one significant shortcoming. Since New Earnings Survey data are based on tax records, employees who earn less per week than the lower tax thresholds are omitted from the sampling frame. Such exclusions are far more problematic among part-timers compared to full-timers because the former include higher proportions of low-pay workers. The two main consequences are that the NESPD (a) excludes low-paid women[8] and, relatedly, (b) overestimates individual earnings.[9] It is difficult to assess the implications of omitting low paid females for the wage estimates. It is important to emphasise, however, that this drawback is overwhelmingly counteracted by the positive attributes of these data.

The adopted business cycle proxy is the national claimant count unemployment rate produced by the British Office for National Statistics.[10] Wage agreements in Britain typically cover a 12 month period and so the wage measures in the NESPD generally refer to wage settlements negotiated between April, when the samples are taken, and May of the

[8] About 20 percent of part-time women were estimated to be unreported in the mid 1990s (Orchard and Sefton, 1996).

[9] Britain's main household-based earnings survey is the Labour Force Survey (LFS), based on 60,000 households. While it has major limitations compared to the NESPD – for example it has very limited panel properties – it does offer more comprehensive coverage of the low paid. Weekly earnings from the New Earnings Survey are found to be consistently higher than the LFS. For example, in 1997, the differences were found to be about 4 percent for full-time employees, and 14 percent for part-time women (Wilkinson, 1998).

[10] The main reason for choosing claimant count data is that they provide consistent monthly data back to 1975.

previous year. Accordingly, the unemployment rate is constructed to measure the average of the 12 monthly unemployment rates between May of the previous year and the survey month of April.

5 Background statistics

Figure 2 shows rising trends of female and male percentages of part-time to respective total observations over the 26 years covered in this study. The female percentage rose from 28.3% in 1975 to 39.4% in 2001. The equivalent male percentages were 1.6% and 5.7%.[11] Concentrating on part-time and full-time females, Table 2 provides comparative descriptive statistics covering the whole 1975 – 2001 period. At 44 years, the mean age of part-time females is 7 years greater than full-time. The reason from this is readily established from Figure 3 which shows the percentages of part-timers and full-timers at each age over the entire age spectrum from 16 to 90 years. The full-time distribution is bi-modal, with an especially marked peak in the mid-20s age groups. The second peak occurs in the late- 40s. The pronounced dip between the full-time peaks is mirrored by a steep rise in the proportions of part-time women between their early 20s and late 30s. The part-time graph peaks between early to late 40s. From the early 50s, there is a steep decline in the percentages of both groups. Overall, the left skewness of the full-time distribution and the right-skewness of the part-time account for the higher mean age of the latter group.

It would be expected that the changing concentrations of part-time and full-time women over the age distributions would to some degree relate to propensities to move

[11] I regressed these percentages on a constant, time trend, and change in the national unemployment rate. At this aggregate level, both female and male regressions displayed acyclical responses in the part-time percentages.

Figure 2 Percentage of part-time to total observations in NESPD: females and males, 1975-2001

