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DUAL TRACKS: PART-TIME WORK IN LIFE-CYCLE EMPLOYMENT FOR BRITISIH WOMEN

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Abstract

Almost half the women in work in the UK work part-time, but views conflict: does this support a woman's career or is it a dead-end trap?

Cohort data on labour market involvement to age 42 show highly varied pathways through full/part-time/non-employment. Econometric estimation confirms that individual characteristics matter, but labour market history is particularly powerful. Part-time work serves two different functions. A history of full-time work even including spells in part-time or non-employment, tends to lead back to full-time work, so supporting a career. Part-time work combined with non-employment is unlikely to lead to full-time work, and is a trap.

Dual Tracks: Part-time Work in Life-Cycle Employment for British Women

Close to six million women, 45 per cent of those in employment in the UK, are now working part-time, and around two-thirds of working women will have worked part-time at some stage of their adult careers. Yet for very few will part-time employment be the norm throughout their working lives. The great majority will intersperse one or more spells of part-time work with periods of full-time work, many also with time out of the labour market. This life-cycle perspective on women's labour supply, and the place of part-time work in it, is the focus of this paper.

Part-time work evokes ambiguous responses. It is frequently the route which women choose in order to combine continuing labour market involvement with household responsibilities particularly during the childcare years. In this respect its availability is welcomed, and may even be insufficient. In a study of actual and preferred employment patterns for the OECD Jaumotte (2003) reports that among couple families with a child under the age of six the combination of a full-time job for the male partner with a part-time job for the mother is preferred by 42 percent of couples in the UK, against full-time employment for both partners as the preferred choice of only 21 percent, and full-time employment for the man with non-employment for the mother for only 13 percent. The male/female full/part-time combination preferred by 42 percent is, however, the actual employment pattern for only 32 percent of couples, suggesting unsatisfied demand for part-time jobs. However, it is also widely documented that many part-time jobs are 'bad' jobs in low-wage occupations offering little opportunity for career progression (Grimshaw and Rubery. 2001; Hakim, 1998). This leads to the perspective of part-time work as a dead-end or trap to women's careers, part of an 'exclusionary' cycle, where low-wage, insecure part-time jobs alternate with spells of non-employment (Blossfeld and Hakim, 1997). While these views are not wholly inconsistent, their differing levels of endorsement of the social contribution of part-time work make it important to establish the role which part-time work plays in women's life-cycle labour market involvement. How far does it support the continuation of labour market participation and a future career? How far is it a dead-end for women's careers? Or is it both, functioning in a different role for different groups of women?

A natural view of part-time work is as a stepping stone to full-time work for women who have been out of the labour force, probably for family reasons, or in the reverse direction for older workers winding down to retirement. However, the limited available evidence indicates that only a small proportion of transition paths conform to this pattern. O'Reilly and Bothfeld (2002) using the British Household Panel Survey (BHPS) for women of all ages find that over the years 1990-5 'only a tiny number' of women used part-time work as a bridge back into a full-time job after a spell of non-employment. Their main evidence is of part-time work in an 'exclusionary' pattern where it is interspersed with spells of non-employment. They find that in 26 percent of all spell sequences women transiting through part-time work from non-employment exit back to non-employment. Successful 'maintenance' transitions, where a part-time spell is a temporary alternative to full-time work, constitute fewer than 8 percent of spell sequences. Although O'Reilly and Bothfeld cover transitions for women of all ages their relatively short data period of five years can give not much more than a snapshot view, leaving open the issue of the life-cycle transition dynamics over a more extended time frame. For the US, where part-time work among

prime-age women is much less common but a longer data period is available, Blank (1998) like O'Reilly and Bothfeld, gives the 'stepping stone' view no support, concluding that, while part-time work serves an important function in bringing women from outside the labour market into paid employment, it does little to then move them into full-time work. Equally, she does not endorse the primacy of the 'exclusionary' pattern found by O'Reilly and Bothfeld. Rather, she identifies two leading patterns in transitions through part-time work. For the majority, a spell in part-time work serves as an alternative to full-time work, to which they then return. The primary role for part-time work among American women is thus the 'maintenance' one, supporting continued labour market participation within a basically full-time career. The other major group which Blank identifies enter part-time work from non-employment and then leave the labour market again, showing part-time work, as with O'Reilly and Bothfeld, forming part of an 'exclusionary' cycle of weak labour market attachment.

We present an analysis of the role of part-time work over an extended portion of the life-cycle for a cohort of women in Britain. We follow the patterns of labour market participation of a 1958 birth cohort until they are aged 42 in 2000. This time-span covers half of their employment life-cycle, almost the entirety of their child-bearing years and a substantial portion of the period when childcare responsibilities are greatest. The dataset providing this long panel, the National Childhood Development Survey (NCDS), provides a rich set of information on personal and household characteristics as well as labour market status. A valuable additional feature is that at its main sweeps when the respondents are aged 23 and 33 the NCDS includes a range of questions on attitudes to responsibilities and roles within the household, providing information on normally unobservable personal characteristics.

At the aggregate level the patterns of labour market involvement chosen by this cohort are smooth. Most of the women enter full-time employment on leaving education. Participation in part-time work begins to emerge as they reach their mid-20s, rises steeply through to their early 30s, then levels off at around one-third of the sample as they move into their 40s. In terms of year-to-year transitions each state is highly persistent. 88 percent of those in part-time work in any year continue in that state in the following year, making it only marginally less persistent than full-time work, where 92 percent continue, but more persistent than non-employment, with 81 percent continuing. However the pathways followed at the individual level through the three labour market states are complex and highly varied. In spite of year-to-year persistence on the longer perspective the dominant pattern is diversity, involving multiple labour market states. Almost half of the women in the sample have at least one spell in each of the three labour market states. Moreover, the women who spend time in each of the three labour market states do so in very varied ways, in terms of the structure of spell sequences and their duration, and the ages at which they make transitions.

Our interest is in the patterns of labour supply which women choose over the first half of their adult life-cycle and particularly the role of part-time work in these. We focus on the duration of the spell in the individual state and the choice of destination on exit from it. The variety of pathways evident from the Surveys points to a major role for individual heterogeneity. The strong evidence of year-to-year persistence in employment status requires a model including state dependence. Since no estimator exists which addresses these econometric issues simultaneously in the context of choice among multiple states we apply a range of estimation

techniques, each dealing with a major subset of the issues and together giving comprehensive coverage. Our principal finding is that part-time work serves two different functions. Women whose past history predominantly involves full-time work, possibly in conjunction with spells of part-time work or non-employment, revert to full-time work. Women whose labour market history combines spells in part-time work with non-employment are unlikely subsequently to take up full-time work. Women are persistent workers or persistent non-workers. Both categories engage in part-time work but in different ways. Part-time work is both a support and a trap for women's future careers, but these alternative roles apply to different groups.

The paper is structured as follows. Section 1 describes the dataset and profiles the employment states, transition patterns and spell durations for the cohort up to age 42. Section 2 develops the various econometric approaches which we adopt to estimate the choice of the alternative states. Section 3 reports the empirical estimates of these. Section 4 uses competing risks duration analysis to examine time spent in the different labour market states with alternative exit states. Section 5 draws some implications.

1. The NCDS and women's employment patterns to age 42

The National Child Development Survey (NCDS) follows the birth cohort of 8-15 March 1958. The Survey has its main sweeps for the cohort in its adult years, sweeps 4-6, at age 23 (1981), age 33 (1991) and most recently age 42 (2000). At these dates extensive information is collected on a wide range of personal and household characteristics, including labour market status. In addition retrospective information is collected on the principal personal and labour market events occurring in the years between the previous sweeps, making it possible to construct a complete annual history for the key variables of interest.

Survey participants are invited to maintain a diary of major events on an on-going basis (an annual birthday card is sent as a prompt) but much of the record for the intervening years is completed retrospectively at the major sweeps. At these dates cohort members report on four labour market states - employment, unemployment, education and 'other' which includes caring responsibilities at home. Within each of these categories start and end dates by month for each job or activity spell are established, allowing the detailed time-path to be traced. In addition the sweeps at age 33 added a retrospective on 'your life since age 16'. Across successive sweeps this creates multiple, and on occasion conflicting, accounts of labour market history. Given the trade-off between the consistency to the record of work history to be gained from using the latest sweep at age 42 as the single source and the greater risk of recall error as jobs and other events recede further into the past we have constructed the work histories by combining the information for ages 33-42 from the sweep at age 42 with information from ages 23-33 from the sweep at age 33 and from school-leaving up to age 23 from the sweep at age 23. From the monthly histories we allocate each year to one of three labour market states: full-time employment, part-time employment or non-employment (out of the labour market). The allocation is made on the basis of the major activity engaged in over the year. This allocation of the year as a whole is chosen because our perspective is the major patterns of the first half of the adult life-cycle rather than short-term detail. Moreover shorter episodes are much more vulnerable to recall error in both incidence and dating. A further advantage of classifying the year as a whole relates to maternity

leave which unfortunately is not identified specifically in the work histories. In the period covered statutory maternity leave entitlement was 14 weeks or less; women taking this leave and then resuming employment will therefore be classified as in employment for the year as a whole.[1] Part-time employment is self-classified within each job. This derived annual profile of labour market status is matched to time-varying personal characteristics, including the number and ages of children and characteristics of any partner. A particular further feature of the NCDS which is valuable in the present context is that the main sweeps of the Survey contain direct reporting of expectations and preferences normally unobservable to the researcher; these include intentions in regard to future child-bearing, the allocation of intra-household roles, including how childcare responsibilities are shared, and attitudes to the mother's labour market involvement such as whether family life is perceived as suffering if she works full-time.

