Is it Easier to Escape from Low Pay in Urban Areas? Evidence from the UK

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Abstract

In this paper we compare periods of low pay employment between rural and urban areas in the UK. Using the *British Household Panel Survey*, we estimate the probability that a period of low pay employment will end allowing for a number of possible outcomes, namely to a 'high pay' job, self-employment, unemployment and out of the labour force. The results show that there are statistically significant differences in the dynamics of low pay across urban and rural labour markets, particularly in terms of exits to high pay and out of the labour force. After controlling for different personal and job characteristics across markets, rural low pay durations are slightly longer on average, with a lower probability that rural workers will move to high pay. However, the results suggest that the most significant urban-rural differences in the typical low pay experience are concentrated among certain types of individuals, e.g. young workers, women without qualifications.

1 Introduction

Low pay is perceived as a policy problem if individuals are trapped in low-paid jobs, or if they experience a cycle of low-paid jobs and unemployment. Low pay is particularly concentrated in businesses with few employees, in certain industries and for those in part-time and seasonal jobs (Metcalf, 1999). As these type of jobs are distributed unevenly across space, the incidence of low pay is higher in certain locations, e.g. rural areas, where such jobs are particularly concentrated (Countryside Agency, 2001). Labour markets may also operate more efficiently in more densely populated urban areas, for example because job match quality is better or through improved learning spillovers between workers (Wheeler, 2000; Glaeser 1999). The empirical evidence is consistent with this and shows that workers in rural labour markets, particularly women and young workers, are often disadvantaged in terms of pay and employment opportunities (Cloke et al, 1995; Hodge et al, 2002; Pavis et al 2001; Glaeser and Maré 2001).

As a means of reducing poverty, the present UK government aims to encourage individuals into work using a series of policies to "make work pay" e.g. welfare to work, the minimum wage, working tax family credit. However, if entry-level jobs offer permanently low pay, or a high probability of exit out of employment, this strategy is likely to be undermined (Stewart and Swaffield, 1998). The time spent in low-paid jobs and the probability of progressing to a higher paid job are therefore important for the success of these policies in the UK. Both of these factors may vary significantly between urban and rural labour markets.

UK policy makers are also increasingly emphasising the rural dimension of programmes which address social exclusion. It is therefore important for policy design to consider the extent of any urban advantage for low pay employees. In particular, is there a blanket 'advantage' for all urban low pay employees relative to their rural counterparts? Or,

is the effect of rural disadvantage simply concentrated on certain types of individuals (Hodge et al, 2002)? Although there is extensive qualitative evidence on rural disadvantage and some quantitative evidence on urban-rural differences in low pay (Gilbert et al, 2003; Phimister et al, 2000), there is a lack of quantitative work which explains observed urban-rural differences in the time spent in low pay, how time spent in low pay interacts with the final destination of those experiencing low pay, and the extent to which differences in the operation of urban and rural labour markets affect different types of individuals.

This paper aims to explore the extent to which urban-rural differences in the underlying dynamics of low pay lead to differences in the typical low pay experience for urban and rural workers. As the destination of an individual leaving low pay is important, we distinguish the ways in which a low pay spell may end. Specifically, we use urban and rural data on low pay employment spells from the British Household Panel Survey (BHPS) to estimate a model of exits from low pay to four possible destinations: namely, a 'high pay' job, self-employment, unemployment and out of the labour force. Using this model we examine the extent and source of differences in low pay dynamics between urban and rural workers after controlling for the impact of differences in both observed characteristics of the urban and rural samples, e.g. industry of employment, education level, and unobserved heterogeneity. Using the predictions of the model we quantify how urban-rural differences alter the duration of low pay spells and the probability of leaving low pay for certain key individual types, e.g. women and young workers.

In the next section, we discuss the factors affecting low pay dynamics and why the experience of low pay may vary across space. Section 3 describes the data used and provides descriptive evidence on the extent of urban-rural differences in low pay duration and exits. In Section 4, the model and the associated estimation issues are discussed. Section 5 reports the estimation results and analyses the predictions of the model. Section 6 concludes.

2 Background

Low Pay Dynamics

For an individual, exits from low pay employment can occur in a variety of ways: by sufficient wage growth to move out of the low pay category, by leaving the low pay job to another employment state such as a higher paid job or unemployment, or by leaving the workforce entirely. Hence, all the factors affecting wages and their growth, job turnover, tenure and employment status will also affect time spent in low pay. For example, human capital and job tenure are important determinants of wages and wage growth, while job tenure itself is positively correlated with education levels (Neal, 1998). Unsurprising therefore human capital and job tenure have also been found to be important in the earnings mobility of low paid workers (Gregory and Elias, 1994; Gosling et al., 1997).

Wages have also been found to be higher in larger firms or plants (Oi and Idson, 1999), while jobs which start in larger firms tend to last longer (Davis et al, 1996). Inter-industry differentials in wages and job turnover have also been long recognized (Krueger and Summers 1988; Neal, 1998). Similar job characteristics have also been found to be important in low pay exits (Sloane and Theodossiou, 1998).

Gender differences in pay, labour market attachment and job turnover are well recognized (Altonji and Blank, 1999), while 'job shopping' by young workers means that the rate of job turnover is highest when workers start their careers (Topel and Ward, 1992). There are also clear gender and age differences in low pay, with the highest incidence of low pay among young workers and women (Metcalf, 1999). Gender and age differences have also been found in low pay mobility, with women and older workers having longer low pay employment durations (Gregory and Elias, 1994). Finally, evidence suggests that residential mobility and housing market structure are important components of job status change

(Boheim and Taylor, 2002), with some evidence that housing tenure is also a significant explanatory factor in low pay dynamics (Sloane and Theodossiou, 1998).