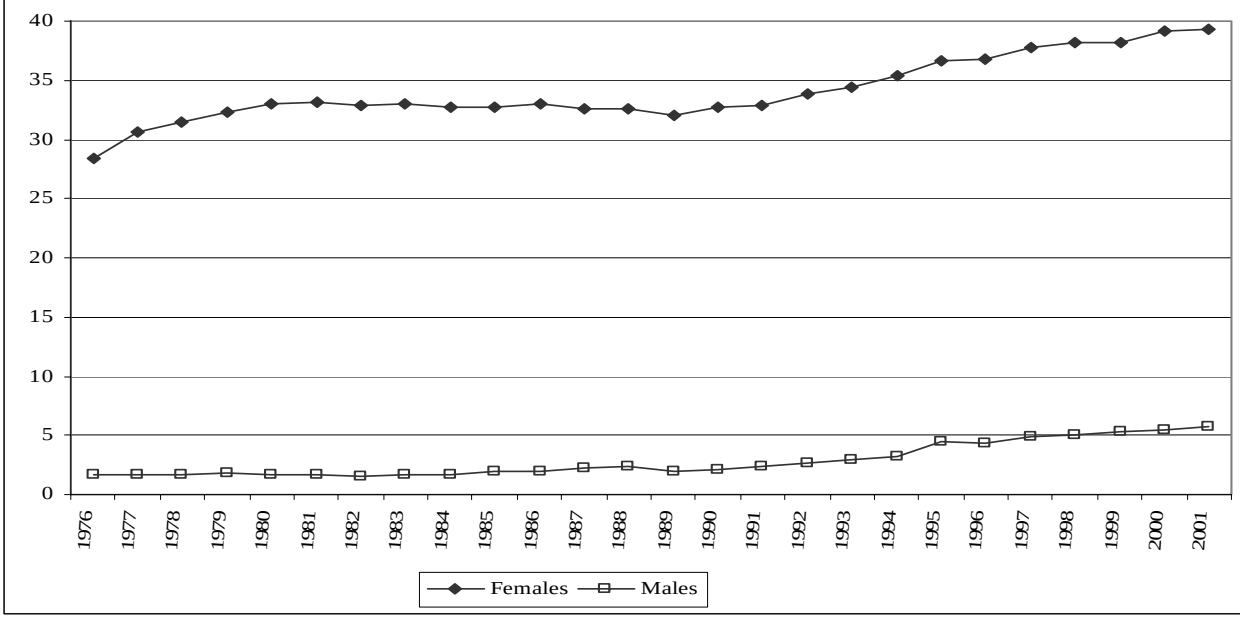


Figure 3 Percentages of part-time and full-time women within ages from 16 to 90

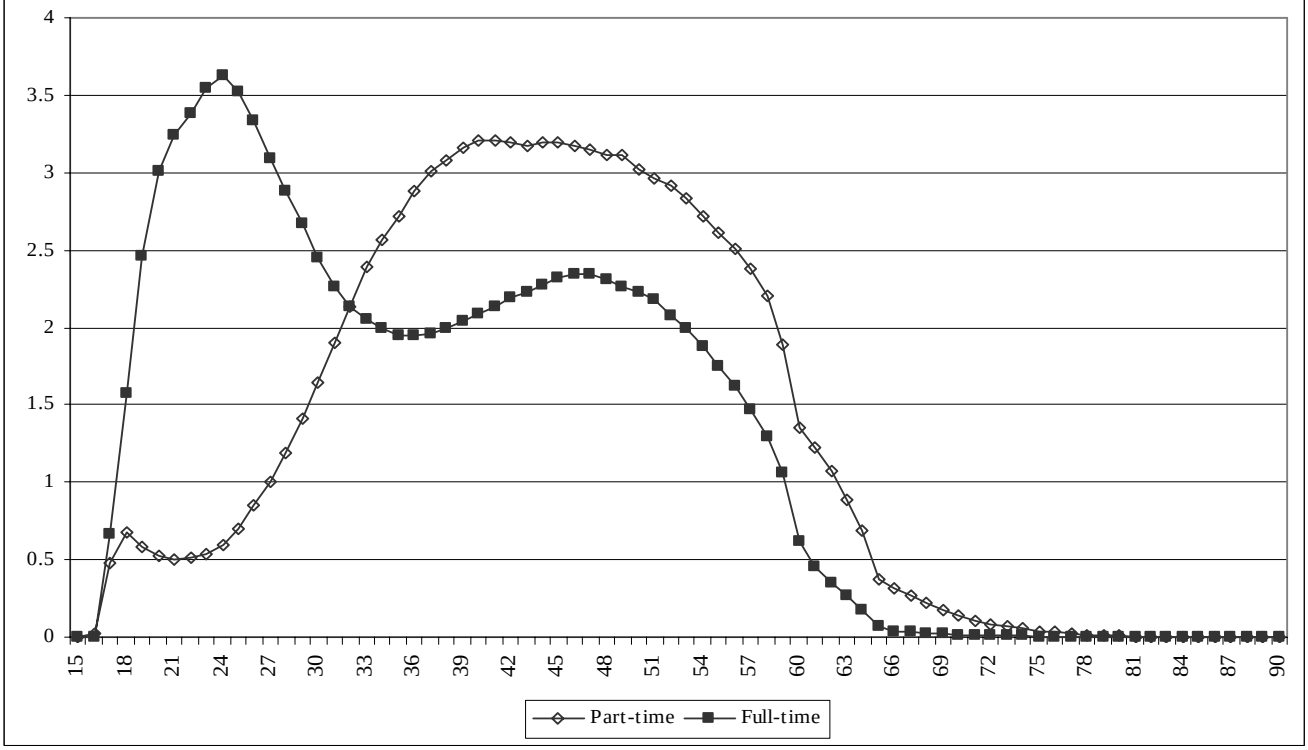


Table 2 NESPD summary statistics, 1975 – 2001

	Part-time females	Full-time females
Number of observations **(Number of individuals)**	327,534 (79,488)	669,232 (117,553)
Mean age **(Median age)**	44 (44)	37 (36)
Mean weekly basic paid-for hours **(standard deviation)**	20.9 (7.9)	36.1 (4.2)
Basic hours changes of p – *f* and *f* – *p* within-job moves **(standard deviation)**	12.9 (7.6)	-12.8 (7.4)
Basic hours changes of p – *f* and *f* – *p* between-job moves **(standard deviation)**	17.6 (8.1)	-16.6 (7.5)
Mean Δlnw of p- and f- stayers **(standard deviation)**	0.009 (0.2)	0.03 (0.1)
Mean Δlnw of p-f and f-p within-job movers **(standard deviation)**	-0.07 (0.4)	0.12 (0.4)
Mean Δlnw of p-p and f-f movers **(standard deviation)**	0.24 (0.03)	0.08 (0.02)
Mean Δlnw of p-f and f-p between job movers **(standard deviation)**	0.74 (0.4)	-0.01 (0.4)
Private sector as proportion of total observations	48%	58%
Bargaining coverage as proportion of total observations	59%	50%
Private sector *and* bargaining coverage as proportion of total observations	12%	13%
Public sector *and* bargaining coverage as proportion of total observations	47%	37%