The NCDS samples of women were 6270 in sweep 4 in 1981, 5799 in sweep 5 in 1991 and 5789 in sweep 6 in 2000; we restrict our attention to those women who were present in all three sweeps (4495) and for whom we have a full employment history between the ages of 23 and 42, our main period of interest; for most of these we also have available their labour market history between ages 16 and 23. Excluding those never in employment the sample available for the analysis comprises 3459 women.

[Chart 1]

The choice of employment state by the cohort members between ages 16 and 42 is shown in Chart 1. Participation moves widely across the major labour market states, with a very different time-profile in each. Half of the cohort left full-time education at the minimum school-leaving age of 16, almost all proceeding into full-time work. Further school-leaving at ages 17-18 raised participation in full-time work to almost 70 per cent where it remained until the women were in their early 20s, the later new entrants from full-time education already being offset by the rising number of withdrawals into caring at home. Over the following ten years participation in full-time work declined by 25 percentage points before beginning a modest recovery after the women reached their mid-30s. Non-participation for caring at home rose steeply as the women moved through their 20s, peaking at around 28 per cent at ages 26-28 before dropping away to just 11 per cent. at age 42. Part-time work was of negligible importance initially, first reaching 10 percent of the cohort only at age 25. Thereafter it continued to rise, steeply through their later 20s, more modestly through their 30s, with 35 per cent of women working part-time as they moved into their 40s.

[Charts 2 a-c]

A hypothesis which is easily dismissed is that participation in part-time work reflects self-selection by women of lower educational attainment and therefore potential labour market rewards. Charts 2 show that participation takes broadly the same profile among women with higher educational attainment as among those leaving school at age 16, although with variation in the timing and level of participation. Women who continued in education beyond 19 moved into full-time work in their mid-20s at participation rates over 80 per cent, very similar to those of the early school leavers who moved into full-time employment in their late teens. More educated women subsequently withdrew from employment in increasing numbers, again several

years later than those with minimum education. But even at its peak their non-participation rate was substantially below the level of those with less education, although the convergence after age 35 is striking. Most significantly for our purposes, participation in part-time work shows the closest similarity in time-profile across the education groups, varying inversely with educational attainment but within a relatively narrow range.

[Charts 3 a-c]

Unsurprisingly, the major variation in employment patterns over this age range is associated with the presence of children, measured here by the number at age 42 when family formation will be close to completion (Charts 3). The differences are greatest when the women are in the 20s, with some subsequent convergence. For women with no children full-time employment is the norm throughout, but particularly when they are in the their 20s; as they turn 40 around 80 per cent of childless women are in full-time employment against 40 per cent of those with children. Non-employment gives the converse pattern, with those who are to have larger families already moving into non-employment in their late teens. As with educational level, part-time work is the state which shows the least variation with family size. Women with one child move into part-time work less frequently and rather later than those with more children, but by their early 40s participation in part-time work by mothers is largely unaffected by the number of children present. As family formation approaches completion around 40 per cent of mothers are in part-time employment, regardless of family size, while only a small proportion of childless women choose to work part-time. We note in passing that only in the case of full-time employment by mothers with larger families (two or more children) does participation follow the traditional M-shaped profile.

What pathways do women choose across full-time work, part-time work and non-employment (caring at home) and how long are their spells in each state? It was noted from Chart 1 that part-time work (defined as the major activity across the year as a whole) emerges as a significant labour market choice only once the cohort are into their early 20s. For this reason also we concentrate on activity patterns from age 23, when full-time education is largely completed and the cohort members are participating in the adult labour market.

Choice across three labour market states per year over the 20-year span from age 23 to 42 generates 3^{20} = 3.5 billion possible sequences of labour market involvement. The actual sequences adopted by the women in the sample emerge as many and highly varied. Table 1 shows the summary patterns.

[Table 1]

Across the period as a whole (first column) by far the most striking feature is the prevalence of time spent in all three states; in this first half of their adult life-cycle close to half of the sample (46.7%) combine spells in both full- and part-time employment with time out of the labour market. When the time-frame is shortened by sub-dividing the period this dominance is eroded, and the overall balance of activity alters, confirming the importance of the life-cycle perspective. As noted above, choices between the ages of 23 and 33 for the sample as a whole involved declining participation in full-time work, a rise in part-time employment, and substantial non-

participation. Even within this ten-year period one-quarter of women spent time in all three states. Almost half worked part-time at some stage, before or after spells in full-time work, non-employment or both. Practically none, however, worked only on a part-time basis throughout. Part-time work was thus extensively used, but in conjunction with spells of full-time commitment to either employment or caring at home. As the women moved through their 30s and into their 40s individual patterns tend to cohere around single or dual states, with only 11 per cent recording spells in all three states. Part-time work is now very much to the fore, with almost 60 per cent of the women spending some time employed on this basis. Only 11.5 per cent work part-time throughout, many fewer than the number who work part-time in conjunction with spells in full-time work or out of the labour market. The majority of the cohort are therefore choosing part-time employment, but again predominantly as complementary to full-time employment or caring at home.

While the majority of women choose different labour market states within their life-cycles year-to-year persistence in each state is high and transitions between them relatively infrequent. Over the period as a whole 88 percent of women are in the same labour market state in any year as in the previous year (Table 2). This is even higher than the 79 percent persistence reported by Blank (1998) in a similar analysis for the US for women of all ages over 14 years. Continuing full-time employment is much the most common pattern, accounting for 45 per cent of year-to-year transitions, and also the most persistent, 92 per cent on average continuing in that state. But levels of persistence are almost as high in part-time employment (87 per cent) and only marginally lower in non-employment (81 per cent). At ages 23-33 non-employment is considerably more persistent than part-time work; from age 33 this pattern is reversed with 30 per cent of year-to-year episodes involving continued part-time employment. At age 23-33 the most frequent transitions between states were from full-time employment into caring at home (3.8%) and into part-time work after a spell of non-employment (3.9%). After age 33 the most frequent continues to be into part-time work from non-employment, but transitions from part-time to full-time work are of increasing importance. In the aggregate, therefore, some sequencing in choice of labour market state is discernible. The much more striking characteristic, however, is persistence in each state once the choice has been made.

[Table 2]

Over the twenty years 11236 spells are recorded across the three labour market states, including those already in progress at age 23 or continuing at age 42 (left or right censored); of these 7700 are completed spells. Per cohort member these imply an average of 3.2 spells overall, with 2.2 completed. As shown in Table 3, including uncompleted spells full-time work is the most frequent state, accounting for 37 per cent of spells, but both part-time work (29 per cent) and non-employment (34 per cent) feature strongly. Part-time and non-employment spells tend to be considerably shorter, on average around half the length of a full-time spell. Non-employment in particular is characterized by multiple spells. Among completed spells, however, non-employment is most frequent, 41 per cent of spells, with 33 per cent full-time and 26 per cent part-time. Part-time and non-employment spells continue to be characterized by shorter durations and more frequent multiple spells. The lower panel gives the more detailed distribution of durations for first spells in that state from age 23 (typically over 70 per cent of spells). Where

full-time spells are strongly skewed towards long durations, part-time and non-employment spells are concentrated at short durations, with 40 per cent lasting three years or less.

[Table 3]

In the first twenty years of their adult lives the majority of women interleave spells in part-time work with spells in full-time employment and/or time non-employed for family care. Persistence within each state is substantial, but the preponderance of multi-state histories at the individual level confirms the significance of movement between them. This suggests that the various labour market states, which are substitutes at any point in time, are also complementary within life-cycle labour supply. The following Sections examine these complementarities focusing on the role of part-time work, linking the choice of part-time employment and the time spent in it to both the individual woman's earlier history of labour supply and her subsequent choice of activity. Clear complementarities emerge between part-time work and both full-time employment and non-employment, but with a different role for part-time work in the two contexts.

2. Modelling the choice of labour market state

To analyse the role of part-time work in the context of women's life-cycle labour supply we focus on two dimensions: the choice of labour market state, and duration within that state. In each case the inter-temporal dimension is a central concern. The participation decision across the three labour market states will be set in the context of the woman's work history as well as personal characteristics and life-cycle events, and duration within part-time work will be conditioned by past history and future exit state.