between the two employment states. Figures 4 and 5 show, respectively, $f - p$ and $p - f$ job moves by age, both between and within jobs. In these figures both between- and within-job moves are highly positively correlated. The initial rise in full-time employment at the start of working life shown in Figure 3 corresponds with a brief early period of high percentages of $p - f$ job moves in Figure 4. Then Figure 3 reveals marked falls in full-time/rises in part-time employment between mid 20s and mid 30s. These movements are overlapped in part by a fall in $p - f$ moves in Figure 4 up to the late 20s while they are more comprehensively matched in Figure 5 by a rise in $f - p$ moves. The modest recovery of full-time employment between the late 30s and mid 40s was preceeded, and then overlapped, by rises in $p - f$ moves in Figure 4 and accompanied by relatively steep declines in $f - p$ moves in Figure 5.

As for hours of work, Table 2 reveals that average basic weekly working time of full-time females was 15 hours longer than part-time; that is, 36 compared to 21 hours. Moving from part-time to full-time jobs (i.e. $p - f$ moves) involved average weekly basic hours increases of 12.9 hours for within-job moves and 17.6 hours for between-job moves. These magnitudes were closely matched in the other direction; within-job $f - p$ moves involved reductions of 12.8 weekly basic hours while between-job $f - p$ moves reduced weekly hours by 16.6. Not shown in the table, stayers and $f - f$ job movers averaged extremely small hours changes while p - p job moves involved average changes of 0.6 weekly hours. The dependent variable in the subsequent wage regressions is the change in the log of the real basic wage (Δ *lnw*). From Table 2, it is clear that easily the biggest mean change in this variable occurred for $p - f$ between-job movers. Interestingly, the smallest change was experienced by their within-job counterparts.

Figure 4 Female *p - f* job movers by age
(Percentage of total observations at each age, 1975-2001)

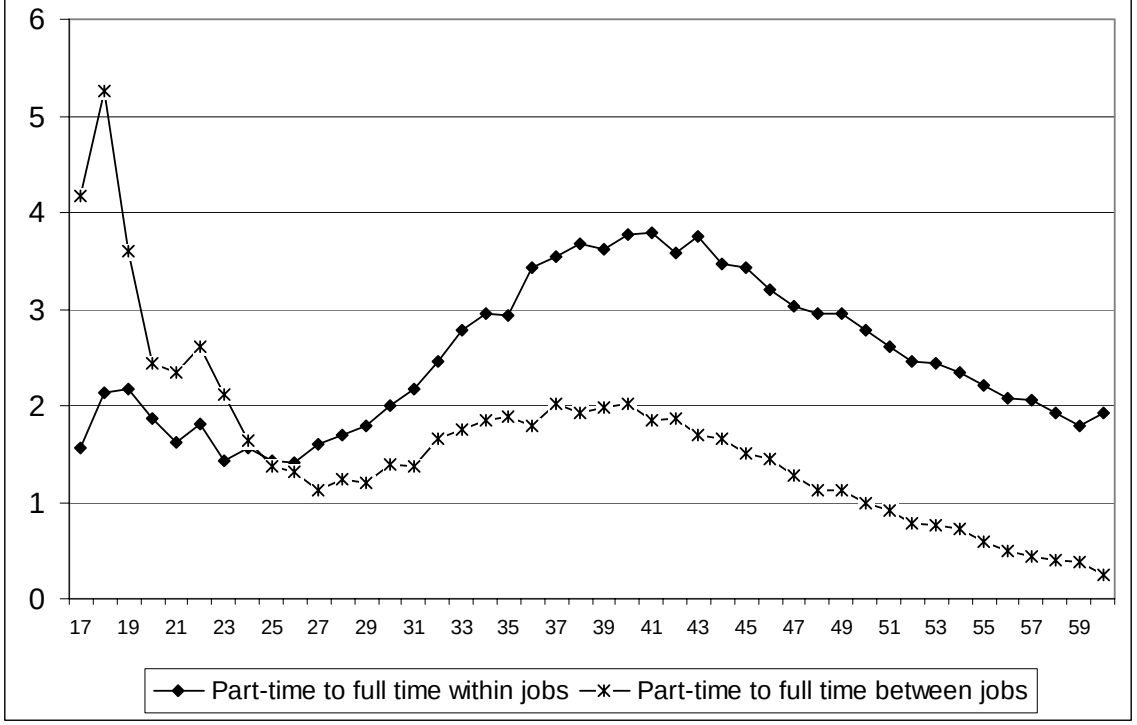
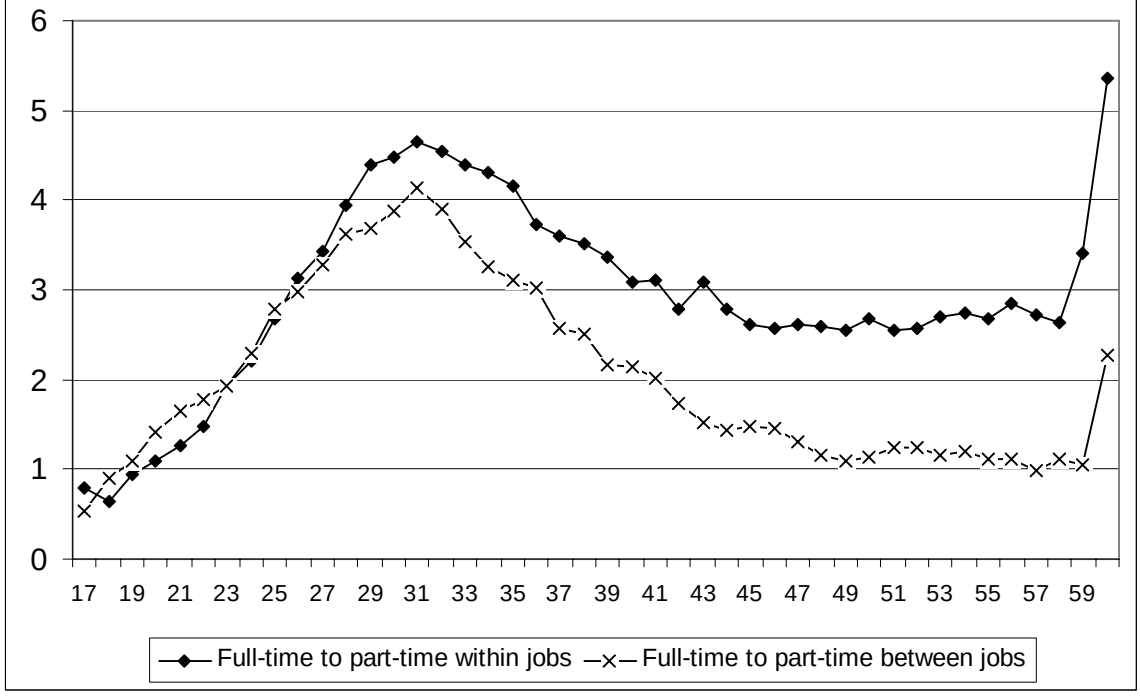


Figure 5 Female *f - p* job moves by age
(Percentage of total annual observations at each age, 1975-2001)



An important later distinction is the private-public sector dichotomy. In the full data, 48% of part-timers and 58% of full-timers worked in the private sector. The higher proportion of part-timers in the public sector accounts for the fact that there are proportionately more part-timers covered by a collective bargaining agreement (58%) than full-timers (50%). The last two rows of Table 2 reveal that collective bargaining coverage is a far more significant phenomenon in the public compared to the private sector.

Table 3 Positions of average job movers on income distributions during periods of rising and falling unemployment

	Unemployment rising	**Unemployment falling**
***p – f* within-job movers**	(between) 50^{th} - 55^{th} percentile	50^{th} - 55^{th} percentile
***p – p* movers**	40^{th} - 45^{th} percentile	40^{th} - 45^{th} percentile
***p – f* between-job movers**	45^{th} - 50^{th} percentile	45^{th} - 50^{th} percentile
***f – p* within-job movers**	60^{th} - 65^{th} percentile	65^{th} - 70^{th} percentile
***f – f* movers**	65^{th} - 70^{th} percentile	65^{th} - 70^{th} percentile
***f – p* between-job mover**	50^{th} - 55^{th} percentile	50^{th} - 55^{th} percentile

Table 3 shows the average percentile positions on the total wage distribution of the six categories of movers. For later purposes these are shown during periods of rising and falling unemployment. Unsurprisingly, the highest wage ranking occurs among movers switching between full-time jobs. Close behind are full-timers who switch to part-time work within the same job. For many workers, such *f - p* moves involve losses in weekly

earnings rather than hourly rates for the job. The lowest wage ranking occurs among women working part-time who switch to another part-time job.

6 Empirical set-up

Decompositions of part-time and full-time wage cyclicality

The following approach to decomposing the total wage cyclicality of part-time and full-time individuals into their respective stayer and mover classifications is based on Solon, Whatley, and Stevens (1977) and Devereux and Hart (2006).

Let P_i represent the weight attributed to the proportion of workers changing job within the i'th mover category. Given we are dealing with part-time and full-time jobs, it is natural to weight each individual by hours worked. So, $P_i = h_i/H$ where h_i is the total hours worked in the i'th mover group and H is the total hours worked over all observations (see Table 1 for the relative weights based on hours). Let $E(\Delta lnW_{K0})$ be the expected wage growth of job stayers ($K = p, f$). Further, let $E(\Delta lnW_{Ki})$ denote the expected wage growth of the i'th category of job mover (i = 1,2,3). Then, overall expected wage growth of either part-time ($K = p$) or full-time ($K = f$) observations is expressed

$$(2)\quad E(\Delta \ln W_K) = (1 - P_1 - P_2 - P_3)E(\Delta \ln W_{K0}) + \sum_{i=1}^{3} P_i E(\Delta \ln W_{Ki})$$

$$= E(\Delta \ln W_{K0}) + \sum_{i=1}^{3} P_i E(\Delta \ln W_{Ki} - \Delta \ln W_{K0}) \quad (K = p, f)$$

where the three part-time mover groups (i.e. $K = p$) or full-time mover groups ($K = f$) are listed at the bottom of Table 1.