Focusing first on choice of labour market state, our formulation follows that developed by Hyslop (1999) which models the participation decision as the outcome of a dynamic programme of labour market search under uncertainty in the presence of adjustment costs to changing participation state. Utility is defined over consumption and labour supply, conditioned on household characteristics. The expected present value of utility is

$$U_t = \sum_{s=0}^{\infty} \frac{1}{(1+\rho)^s} E_t\, u(C_{t+s}, h_{t+s}, Z_{t+s}) \qquad (1)$$

where $u(.)$ is period flow utility, ρ the rate of time preference[2], C per period household consumption, h labour supply (participation) and Z a vector of household characteristics capturing observed and unobserved heterogeneity across households and over time. The period-by-period budget constraint is

$$C_t = y_t + w_t h_t - \gamma_1 (1 - h_{t-1}) \qquad (2)$$

where w_t is the wage rate, y_t is non-labour (including partner's) income, assumed exogenous, and γ_1 the search cost associated with changing participation state. Assuming inter-temporal

separability in the utility function and noting the absence of asset accumulation in the budget constraint (1) is maximised subject to (2) on a period-by-period basis. Within the dynamic programme the reservation wage for a non-participant ($h_{t-1} = 0$) is the wage which equalises the utility from participation (inclusive of search/adjustment costs) with utility in non-participation. The reservation wage for a participant ($h_{t-1} = 1$) is similar but without the search/adjustment costs. The participation decision for period *t* can therefore be characterised as

$$h_t = I\left(w_t > w^*_{0t} - \gamma h_{t-1}\right) \qquad (3)$$

where *I* denotes an indicator function equal to 1 if the expression is true and 0 otherwise, w_t is her market wage, w^*_{0t} her reservation wage as a non-participant and γ the adjustment cost of entering participation modified by the marginal utility of consumption in work relative to non-participation[3]. Through the role of adjustment costs the current participation decision depends on previous participation status h_{t-1}.

A reduced form specification for (3) applicable in a panel data framework is

$$h_{it} = I\left(X'_{it}\beta + \gamma h_{it-1} + u_{it} > 0\right),\ i = 1....N; t = 1,.....T-1$$

or, as in Heckman (1981)

$$h_{it}^* = X'\beta + \gamma h_{it-1} + u_{it} \qquad (4)$$

where h_{it}^* is the latent variable, the propensity for individual *i* to choose participation, and X_{it} is a vector of observed variables determining w_{it} and w^*_{0it}. The determinants of the individual's market wage will include human capital, deriving from education and work experience, while the reservation wage will be influenced by personal characteristics and household structure, notably the presence of children. The presence of children, requiring arrangements for childcare, introduces an additional important element to search/adjustment costs in the present context.

Since unobserved individual heterogeneity is a potentially important determinant of the participation decision we specify

$$u_{it} = \varphi_i + \varepsilon_{it} \qquad (5)$$

where ϕ_i is an unobservable person-specific time invariant element and ϵ_{it} is a random component with mean zero, variance σ^2_ϵ, serially uncorrelated and uncorrelated with the person-specific element ϕ_i.

In principle we would like a trichotomous indicator variable *I* to give simultaneous choice across three labour market states, with state-specific reservation wages and differential adjustment costs. However, no satisfactory panel estimation method exists for dynamic multiple choice models, such as a dynamic multinomial logit or probit, particularly in the presence of unobserved individual-specific effects (Arellano and Honore, 2001). Our estimation strategy is therefore to present a series of estimates, each addressing a sub-set of the econometric issues to build up a

weight of evidence on the economic questions. Moreover, previous employment status may play a more subtle role in the present context. As noted above there are pointers in the existing literature to part-time work playing varying roles, such as 'maintenance' or 'exclusionary', depending on its longer-run interaction with spells in other states. In addition to dynamic estimators we also explore more detailed patterns of work histories to represent this.

The following estimators are used:

(A) ***Pooled multinomial logit (MNL)*** - this has the major advantage of giving priority to the simultaneous multi-way choice among the three alternative labour market states. However, it has to be implemented through pooling of the annual observations for each individual. While dummy variables representing various aspects of employment histories can be included to encompass the inter-temporal dimension in labour supply these do not fully exploit the dynamic structure of the panel form of our data. Moreover the lack of a panel data framework in MNL estimation precludes treating unobservable heterogeneity econometrically, although we are able to proxy fixed or semi-fixed tastes by responses on attitudes to work and family life.

(B) ***Binary choice random effects logits*** – to apply dynamic panel methods controlling for unobserved heterogeneity restricts us to the case of binary choices. We first examine the choice between full- and part-time work. Within the logistic structure unobserved individual heterogeneity is addressed by both fixed and random effects. Moreover, on a random effects approach we follow Chamberlain (1984) in making the unobservable person-specific effect a linear function of the time-means of the included *X*'s:

$$\phi_i = \alpha_0 + \alpha_i + \delta \bar{X}_i \qquad (6)$$

where α_0 is the intercept, $\bar{X}_i$ is the vector of means of the time-varying covariates with coefficients δ, and α_i is the pure individual effect, assumed to be logistically distributed with mean zero and variance σ^2_α. Inserting this in (4) gives

$$h_{it}^* = \beta' X_{it} + \gamma h_{it-1} + \delta \bar{X}_i + \alpha_i + \varepsilon_{it} \qquad (7)$$

This model is equivalent to estimation using random effects while including the means of the time dependent variables as additional regressors.

To analyse the role of past history we estimate the random effects logit model both as a dynamic panel and with the dynamic structure replaced by the detailed work histories. This allows us to compare the implications of the detailed employment history representation directly with the dynamic panel formulation.

C. ***Random effects probit model with sample selection*** – approach (B) addresses the choice of labour market state without formally treating the selection into employment. Estimator (C) again applies to the binary choice between full- and part-time work but estimates this decision h_{iA} jointly with the selection of employment/non-employment h_{iB}:

$$h_{iA}^{*} = \beta_{A}^{'} X_{iA} + \varepsilon_{iA}$$
$$h_{iB}^{*} = \beta_{B}^{'} X_{iB} + \varepsilon_{iB} \qquad (9)$$

where h^* denotes the latent variable, $h_{iA} = 1$ if $h_{iA}^* > 0$, $h_{iB} = 1$ if $h_{iB}^* > 0$ and h_{iA} is observed only if $h_{iB} = 1$. A dynamic formulation is not available for this estimator so only the detailed work histories are used.

3. Estimates of choice of employment state

The equations for choice of employment status are estimated for women aged 23 to 42. At age 23 the vast majority of the sample have completed full-time education and face the choice set of the three states of interest: full-time employment, part-time employment and non-employment. Age 42 is the latest available in the survey. We seek to represent the influences on the market wage and the reservation wage, particularly the role of past choices of labour market status. To capture the complexity of pathways evident in the data and their possible impact on subsequent status we also use a detailed set of measures characterising the individual's employment history across the three states for the preceding five years. Further determinants of human capital and therefore the potential market wage are educational attainment (measured by the age of leaving full-time education: 16, 17-18, over 18), and further years of employment experience. Family characteristics are potentially major influences on preferences and the reservation wage. The roles of child-bearing and child-care are measured by whether the woman gave birth to a baby in the preceding year, whether the household contains a child aged under five, and the number of children present. Non-labour income is proxied by marital status and the presence of an employed partner[4]. Attitudes towards combining work and motherhood, and family formation plans, are pointers to otherwise unobservable tastes and preferences. These include plans to have more children, reported at ages 23, 33 and 42, views at age 16 on the best timing of family formation and on plans to resume work, and attitudes to women working and responsibility for caring for sick children as reported at age 33. Information from employment history diaries for the years before age 23 allows us to control for any initial conditions at the starting state h_{i1}. A time trend is included to capture on-going developments in the macroeconomic context or the effects of the cohort ageing, where these cannot be distinguished within a single cohort. Summary statistics on the variables used are given in Appendix A1.

(A) *Pooled multinomial logits*

Table 4 reports the estimates of model (A), a multinomial logit (MNL) model on a trichotomous indicator of employment state in year *t*, using the pooled observations over the 20-year period. Full-time employment is taken as the base state. Two representations are used for the inter-temporal dimension in the participation decision: employment status in the previous year, and the five-year work histories. Since the choice is a simultaneous three-way one the results for choice of non-employment relative to full-time work are also reported for the estimates with the work histories.

The effects of the 'family structure' variables, already well established in the literature, are replicated. Child-bearing and the presence of a pre-school child are both strongly conducive to part-time employment and non-employment rather than full-time employment, although the number of children present influences non-employment only. Being married and the presence of an employed partner support an orientation to part-time work; being married also supports non-employment, as does being divorced - the lone mother problem. Higher educational attainment lowers the choice of both part-time and non-employment. The impact of the attitudinal variables, although limited, is consistent with their implied level of commitment to the labour market.