Differentiating (2) with respect to the change in the unemployment rate, ΔU, provides a decomposition of total part-time or full-time wage cyclicality, that is

$$(3)\quad \partial E(\Delta W_K)/\partial(\Delta U) = \partial E(\Delta \ln W_{K0})/\partial(\Delta U) + \sum_{i=1}^{3} P_i[\partial E(\Delta \ln W_{Ki} - \Delta \ln W_{K0})/\partial(\Delta U)] + \sum_{i=1}^{3}[E(\Delta \ln W_{Ki} - \Delta \ln W_{K0})]\partial P_i/\partial(\Delta U) \quad (K = p, f).$$

The first term on the right-hand-side of (3) expresses wage/unemployment responses of part-time or full-time stayers. The second term denotes the incremental effect on wage cyclicality of part-time or full-time movers relative to their respective stayers. The third term represents the contribution of part-time or full-time job changes. For part-timers, therefore, there are four wage responses (p- stayers, *p – f* within-job movers, *p – p* and *p – f* between-job movers) and three job change probabilities (depicting *p – p* and *p – f* within- and between- job changes). Equivalently for full-timers, there are four wage changes (f- stayers, *f – p* within-job movers, *f – f* and *f – p* between-job movers) and three job changes (*p – p* and *p – f* within- and between- job changes).

Estimation

In essence, the empirical work concerns an evaluation of equation (3). This involves four main sets of questions. First, are the wages of p- and f- stayers significantly procyclical? Second, are the wage cycles of p- movers and f- movers significantly different from their equivalent stayers? Third, are job change probabilities significantly procyclical? Fourth, what are the relative contributions of wage and job changes of stayers and movers to the total wage cyclicality of part-time and full-time workers?

(a) Wage change estimation

The approach to the first two of these questions, concerning wage cyclicality, follows the two-step estimation procedure of Solon, Barsky, and Parker (1994) (see also Devereux, 2001). This is designed to prevent downward biases in the standard errors of wage-unemployment estimated coefficients when mixing individual-level wages with national-level unemployment rates (Moulton, 1986). The wage equation is estimated in step 1 for individual i at time t. This is given by

$$(4) \quad \Delta \ln w_{Kit} = \alpha A_{Kit} + \sum_{t=1}^{T} \phi_{K0t} D_t + \sum_{t=1}^{T} \sum_{i=1}^{3} \phi_{Kit} M_{Kit} D_t + \varepsilon_{Kit}$$

where w is the real basic hourly wage, A is a cubic in age, D_t is a dummy variable equal to 1 if the observation is for year t, and ε is a random error term. The $M.D$ terms denote interaction between the three part-time (i.e. $K = p$) or full-time ($K = f$) mover dummies, expressed in equation (1) (see also Table 1), and the time dummy.

In step 2, the dummy variable estimates, $\hat{\phi}_{Kjt}$ $(K = p, f; j = 0,1,2,3)$ are regressed on the change in the unemployment rate, a linear time trend (from 1 to 26), and constant; that is

$$(5) \quad \hat{\phi}_{Kjt} = \beta_{Kj0} + \beta_{Kj1} \Delta U_t + \beta_{Kj2} Year_t + \nu_{Kjt} .$$

Equation (4) is estimated by OLS and equation (5) by weighted least squares (WLS) where the weights are the number of individuals observed in a given year. The dependent variable is multiplied by 100 which allows the estimated coefficient on the

change in the unemployment rate to be interpreted as the percentage change in the wage for a one-point change in the unemployment rate.

Equation (5) links directly to the decomposition of wage cyclicality in (3). Using $\hat{\phi}_{K0t}$ in (5), the estimated value of β_{K01} gives the cyclical wage response of *p*-stayers ($K = p$) and *f*-stayers ($K = f$). This is the first term on the right-hand-side of (3). Using the remaining $\hat{\phi}_{Kit}$ ($K = p,f;\ i = 1,2,3$) in (5), we obtain estimates of β_{Ki1} which is the incremental wage effect related to each of the six categories of job move. These comprise the second term of (3).

(b) Job change estimation

The third question relates to estimating the cyclicality of within- and between-job moves. These comprise the last term in (3). The same two-step approach is used, replacing Δlnw_{it} in equation (4) with the binary variables in (1) that indicate six types of job move (three each for part-time and full-time workers). Thus, the estimating equation is applied to one category of job move at a time and takes the form

$$(6)\quad M_{Kit} = \alpha A_{Kit} + \sum_{t=1}^{T} \eta_{Kit} D_t + \mu_{Kit}$$

$$(7)\quad \hat{\eta}_{Kit} = \beta_{Ki0} + \beta_{Ki1}\Delta U_t + \beta_{Ki2} Year_t + \nu_{Kit} \quad (K = p, f;\ i = 1,2,3).$$

In line with the wage specifications, equation (7) is estimated using weighted least squares and so, in effect, this is a linear job change probability model.[12]

[12] I use the linear probability model to be consistent with the approach of Solon et. al. (1997) and Devereux and Hart (2006). Its main advantage is that it permits use of the same 2-step approach adopted for wages.

(c) Estimation of contributions to total wage cyclicality

The fourth question involves assessing the relative importance of the right hand side arguments in equation (3) to total wage cyclicality. This is more directly approached by re-rewriting (3) so as to decompose total wage cyclicality into the separate contributions of the wage changes of job stayers and job movers as well as the probabilities of job moves. Thus,

$$(8)\quad \partial E(\Delta W_K)/\partial(\Delta U) = (1 - P_1 - P_2 - P_3)\partial E(\Delta \ln W_{K0})/\partial(\Delta U) + \sum_{i=1}^{3} P_i[\partial E(\Delta \ln W_{Ki})/\partial(\Delta U)] + \sum_{i=1}^{3}[E(\Delta \ln W_{Ki} - \Delta \ln W_{K0})]\partial P_i/\partial(\Delta U) \quad (k = p, f;\ i = 1,2,3)$$

recalling that $P_i = h_i/H$ represents the proportion of workers in the i'th mover category weighted by each group's share of total hours.

Composition bias

The foregoing estimates will be biased if there are systematic differences in the types of individuals who move over the business cycle that are not accounted for by the fixed individual effects and age variables in the estimating equations. For example, if movers during a boom are predominantly individuals whose productivity is increasing, and movers during a recession are predominantly individuals whose productivity is falling, we would have a procyclical bias for movers, and countercyclical bias for stayers. Approximating productivity by average position on the total wage distribution, it is shown in Table 3 that only in the case of $f - p$ within-job movers does a (modest) divergence occur between the two unemployment regimes. These outcomes provide some support for concluding that composition bias is probably not a large problem.

7 Results

Results based on the complete female data are shown in Figure 4. The following findings stand out.

(i) The wage cyclicality of *p*- stayers is highly procyclical and not statistically different from that of *f*- stayers. A one point reduction in unemployment is associated with a 1.38% (1.66%) increase in the real basic wage of *p*- (*f*-) stayers.

(ii) *p*- stayers account for 74% of total part-time wage cyclicality and *f*- stayers account for 80% of total full-time wage cyclicality. This reflects both the high wage procyclicality of stayers and their numerical dominance (see Table 1).

(iii) Easily the second most important contributory full-time group to total wage cyclicality are $f - f$ movers. They account for 14.7% of total full-time cyclicality, an outcome partly accounted for by the fact that their wage changes display a significant positive increment to wage movements of *f*- stayers. A one point unemployment reductions is associated with a 2.17 real wage increase. Moreover, equivalent $f - f$ job changes are also significantly procyclical.

(iv) By contrast, the wage cyclicality of $p - p$ movers is not significantly different from *p*- stayers.[13]

(v) Wage changes associated with $p - f$ within-job moves are not statistically different from *p*- stayers, although they do account for almost 10% to total part-time wage cyclicality due to their relatively large quantitative importance (see Table 1).

[13] The percentage contributions of each group towards total wage cyclicality are based on equation (8). If the wage change/unemployment change coefficient of a *p*- mover category is statistically different from zero (at 0.05 or less) then the coefficient is added to that of *p*- stayers. If it is not statistically different, then the given mover category takes the same coefficient estimate as for *p*- stayers. As for part-time job moves, these are included in the calculation of wage cyclicality if they are statistically different from zero (at 0.05 level or less). The same logic applies to the full-time column.

(vi) Wage cyclicality linked to $p - f$ between-job moves is significantly larger than cyclicality of *p*- stayers. A one point reduction in unemployment is associated with 2.37% wage increase. Further, for this group, associated job moves are also significantly procyclical.

(vii) Wage changes accompanying $f - p$ within- or between-job moves do not differ significantly from those of *f*- stayers.

(viii) While most job changes are significantly procyclical they account for very modest percentages of overall wage cyclicality.[14]

In section 3, it was argued that distinguishing between the private and public sectors and between covered and uncovered by a collective agreement may have significant bearings on the findings. On testing, it was found that accounting for collective bargaining coverage adds little to the analysis. However, the private/public sector dichotomy is important. Results are shown in Table 5. Generally, findings in respect of *p*- and *f*- stayers are unchanged compared to the aggregated results of Table 4. Again, they are highly procyclical with no statistically significant differences across the stayer groups.[15] Note, however, that only two-thirds of total part-time wage cyclicality in the private sector is accounted for by stayers; this contrasts with 80% or more among their full-time equivalents and among both part-timers and full-timers in the public sector. The reason is due principally to perhaps the most interesting result in Table 5. Those

[14] Note that in the case of $f - p$ between-job moves, while the change is significantly procyclical it accounts for a *negative* contribution to total wage cyclicality. From equation (8), this arises because expected wage changes associated with $f - p$ between-job moves are less than the expected wage changes of *f*- stayers.

[15] The unemployment change coefficient for *f*- stayers in the public sector is not significantly different from zero. Notwithstanding, for the purposes of apportioning relative contributions to total wage cyclicality, the estimated coefficient is treated as reflecting 'true' procyclicality of this group.