[Table 4]

On the influence of past participation choices the lagged employment state is clearly highly significant, and confirms the persistence in each state evident in the raw transitions in Table 2. The detailed work histories, however, add striking further insights, with strongly determined effects and clear sign-reversals between the different labour market states. Extended to a five year perspective a past history of continuous involvement in each of the three states makes it a highly likely current choice. More subtly, a history of full-time employment combined with even a substantial amount of part-time work makes subsequent part-time or non-employment less likely. This gives clear support to the concept of the maintenance role of part-time work, serving as an interlude in a career basically oriented towards full-time work. Conversely, career histories comprising part-time work and non-employment are strongly associated with further part-time work and non-employment, supporting the concept of part-time work as part of a profile of persistently weak labour market attachment. The detailed employment histories are indicating that part-time work can be part of two different pathways in labour supply.

(B) ***Binary choice logits with fixed and random effects***

While giving highly suggestive results, the pooled MNL model does not exploit the panel dimension of our data. The models (B) reported in Table 5 address the issues of dynamic specification and unobserved individual heterogeneity for the two-way choice of part-time relative to full-time work, conditional on employment. To give comparability across the specifications all are on a logit basis. The first column reports the dynamic panel specification under random effects, with full- and part-time employment as previous states (non-employment is the omitted state). In columns 2-4 the dynamic specification is replaced by the detailed work histories, with unobserved heterogeneity addressed in three ways: through fixed effects, random effects, and random effects augmented by the means of the time-varying variables.

Table 5 concentrates on the coefficients of central interest, on previous labour market state or work histories; the full results are given in Appendix Table A2. The dynamic specification confirms persistence: women are highly likely to continue in the same employment state as in the previous year; this persistence is particularly strong in full-time work. Again the five-year histories develop the picture further; a past history of full-time employment, including spells of part-time work or non-employment, is strongly conducive to further full-time rather than part-time employment; a history of part-time work in conjunction with spells of non-employment is strongly conducive to further part-time rather than full-time work. The dual track through part-time work is confirmed for each specification, each providing a different treatment of

unobserved heterogeneity, with closely similar coefficients in each case. The other variables perform as expected. The family structure measures are strongly significant for the choice of part-time work, again with very similar coefficients across the specifications. The inclusion of the means of time-varying observables to proxy unobserved heterogeneity weakens the significance of the attitudinal measures, reducing them to non-significance. This confirms that where such measures are available they can provide satisfactory controls for unobservable heterogeneity.

[Table 5]

(C) *Random effects bivariate probit model with sample selection*

The estimates in Table 5 on the choice of part-time against full-time work are conditional on participation in employment, but this selection is not formally modelled. To do so requires a probit model. Table 6 reports the estimates from a random effects bivariate probit with simultaneous selection into employment. Given the significant additional insights from the work histories in all the models above we concentrate on this specification. In the selection equation into employment work history is represented by combinations of employment/non-employment over the preceding five years, ignoring the distinction between full- and part-time work. The choice of full-time over part-time status in turn is related to the 15 combinations of full/part-time and non-employment over the preceding five years. The two equations are estimated jointly, where the full/part-time choice is observed only when employment is chosen. The family structure variables are divided between the two equations, with recent birth seen as particularly relevant to employment participation and the presence of a pre-school child and the number of children to the full/part-time choice.

The results in Table 6 are in line with those derived above. Selection into employment strongly reflects previous employment history, and is monotonic in the proportion of the previous five years spent in work. Having just had a baby makes employment less likely, while the attitudinal variables perform as expected. On the choice of part-time against full-time employment the presence of a child under five and the number of children in the household are strongly significant influences in favour of part-time employment, and the attitudinal variables are again significant. Importantly, the impact of the detailed work histories is highly significant and in line with the findings above. Previous full-time employment, on its own or in conjunction with spells of part-time work or non-employment, is a clear pointer to current full-time employment. Continuous part-time work or spells in part-time work in conjunction with spells of non-employment are clear pointers against the choice of full-time work. The dual track is confirmed.

[Table 6]

4. Spells in part-time work: past history, duration and exit states

This section gives a further perspective on the life-cycle dimension to labour market participation, considering the duration of a part-time spell in the context of alternative exit states,

and specifically how these exit probabilities vary with prior labour market choices. We adopt a competing risks framework with full-time employment and non-employment as the alternative exits, with controls for prior employment state. Also included are the time-varying covariates which reflect personal and household circumstances. All spells of part-time employment, completed and uncompleted, from age 23 are included; to avoid left-censoring the small number of spells already in progress at age 23 are extended back to their start date[5]. A quartic form is adopted for the baseline hazard, as the time-phasing there most closely matches the profile from the non-parametric form. The estimates are shown in Table 7, where the survival function is continuing in part-time work.

[Table 7]

Consistent with the estimates of choice of state above, having a baby in the previous year tends to route women either back to full-time work (after maternity leave) or into non-employment. A larger number of children, on the other hand, is associated with longer spells in part-time work. Since the data are a single cohort, many of the remaining variables reflect the later age at which more educated women begin family formation. The most striking result relates to the employment state prior to the part-time spell. Where this was non-employment, exit to full-time employment is less likely and exit back to non-employment more likely – the part-time/non-employment cycle.

The derived exit probabilities to the alternative states at differing durations are illustrated in Chart 4, differentiated by prior employment state. Since the number of part-time spells experienced is a significant variable in Table 7 the probabilities are evaluated for the first spell in part-time work (first spells account for 72 per cent of all part-time spells). Exits to full-time employment peak after 4-6 years of part-time work. At all spell durations women who were previously working full-time are more likely to return to full-time work than those previously non-employed. For part-time spells of up to seven years' duration they are around 20 per cent more likely to do so; even from longer spells exit back to full-time work remains 10 per cent more likely. Women are more likely to move into non-employment after a spell in part-time work if they were previously non-employed than if they were previously in full-time work. This difference is particularly marked at short spells of part-time work. This not only confirms the part-time/non-employment cycle but indicates that it is particularly marked for part-time spells of short duration.

[Chart 4]

5. Part-time work: a support or a trap to women's careers?

Our focus has been the place of part-time work in women's life-cycle labour supply, particularly the influence of past on future choices. Persistence in employment status is well documented. It may be attributed to individual preferences ('life-style' persistence in the phrase from Shaw (1994)) or expectations which are not observable but correlated with past behaviour[6]. Or it may be attributed to state dependence; past participation affects human capital formation, may alter

preferences, or bring networks and job search knowledge which reduce the costs of changing state (Shaw's 'period-to-period persistence). Alongside these, which are widely agreed, part-time work is both endorsed for its role in supporting women's continuing careers in the labour market, and criticised for being a trap to successful careers. Our analysis adds a further dimension to this. For many women spells in part-time work are interludes, maintaining labour market attachment until full-time employment is resumed. For others, spells of part-time work alternate with non-employment in a part-time/non-employment cycle. It is misleading to characterise part-time work as playing a single, homogeneous role. It provides dual tracks, suiting women with differing degrees of labour market attachment.

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Charts and Tables

Chart 1 Employment State, Ages 16-42 (%)

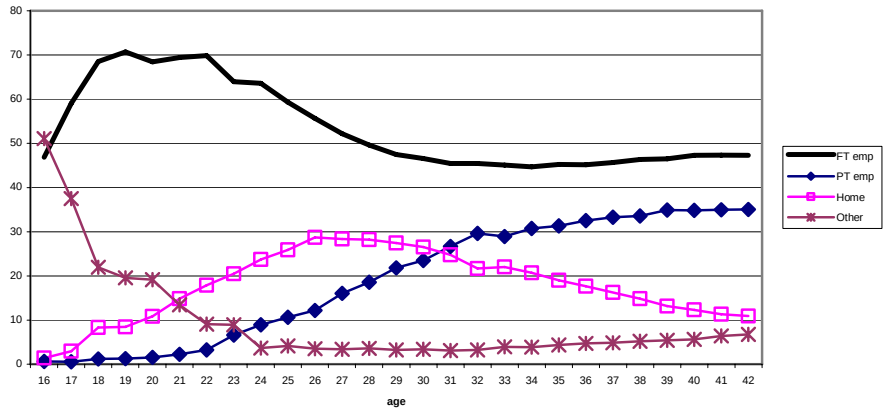


Chart 2a Percentages in Full-time Employment by Age Left Education

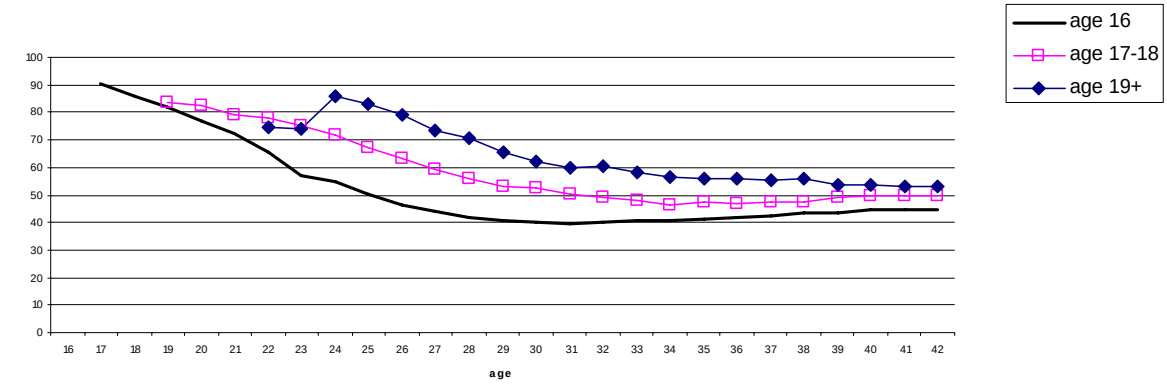


Chart 2b Percentages in Part-time Employment by Age Left Education

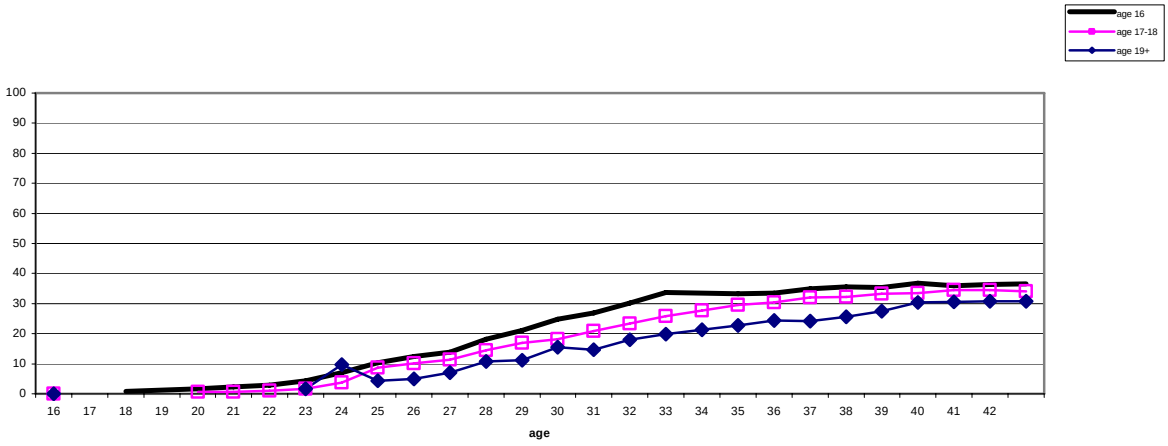


Chart 2c Percentage Non-employed by Age Left Education

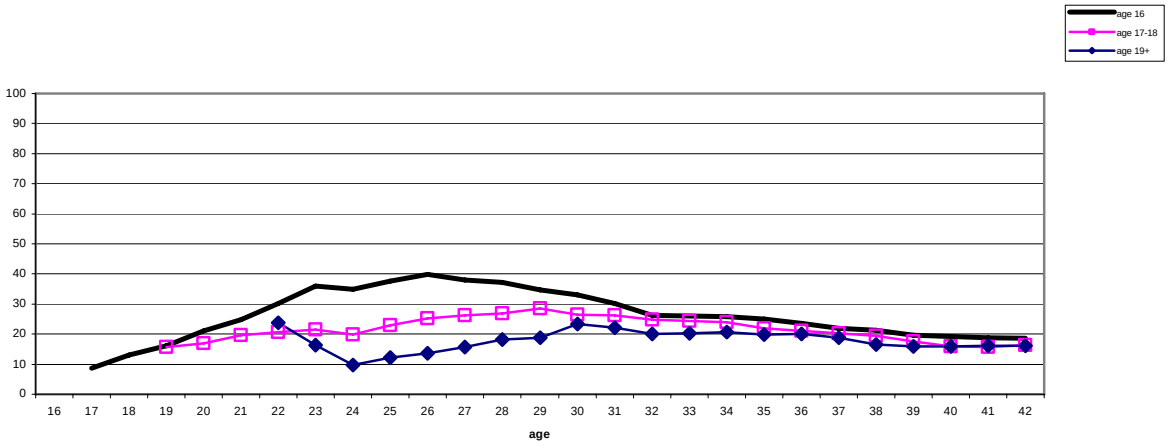


Chart 3a Full-time Employment by Number of Children at Age 42

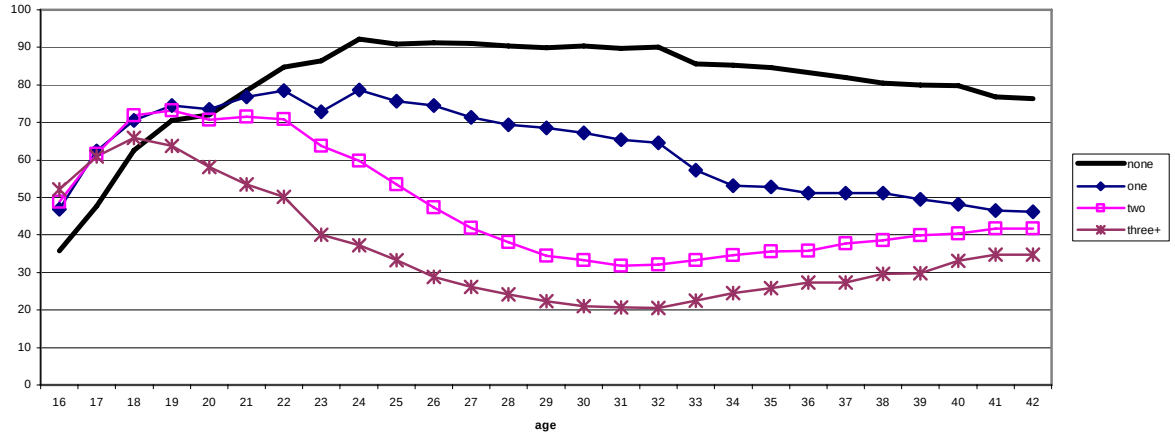


Chart 3b Part-time Employment by Number of Children at Age 42

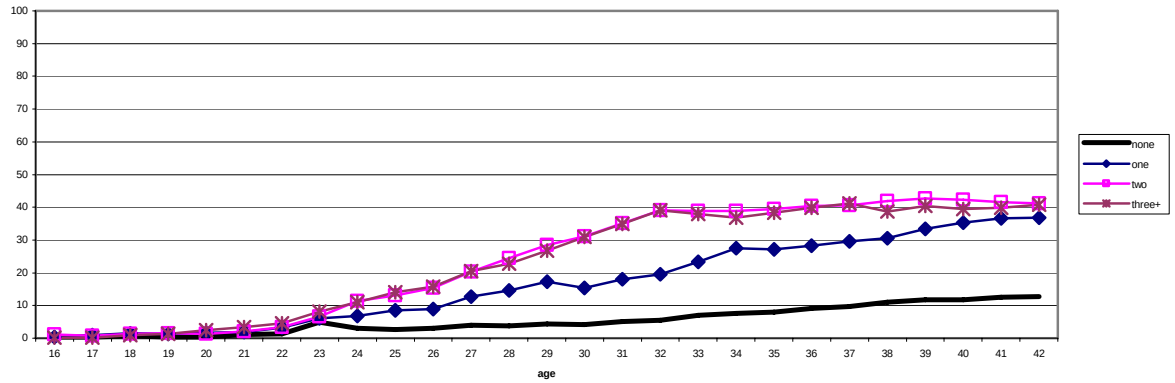


Chart 3c Non-employment by Number of Children at Age 42

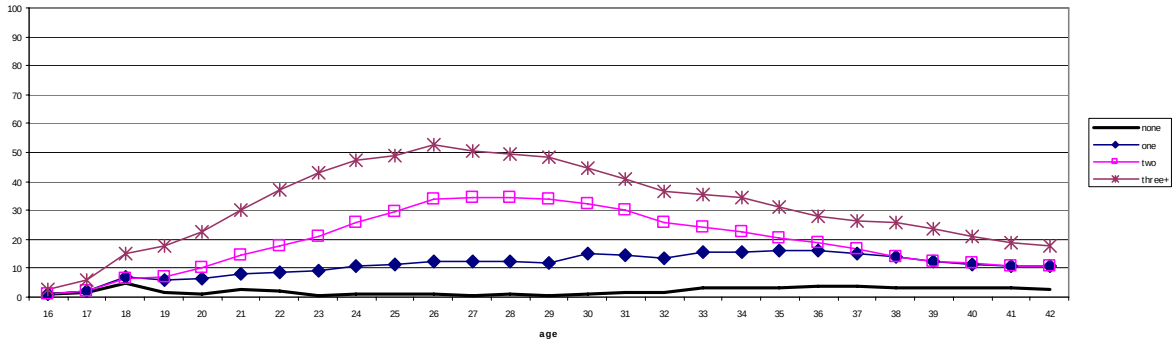


Table 1 *Patterns of Annual Labour Market State, Women aged 23-42; percentages*

	Ages 23-42	Ages 23-33	Ages 33-42
Full-time employment only	15.4	23.9	25.1
Part-time employment only	0.4	0.8	11.5
Out of labour market only	1.9	5.1	6.0
Combinations of FT employment and OLM	15.4	21.9	10.1
Combinations of PT employment and OLM	8.6	12.8	18.6
Combinations of FT and PT employment	11.7	10.5	17.7
All three states	46.7	25.1	10.9
Total	100	100	100

Source: Authors' calculations using NCDS.