Table 4 Real wage changes and unemployment rate changes: 1975-2001

PART-TIME	**Coefficient on ΔU_t**	**(% contribution)**	**FULL-TIME**	**Coefficient on ΔU_t**	**(% contribution)**
WAGE CHANGE					
***p*- stayers**	-1.38** (0.54)	(74.1)	***f*- stayers**	-1.66** (0.46)	(80.4)
***p* - *f* within-job movers**	-0.68 (0.58)	(9.7)	***f* - *p* within-job movers**	0.36 (0.54)	(1.6)
***p* - *p* between-job movers**	-0.27 (0.21)	(5.9)	***f* - *f* between-job movers**	-0.51** (0.12)	(14.7)
***p* - *f* between-job movers**	-0.99* (0.40)	(8.2)	***f* – *p* between-job movers**	0.64 (0.75)	(0.5)
JOB MOVE					
***p* - *f* within-job**	-0.002 (0.001)	(0.0)	***f* – *p* within-job**	0.0003 (0.001)	(0.0)
***p* - *p* between-job**	-0.005* (0.002)	(0.5)	***f* - *f* between-job**	-0.011** (0.003)	(3.0)
***p* - *f* between-job**	-0.003** (0.0004)	(1.5)	***f* - *p* between-job**	-0.0008** (0.0001)	(-0.2)
TOTAL					
	-1.46	(100.0)		-1.77	(100.0)

Notes: Standard errors in parenthesis. Results refer to step two of the two-stage estimation procedure. There are 26 observations at this stage. The % contribution columns are based on equation (8) and show the contribution of each wage and job group to the total wage cyclicality. **Statistically significant at 0.01 level; * significant at 0.05 level, two-tail tests.

Table 5 Real wage changes and unemployment rate changes delineated by private and public sectors: 1975-2001

	PRIVATE SECTOR		PUBLIC SECTOR			PRIVATE SECTOR		PUBLIC SECTOR	
PART-TIME	ΔU_t	**(%)**	ΔU_t	**(%)**	**FULL-TIME**	ΔU_t	**(%)**	ΔU_t	**(%)**
WAGE CHANGE									
***p*- stayers**	-1.46** (0.44)	(66.1)	-1.40* (0.66)	(81.8)	***f*- stayers**	-1.93** (0.33)	(79.7)	-1.38 (0.73)	(86.5)
***p* - *f* within-job movers**	-1.40* (0.63)	(19.1)	0.08 (0.72)	(10.1)	***f* – *p* within-job movers**	0.37 (0.50)	(1.4)	0.03 (0.75)	(2.2)
***p* - *p* between-job movers**	-0.60** (0.23)	(8.3)	0.12 (0.31)	(4.7)	***f* - *f* between-job movers**	-0.61** (0.18)	(16.1)	-0.03 (0.13)	(8.4)
***p* - *f* between-job movers**	-1.01 (0.64)	(5.2)	-0.38 (0.83)	(3.2)	***f* – *p* between-job movers**	0.98 (0.85)	(0.5)	0.30 (0.80)	(0.4)
JOB MOVE									
***p* - *f* within-job**	-0.003* (0.001)	(-1.0)	-0.002 (0.002)	(0.0)	***f* – *p* within-job**	0.0006 (0.001)	(0.0)	-0.00004 (0.001)	(0.0)
***p* - *p* between-job**	-0.004* (0.002)	(0.3)	-0.004 (0.003)	(0.0)	***f* - *f* between-job**	-0.011** (0.003)	(2.5)	-0.008* (0.004)	(2.5)
***p* - *f* between-job**	-0.004** (0.0005)	(1.9)	-0.001** (0.0004)	(0.2)	***f* – *p* between-job**	-0.0006* (0.0003)	(-0.2)	-0.0004 (0.0002)	(0.0)
TOTAL									
	-1.68	(100.0)	-1.40	(100.0)		-2.06	(100.0)	-1.42	(100.0)

Notes: see Table 4.

Table 6 Real wage changes and unemployment rate changes of part-timers below and above median age: 1975-2001

PART-TIME (< MEDIAN AGE)	**Coefficient on ΔU_t**	**(%)**	**PART-TIME (≥ MEDIAN AGE)**	**Coefficient on ΔU_t**	**(%)**
WAGE CHANGE					
***p*- stayers**	-1.32* (0.52)	(66.2)	***p*- stayers**	-1.46** (0.55)	(80.9)
***p* - *f* within-job movers**	-1.09* (0.55)	(17.2)	***p* - *f* within-job movers**	0.15 (0.80)	(8.3)
***p* - *p* between-job movers**	-0.06 (0.33)	(5.8)	***p* - *p* between-job movers**	-0.61* (0.25)	(7.8)
***p* - *f* between-job movers**	-0.88* (0.43)	(6.7)	***p* - *f* between-job movers**	-1.12 (0.79)	(2.9)
JOB MOVE					
***p* - *f* within-job**	-0.002** (0.0007)	(-1.0)	***p* - *f* within-job**	-0.002 (0.002)	(0.0)
***p* - *p* between-job**	-0.013* (0.006)	(1.6)	***p* - *p* between-job**	-0.002* (0.0009)	(0.0)
***p* - *f* between-job**	-0.012** (0.002)	(3.6)	***p* - *f* between-job**	-0.0008** (0.0002)	(0.1)
TOTAL					
	-1.54	(100.0)		-1.50	(100.0)