Table 2 *Average Year-to-Year Transitions across Labour Market States, Women aged 23 to 42 (percentages)*

Year *t+1*	Full-time	Part-time	Out of labour market	Full-time	Part-time	Out of labour market
Year *t*	% of sample			% of row		
Ages 23-42						
Full-time	45.5	1.3	2.6	92.1	2.6	5.3
Part-time	1.5	21.7	1.6	6.0	87.5	6.5
Out of labour market	1.5	3.3	20.9	5.8	12.8	81.3
Ages 23-33						
Full-time	47.7	1.4	3.8	90.2	2.6	7.2
Part-time	1.0	14.6	1.8	5.7	83.9	10.3
Out of labour market	1.9	3.9	23.8	6.4	13.2	80.4
Ages 33-42						
Full-time	43.1	1.1	1.2	94.9	2.4	2.6
Part-time	2.0	29.6	1.4	6.1	89.7	4.2
Out of labour market	1.1	2.7	17.7	5.1	12.6	82.3

Source: Authors' calculations using NCDS.

Table 3 *Spells in Full-time and Part-time Employment and Out of Labour Market, Women Aged 23-42*

	All spells						Completed spells					
	Full-time		Part-time		Non-employment		Full-time		Part-time		Non-employment	
	No.	Average length	No.	Average length	No.	Average length	No.	Average length	No.	Average length	No.	Average length
Pooled	4184	10.6	3258	5.5	3794	5.2	2530	8.5	2015	3.8	3155	4.5
1st spell	3083	12.3	2331	5.8	2511	6.0	2122	9.4	1543	3.9	2206	5.2
2nd spell	945	6.1	768	4.9	985	3.8	357	3.6	406	3.3	764	3.0
3rd spell	138	5.0	136	4.1	249	3.3	46	3.2	56	2.8	155	2.6
4th spell	18	3.6	20	3.4	42	2.5	5	1.2	10	2.5	28	1.8
5th spell	-		3	1.3	7	3.0	-		-		2	3.0

Length of 1st spell (years)	% of all spells			% of completed spells		
	Full-time	Part-time	Non-employment	Full-time	Part-time	Non-employment
1	4.6	21.5	18.7	6.4	31.5	20.9
2	4.0	12.2	12.8	5.2	15.2	13.4
3	3.6	10.7	10.2	4.5	13.9	10.9
4	3.7	7.5	7.5	4.2	7.9	8.1
5	4.0	6.0	7.7	4.7	6.1	8.1
6-10	30.6	27.1	27.7	37.3	20.0	27.9
11-15	17.8	9.7	9.1	22.7	4.7	8.2
16-20	13.3	5.2	4.1	11.7	0.6	2.2
20+	18.5	0.3	2.3	3.4	-	0.3

Table 4 *Pooled Multinomial Logit Estimates of Choice of Full-time or Part-time or Non-Employment Women aged 23-42.*

	Part-time		Non-employment		Part-time		Non-employment	
Reference category is full-time (FT) employment	coefficient	z-value	coefficient	z-value	coefficient	z-value	coefficient	z-value
Work history – previous year								
Employed full-time	reference		reference					
Employed part-time	5.34	122.07	2.43	51.48				
Non-employed	3.52	69.11	4.77	114.98				
Work history – previous five years								
Employed full-time (FT) in all years					-3.48	-56.13	-2.28	-39.35
Employed part-time (PT) in all years					1.96	34.22	-0.11	-1.52
Non-employed (OLM) in all five years					0.24	3.33	2.93	42.87
Employed FT in four and PT in one year					-0.97	-13.95	-1.94	-19.12
Employed FT in three and PT in two years					-0.74	-10.2	-1.76	-16.28
Employed FT in two and PT in three years					-0.68	-9.31	-1.89	-16.58
Employed FT in one and PT in four years					-0.32	-4.54	-1.86	-15.88
Employed FT in four and OLM in one year					-1.70	-20.94	0.18	2.79
Employed FT in three and OLM in two years					-1.77	-18.66	0.47	6.97
Employed FT in two and OLM in three years					-1.56	-15.9	0.74	10.49
Employed FT in one and OLM in four years					-1.52	-15.03	0.79	10.81
Employed PT in four and OLM in one year					2.11	24.03	1.46	15.17
Employed PT in three and OLM in two years					2.05	21.35	1.83	17.89
Employed PT in two and OLM in three years					1.99	19.59	2.14	20.25
Employed PT in one and OLM in four years					1.92	18.06	2.40	22.22
Employed in all three states					reference		reference	
Other human capital								
Left school by age 16	reference		reference		reference		reference	
Left full-time education between age 16 and 18	-0.12	-2.72	-0.10	-2.49	-0.11	-3.11	-0.14	-3.97
Left full-time education after age 18	-0.26	-4.82	-0.23	-4.39	-0.24	-5.16	-0.26	-5.78
Years of employment prior to preceding five years	-0.07	-4.20	-0.15	-8.82	0.02	1.29	0.05	3.08
Square of years of prior employment	0.00	-0.24	0.01	5.12	0.00	-3.64	0.00	0.49
Entered full-time employment on leaving education	reference		reference		reference		reference	
Entered part-time employment on leaving education	0.18	1.10	-0.06	-0.39	0.24	1.79	0.01	0.06
Entered non-employment on leaving education	0.00	-0.02	0.01	0.28	-0.01	-0.32	-0.01	-0.2
Family structure								

Had a baby in previous year	1.58	22.30	3.02	55.53	1.63	25.98	2.90	55.02
Has a child under the age of five	0.89	21.00	0.66	16.06	1.56	43.32	1.29	37.14
Number of children present	0.18	8.26	0.21	9.98	0.03	1.36	0.14	7.54
Single	reference		reference		reference		reference	
Married	0.32	4.70	0.47	7.39	0.21	3.55	0.41	7.43
Divorced	0.06	0.81	0.39	5.64	-0.01	-0.15	0.38	6.29
Widowed	-0.20	-0.63	-0.02	-0.06	-0.32	-1.15	-0.21	-0.84
Partner employed	0.24	4.01	-0.06	-1.06	0.26	5.04	-0.08	-1.68
Attitudes								
Plans to have more children	0.05	1.37	0.01	0.23	0.03	1.07	-0.03	-0.97
Agrees that work is less important for a woman	0.15	2.37	0.17	2.84	0.12	2.3	0.14	2.81
Disagrees that work is less important for a women	0.02	0.39	-0.16	-3.03	0.01	0.25	-0.17	-3.81
Agrees that wives who do not have to work should not work	0.01	0.14	0.07	1.07	-0.01	-0.24	0.08	1.47
Disagrees that wives who do not have to work should not work	0.01	0.19	-0.10	-2.02	-0.04	-0.88	-0.09	-2.04
Agrees that mothers should look after children if they are ill	0.04	0.72	-0.03	-0.56	0.04	0.84	-0.01	-0.27
Disagrees that mothers should look after children if they are ill	-0.18	-3.30	-0.23	-4.43	-0.16	-3.39	-0.20	-4.43
Plans to return to work if OLM at age 23	0.07	1.43	0.26	5.27	0.03	0.71	0.30	7.21
Best to start family aged 16 to 19	0.14	1.04	0.22	1.74	0.14	1.28	0.23	2.2
Best to start family aged 20 to 25	0.01	0.13	-0.01	-0.11	-0.02	-0.55	0.02	0.56
Best to start family aged 26 to 30	reference		reference		reference		reference	
Best to start family aged over 30	0.08	0.37	0.15	0.75	0.00	0.01	0.06	0.34
No plans	-0.09	-1.54	-0.01	-0.28	-0.10	-2.07	0.03	0.58
Time trend	0.12	18.24	0.05	7.78	0.10	17.6	-0.04	-6.68
Constant	-7.72	-39.38	-4.60	-24.89	-3.87	-22.86	-0.27	-1.64
	N = 69180				N = 69180			
	LR chi2(56) = 83642.27				LR chi2(82) = 67498.20			
	Log likelihood = -30436.08				Log likelihood = -38508.818			
	Pseudo R2 = 0.5788				Pseudo R2 = 0.4671			

Table 5 – *Panel Logit Estimates of Choice of Full/Part-time Employment Status (ages 23 to 42)*

Reference category: full-time employment	(1) Dynamic random effects		(2) Fixed effects		(3) Random effects		(4) Random effects with means	
	coefficient	z-value	coefficient	z-value	coefficient	z-value	coefficient	z-value
Employed full-time in previous year	-3.79	-53.36						
Employed part-time in previous year	1.23	19.65						
Work history over the previous five years								
Employed full-time (FT) in all years			-2.80	-33.48	-3.46	-42.27	-3.50	-42.55
Employed part-time (PT) in all years			0.59	7.18	1.10	13.79	1.09	13.61
Out of the labour market (OLM) in all years			0.87	7.25	0.78	7.56	0.88	8.3
Employed FT in four and PT in one year			-1.18	-12.78	-1.31	-14.52	-1.35	-14.87
Employed FT in three and PT in two years			-1.20	-12.67	-1.31	-13.97	-1.33	-14.15
Employed FT in two and PT in three years			-1.25	-13.17	-1.34	-14.12	-1.36	-14.3
Employed FT in one and PT in four years			-1.20	-12.61	-1.17	-12.34	-1.19	-12.41
Employed FT in four and OLM in one year			-1.00	-9.06	-1.40	-13.42	-1.44	-13.81
Employed FT in three and OLM in two years			-0.84	-6.61	-1.29	-10.59	-1.29	-10.6
Employed FT in two and OLM in three years			-0.90	-6.54	-1.21	-9.42	-1.17	-9.1
Employed FT in one and OLM in four years			-0.55	-3.83	-0.96	-7.25	-0.90	-6.71
Employed PT in four and OLM in one year			1.18	10.12	1.72	15.2	1.70	14.95
Employed PT in three and OLM in two years			1.28	10.37	1.81	14.95	1.83	15.03
Employed PT in two and OLM in three years			1.48	11.41	1.95	15.35	1.99	15.62
Employed PT in one and OLM in four years			1.53	11.47	2.00	15.14	2.07	15.51

Each specification also includes all the additional variables used in Table 4: age left full-time education, prior employment experience, employment state on leaving education, birth of a baby in the previous years, presence of a pre-school child, number of children, marital status, partner in employment, attitudes towards family and employment, plans for family formation, and a time trend. Column (4) also includes the means of the v=time-varying variables.

Table 6 - *Random Effects Probit (Part-time vs Full-time employment) with Correction for Sample Selection (Employment), Women aged 23 to 42*

	PT Employment vs FT Employment		Selection Equation - Employment	
Explanatory variables	Coefficient	z-statistic	Coefficient	z-statistic
Time	0.00	-2.56	-0.01	-6.67
Employment history years t-5 to t-1				
Employed in all of the five previous years t-1, …, t-5	-	-	1.96	112.27
Employed in four of the five previous years	-	-	1.09	53.59
Employed in three of the five previous years	-	-	0.79	37.44
Employed in two of the five previous years	-	-	0.63	28.40
Employed in one of the five previous years	-	-	-	-
Employed in none of the five previous years	-	-	-	-
Employed FT in all of the five previous years t-1, …, t-5	-1.95	-58.56	-	-
Employed PT in all of the five previous years t-1, …, t-5	0.99	29.94	-	-
OLM in all of the five previous years t-1, …, t-5	-0.03	-0.48	-	-
Employed FT in four and PT in one of the five previous years	-0.69	-16.83	-	-
Employed FT in three and PT in two of the five previous years	-0.59	-13.15	-	-
Employed FT in two and PT in three of the five previous years	-0.56	-12.34	-	-
Employed FT in one and PT in four of the five previous years	-0.36	-8.39	-	-
Employed FT in four and OLM in one of the five previous years	-1.07	-23.07	-	-
Employed FT in three and OLM in two of the five previous years	-1.13	-20.86	-	-
Employed FT in two and OLM in three of the five previous years	-1.01	-17.18	-	-
Employed FT in one and OLM in four of the five previous years	-1.09	-17.06	-	-
Employed PT in four and OLM in one of the five previous years	1.02	21.78	-	-
Employed PT in three and OLM in two of the five previous years	0.99	19.11	-	-
Employed PT in two and OLM in three of the five previous years	0.97	17.15	-	-
Employed PT in one and OLM in four of the five previous years	0.80	11.98	-	-
Employed in all three states in the five previous years	-	-	-	-
Demographics				
Had a baby in year t	-	-	-1.35	-64.92
Number of children in year t	0.14	14.11	-	-
Has child aged five or under	0.65	32.69	-	-
Single	-	-	-	-
Married	0.02	0.66	-0.24	-9.51
Divorced	-0.03	-0.94	-0.24	-8.22
Widowed	-0.09	-0.46	-0.02	-0.19
Partner is employed	0.17	5.64	0.04	3.30
Plans to have (have more) children	-0.08	-4.25	-0.09	-6.37
Starting state				
First state post FT education, FT employment	-	-	-	-
First state post FT education, PT employment	-0.02	-0.27	0.05	0.78
First state post FT education, OLM	-0.03	-1.67	-0.06	-3.92
Number of children at age 23	-	-	-0.05	-4.31

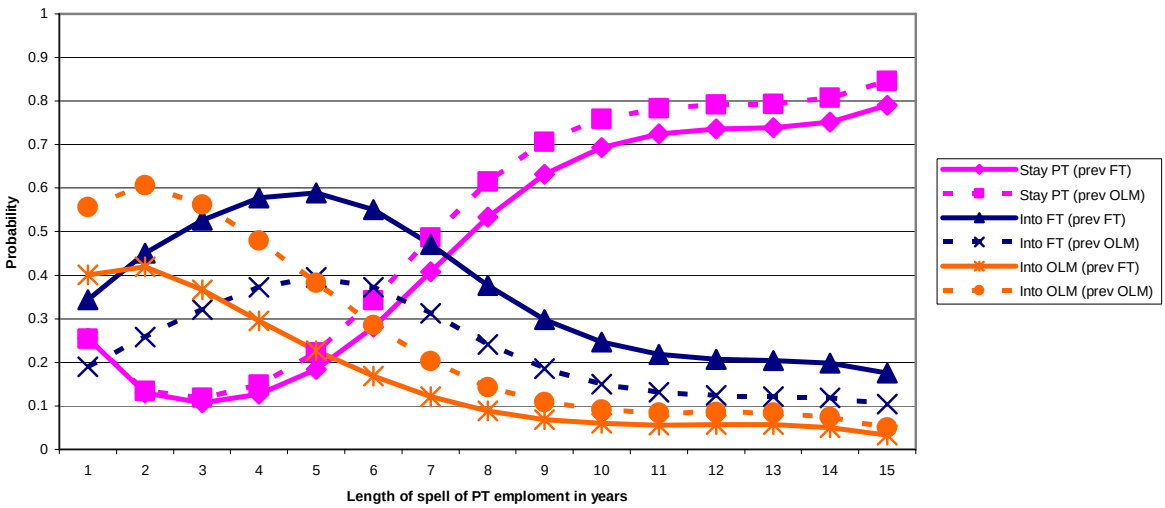
Plans to return to work if OLM at age 23	-0.17	-6.68	-0.08	-4.31
Highest qualification at age 23				
None	-	-	-	-
Sub O-level	-0.14	-3.21	0.09	2.78
O-level or equivalent	-0.12	-5.27	0.11	6.61
A-level or equivalent	-0.17	-5.27	0.12	5.01
Nursing	-0.02	-0.57	0.40	11.48
HND or equivalent	-0.05	-1.09	0.12	3.01
Teaching	-0.21	-2.46	0.39	5.46
Degree or higher	-0.15	-4.73	0.17	6.21
Attitudes				
Agrees that work is less important for women	-0.05	-1.73	-0.07	-2.84
Neither agrees nor disagrees	-	-	-	-
Disagrees that work is less important for women	-0.11	-4.16	0.04	2.01
Agrees that wives who do not have to work should not work	-0.12	-3.96	-0.08	-3.22
Neither agrees nor disagrees	-	-	-	-
Disagrees that wives who do not have to work should not work	-0.13	-4.79	-0.03	-0.14
Agrees that women should look after children if they are ill	-0.09	-3.16	-0.03	-1.29
Neither agrees nor disagrees	-	-	-	-
Disagrees that women should look after children if they are ill	-0.20	-7.39	0.001	0.08
	N=69180	Log-likelihood=-40431.35		

All specifications also include controls for prior employment experience and plans at age 16 for family formation.