Notes. See notes to Table 4. Median age = 44 years.

individuals undertaking *p – f* within-job movers in the private sector display significantly higher wage cyclicality than private sector *p*- stayers; a one point unemployment fall associates with a 2.86 wage increase for these movers. Moreover, these intra-job movers account for 19% of total part-time wage cyclicality in the private sector.

Two other results in Table 5 are worth underlining. The first concerns job movers who retain their job status. In the private sector, wage procyclicality of *p – p* movers and *f – f* movers are the same; both provide an additional 0.6% wage movement for a one point unemployment fall compared to their respective stayers. These latter findings contrast starkly with wage changes of *p – p* movers and *f – f* movers in the public sector which do not differ from their respective stayers. The second finding of note concerns *f – p* movers, both within- and between- jobs. As in Table 4, there is no instance of these movers exhibiting enhanced procyclicality compared to *f*- stayers.

Separating individuals into young and old, predicated on their relation to the median age, offers two additional insights in respect of part-timers. Results are shown in Table 6.[16] First, wage changes of young *p – f* within-job movers add significantly to the wage procyclicality of *p*- stayers. Older *p – f* within-job movers have the same wage cyclicality as their equivalent *p*- stayers. Second, older *p – p* movers display a significant positive increment to the procyclical wages of their equivalent *p*- stayers in contrast to the equivalent estimates for younger age groups were there is no significant difference.[17]

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[16] Full-time results are not shown in Table 6. Splitting the full-time sample in this way provided estimates for both young and old that did not deviate significantly from those shown in Table 4.

[17] Although some caution should be exercised concerning both sets of comparative findings. In neither case are the estimated 'young' – 'old' coefficients significantly different at the 0.05 level.

8 Conclusions

Part-time employment in the U.K., in line with other major OECD economies, is a quantitatively important part of total employment. It is especially common among women workers. It is well known in relation to full-time employment that, in terms of positive wage responsiveness to the business cycle, the U.K. enjoys a high degree of labor market flexibility. The work here establishes that this picture is not changed if part-timers are added to the analysis. Further, earlier U.K. work on female and male full-timers showed that job stayers accounted for the bulk of total average wage procyclicality. This is due to the facts that not only are stayers the quantitatively most important groups but also that they exhibit strong wage procyclicality in their own right. Again, this paper establishes that part-time stayers share this relatively important position with respect to total part-time wage variations.

But the addition of part-time workers to the analysis offers new insights. Previous U.K. and U.S. literature has established that the wage cyclicality of full-time job movers has been significantly higher than job stayers. A job move in earlier studies concerns either a firm-to-firm or job-to-job position change. Adding part-timers involves an additional important type of move. This involves a change in full-time or part-time status within the same job. This paper establishes that $p - f$ moves are especially interesting. Not only are they quantitatively important – accounting for 6% of all part-time observations – but, in the private sector and among young movers, they display significantly greater procyclicality that *p*- stayers. In fact, within the private sector they account for almost one-fifth of total wage cyclicality among part-time workers. While no direct evidence is available concerning the use of part-time employment as a means of

screening to find the most productive individuals to fill full-time jobs, the findings here are at least consistent with such strategic behavior.

It is well established in various studies that wage cyclicality corresponding to *f –f* moves is significantly greater than that linked to *f*- stayers. In the data as a whole, this relative finding does not carry over to the comparison of *p – p* movers and *p*- stayers. The former display statistically the same degree of wage cyclicality as the latter. However, both *p - p* and *f – f* job moves in the private sector are found to display equal and significantly greater procyclical wages than their stayer equivalents (see Table 5). For equivalent groups in the public sector, moving involves no additional degrees of wage changes. The distinction between these sectors is important to the study of wage cyclicality with indirect evidence of much more wage regulation in the public compared to the private sector.

Generally, *p – f* job movers, both within- and between-jobs, display higher degrees of wage procyclicality than equivalent *f – p* movers, although both groups are at least on a par with job stayers. Again, this is consistent with *a priori* expectations. It is highly likely that there is a greater weight of acyclical job change motives in the *f – p* than the *p – f* direction. For example, from Figure 5, it is clear that there is a steeply rising propensity for women to undertake *f – p* moves between their mid- 20s to mid- 30s. Household commitments linked to child rearing almost certainly comprise a major contributory factor to this observation.

An important caveat to all these findings is that the NESPD does not allow us to include low-paid women, defined as those with weekly earnings below tax thresholds. These are predominantly women in part-time employment. It would be very surprising to

learn, however, that the inclusion of these individuals would serve to detract from the findings of high real wage procyclicality among female part-time and full-time stayers and movers in the U.K. labor market.

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