Table 7 - *Competing Risks Hazards from Part-time Employment to Full-time and Non-Employment: Quartic Baseline Specification*

	Spell of part-time employment			
Remains in part-time employment is the reference state	Exit into full-time employment		Exit out of the labour market	
	Coefficient	z-value	Coefficient	z-value
Number of children before spell	-0.23	-3.76	-0.31	-4.78
Had a baby in year before spell	0.73	4.88	1.03	6.76
Age when starting spell	-0.05	-3.75	-0.04	-3.1
Previous spell non-employment	-0.56	-4.46	0.36	2.59
Previous spell full-time employment	-	-	-	
Years of full-time employment before spell	-0.17	-10.23	-0.16	-8.99
Years of part-time employment before spell	-0.29	-7.76	-0.34	-8.06
Partner employed	0.37	3.07	0.41	3.28
Plans to have more children	0.89	8.00	1.12	9.63
Left education at age 16	-	-	-	
Left education aged 17-18	-0.18	-1.47	-0.30	-2.28
Left FT education age > 18	-0.55	-3.35	-0.84	-4.71
Number of spells of part-time employment	0.74	6.09	0.63	4.81
t	2.26	10.76	2.24	9.48
t-squared	-0.52	-10.32	-0.62	-9.86
t-cubed	0.04	9.02	0.05	8.66
t-quartic	0.00	-7.97	0.00	-7.55
	Number of obs = 3258 LR chi2(30) = 1623.67 Prob > chi2 = 0 Pseudo R2 = 0.2268 Log likelihood = -2767.4458			

Chart 4 Evaluated probabilities of remaining or exiting from a spell of PT employment - quartic baseline hazard, 1st spell



Appendix 1 – means and standard deviations of variables

Variables	Mean	Standard deviation
Employed in year t	.747	.435
Employed full-time in year t	.493	.499
Employed part-time in year t	.254	.435
Out of the labour market in year t	.253	.435
Had a baby in year t	.073	.259
Number of children in year t	1.33	1.20
Has pre-school age child in year t	.292	.455
Years of prior employment experience	4.3	4.4
Single	.256	.437
Married	.667	.471
Divorced	.074	.261
Widowed	.003	.054
Partner employed	.664	.472
Plans to have (have more) children	.698	.459
First state post FT education, FT employment	.602	.489
First state post FT education, PT employment	.010	.097
First state post FT education, OLM	.365	.481
Number of children at age 23	.400	.779
Plans to return to work if OLM at age 23	.149	.356
Left FT education at age 16	.599	.490
Left FT education aged 17-18	.248	.432
Left FT education aged 19 or older	.153	.360
Highest qualifications at age 23 - Sub O-level	.041	.198
Highest qualifications at age 23 - O-level or equivalent	.388	.487
Highest qualifications at age 23 – A-level or equivalent	.128	.334
Highest qualifications at age 23 - Nursing	.051	.219
Highest qualifications at age 23 – HND or equivalent	.039	.193
Highest qualifications at age 23 - Teaching	.012	.110
Highest qualifications at age 23 – Degree or higher	.115	.319
Agrees that work is less important for women	.187	.390
Disagrees that work is less important for women	.692	.462
Agrees that wives who do not have to work should not work	.148	.355
Disagrees that wives who do not have to work should not work	.725	.447
Agrees that women should look after children if they are ill	.373	.484
Disagrees that women should look after children if they are ill	.507	.500
Best to start a family aged 16-19	.018	.132
Best to start a family aged 20-25	.555	.497
Best to start a family aged 26-30	.139	.346
Best to start a family aged over 30	.006	.079
No plans	.282	.450

Appendix 2 – Full results for Table 5

Reference category: full-time employment	(1) Dynamic random effects		(2) Fixed effects		(3) Random effects		(4) Random effects with means	
	Coef	z-value	Coef	z-value	Coef	z-value	Coef	z-value
Work history in previous year								
Employed FT in previous period	-3.79	-53.36						
Employed PT in previous period	1.23	19.65						
Out of the labour market	-	-						
Work history in previous five years								
Employed FT in all of five previous years			-2.80	-33.48	-3.46	-42.27	-3.50	-42.55
Employed PT in all of five previous years			0.59	7.18	1.10	13.79	1.09	13.61
Out of labour market in all of five previous years			0.87	7.25	0.78	7.56	0.88	8.30
Employed FT in four and PT in one of previous five years			-1.18	-12.78	-1.31	-14.52	-1.35	-14.87
Employed FT in three and PT in two of previous five years			-1.20	-12.67	-1.31	-13.97	-1.33	-14.15
Employed FT in two and PT in three of previous five years			-1.25	-13.17	-1.34	-14.12	-1.36	-14.30
Employed FT in one and PT in four of previous five years			-1.20	-12.61	-1.17	-12.34	-1.19	-12.41
Employed FT in four and OLM in one of previous five years			-1.00	-9.06	-1.40	-13.42	-1.44	-13.81
Employed FT in three and OLM in two of previous five years			-0.84	-6.61	-1.29	-10.59	-1.29	-10.60
Employed FT in two and OLM in three of previous five years			-0.90	-6.54	-1.21	-9.42	-1.17	-9.10
Employed FT in one and OLM in four of previous five years			-0.55	-3.83	-0.96	-7.25	-0.90	-6.71
Employed PT in four and OLM in one of previous five years			1.18	10.12	1.72	15.20	1.70	14.95
Employed PT in three and OLM in two of previous five years			1.28	10.37	1.81	14.95	1.83	15.03
Employed PT in two and OLM in three of previous five years			1.48	11.41	1.95	15.35	1.99	15.62
Employed PT in one and OLM in four of previous five years			1.53	11.47	2.00	15.14	2.07	15.51
Employed in all three states in prvious five years			-	-	-	-	-	-
Other Human capital								
Left school by age 16								
Left FT education between age 16 and 18	-0.07	-0.91			-0.09	-0.87	-0.15	-1.40
Left FT education after age 18	-0.16	-1.61			-0.23	-1.73	-0.39	-2.95
Years of prior experience	-0.14	-5.77	-0.19	-6.77	-0.13	-5.14	-0.19	-7.09
Square of years of prior experience	0.00	-0.07	0.01	3.40	-0.00	-0.02	-0.00	-1.17
Entered FT employment upon leaving education								
Entered PT employment upon leaving education	0.29	0.97			-0.07	-0.27	-0.02	-0.07

Entered non-employment upon leaving education	0.01	0.15			-0.05	-0.57	-0.07	-0.70
Family structure								
Has a child under the age of five	1.14	20.73	1.45	26.03	1.66	31.81	1.58	28.92
Number of children	0.48	12.71	0.82	15.76	0.58	14.40	0.66	12.96
Single								
Married	0.31	3	0.29	2.28	0.27	2.49	0.22	1.76
Divorced	0.23	1.93	0.60	4.25	0.32	2.60	0.50	3.58
Widowed	-0.31	-0.65	0.38	0.64	0.12	0.25	0.34	0.59
Partner employed	0.46	4.95	0.82	7.43	0.69	7.26	0.84	7.90
Attitudes								
Plans to have more children	0.10	1.77	0.05	0.78	0.09	1.63	0.06	0.95
Agrees that work is less important for a woman	0.19	1.6			0.18	1.16	0.15	1.01
Disagrees that work is less important for a women	0.06	0.54			-0.05	-0.39	-0.08	-0.64
Agrees that wives who do not have to work should not work	-0.05	-0.41			-0.04	-0.30	-0.01	-0.04
Disagrees that wives who do not have to work should not work	-0.08	-0.83			-0.12	-1.07	-0.09	-0.76
Agrees that mothers should look after children if they are ill	0.10	0.95			0.17	1.21	0.21	1.40
Disagrees that mothers should look after children if they are ill	-0.21	-2.11			-0.15	-1.13	-0.16	-1.12
Plans to return to work if OLM at age 23	-0.39	-4.16			-0.73	-6.07	-0.46	-3.28
Best to start family aged 16 to 19	0.06	0.23			-0.04	-0.17	-0.02	-0.09
Best to start family aged 20 to 25	0.00	-0.04			-0.04	-0.30	-0.05	-0.37
Best to start family aged 26 to 30								
Best to start family aged over 30	-0.08	-0.19			-0.26	-0.65	-0.31	-0.74
No plans	-0.16	-1.55			-0.24	-1.76	-0.24	-1.78
Time trend	0.16	15.57	0.12	8.89	0.14	13.71	0.17	13.27
Constant	-5.55	-17.82			-5.98	-17.15	-7.15	-13.55
Time means								
Has a child under the age of five							0.45	1.62
Number of children							-0.19	-2.18
Years of prior experience							0.20	4.61
Married							0.44	1.76
Divorced							-0.55	-1.95
Widowed							-0.57	-0.54
Partner employed							-0.70	-2.91

Plans to have more children							0.12	0.82
	N = 51650 $\chi^2(27)$ = 11998.41 Log L = -10464.804		N = 31011 χ^2 (25) = 12698.64 Log L = -7383.0513		N = 51650 χ^2 (40) = 8601.97 Log L = -13355.123		N = 51650 χ^2 (48) = 8655.62 Log L = -13325.363	

[1] Other studies making use of derived work histories include Narendranathan and Elias (1993) and Gregg (2001).

[2] In a dynamic programming context the infinite horizon approximates a finite horizon except for individuals approaching retirement. As our sample have a maximum age of 42 retirement can be disregarded. Alternatively the rate of time preference may be defined to capture the probability of retirement in each period.

[3] For the full derivation see Hyslop (1999, p. 1259).

[4] Some recall information on partner's earnings is given in the survey but is incomplete and of poor quality.

[5] There are only 113 cases of spells of part-time employment which started before age 23, most started at age 21 or age 22. The results obtained by dropping these left censored spells rather than extending back are almost identical to those presented here in Table 7.

[6] This is elaborated in Booth, Garcia-Serrano and Jenkins (1999).