Urban-Rural Differences in Low Pay

There are a number of reasons why the incidence and characteristics of low pay employment may differ across urban and rural labour markets. Low pay is typically more prevalent in rural areas (Countryside Agency 2001), partly because of the predominance of low pay occupations such as agriculture and tourism, and the concentration of jobs in small firms (Cabinet Office 1999). Some authors argue that this has been exacerbated by a spatial division of labour with rural economies increasingly becoming the recipients of low pay jobs (Findeis and Jensen, 1998, Barkley, 1995). As discussed above, factors such as firm size and industry composition are also correlated with job tenure and therefore this may also induce differences in low pay durations and exit types across urban and rural labour markets.

Urban labour markets may also operate more efficiently than those in less densely populated rural areas. Theoretically, job match quality will improve as labour market density increases if job search costs decrease with market size (Wheeler, 2000). Similarly, Mills (2000) shows that the arrival rate of suitable job offers will be higher in denser urban markets. Finally, Glaeser (1999) argues that because of the greater number of contacts between individuals, informal learning will be increased in denser areas and hence individual productivity and wages in urban areas will grow faster.

Evidence does suggests that job matches tend to be of lower quality, wage growth is lower and that job opportunities (at least for certain groups) are more restricted in rural labour markets (Cloke et al, 1995; Hodge et al, 2002; Glaeser and Maré 2001; Pavis et al 2001). The relative duration of low pay employment in urban areas is likely to be reduced in two ways as a result. First, improved matching or faster informal learning may increase urban

wage growth and hence decrease the time during which the employee is classified as being low paid. Second, because better urban job opportunities increase reemployment probabilities, individuals may be more willing to leave a low paid job to take or search for a better job. Employers in denser urban labour markets may also be more willing to lay off workers more quickly, reducing the time spent in low pay for those workers who exit to unemployment.

Recent qualitative evidence suggests that the effect of rural disadvantage (or urban advantage) is concentrated on certain types of individuals (Hodge et al, 2002). If improved urban labour market efficiency does affect low pay durations and exits, the impact may also be concentrated on individuals with particular characteristics. For example, evidence emphasizes that women are often particularly disadvantaged in rural labour markets with problems of access to transport and childcare most likely to impinge upon this group (Cloke et al, 1995; Porterfield, 1998; Lichter and Constanzo, 1987). Further, women are less spatially mobile than men, with job search conducted over a smaller area (Madden and Chiu 1990). Arguably, in thinner labour markets such reduced mobility may exacerbate the job-matching problem for women (Frank 1978). Hence, the effect of gender on low pay duration and exits may differ across urban and rural markets. Similarly, the greater range of urban jobs would appear to increase the ability for job shopping by young urban workers, whereas young workers in rural areas are often perceived as having some problems accessing jobs (Lindsay et al, 2003). Evidence also suggests that the lack of training and opportunities in rural areas is seen as an impediment by young people (Pavis et al, 2001). Hence, better urban job opportunities may induce distinct urban-rural differences in the low pay experience of young workers.

A number of authors argue (and provide some evidence) that the returns to education are higher in denser urban markets (Glaeser, 1999; Freshwater, 1997). Some differential

returns might also induce differences in the effect of higher education levels on the length of time spent in low pay and the typical type of exit. Finally, urban-rural differences in the effects of housing market structure on low pay mobility are possible. The impact of housing on access to jobs is not simply a rural issue (Ihlanfeldt and Sjoqust, 1998). However, in urban areas, both the public and private rented sector are important whereas in rural areas, access to affordable rented accommodation is often seem as a problem resulting in lower job mobility (Monk and Hodge, 1995).

Empirical Implications

The discussion above helps to guide the empirical work. For example, if urban-rural differences in low pay durations are simply due to the higher prevalence of low pay jobs in rural areas, this suggests that there should be no differences in low pay durations once personal and job characteristics have been controlled for. However, if higher urban density improves labour market efficiency, we expect urban low pay durations to be shorter. Higher wage growth and better opportunities should also mean a higher probability of an exit to high pay employment. Increased job turnover may also induce a higher rate of urban exit to unemployment once other factors are controlled for.

If differences in low pay dynamics are important in explaining the urban-rural low pay differential, we would also expect statistical differences in the effects of age, education, gender and housing tenure between the rural and urban samples. For example, reduced employment opportunities for young workers implies that the impact of age differs across urban and rural markets. If higher returns to education in urban areas increases wage growth, the effect of education in reducing low pay duration and increasing the probability of a low pay exit to high pay employment will be greater in the urban sample. Similarly, if the effect of lower female mobility is mitigated by denser urban labour markets, the negative impact of

being female (or of other demographic variables reflecting mobility) on wage growth should be reduced. In terms of housing, the greater ease of access to rented accommodation in urban areas should increase mobility out of low pay. Finally, we would expect the model predictions of urban-rural differences in low pay durations and exit to be most acute for the types of individuals previously identified as particularly affected by rural disadvantage, e.g. women, young workers.

3 Data

Definitions

The data were drawn from the first eight waves 1991-1998 of the British Household Panel Survey (BHPS). The BHPS is a nationally representative sample of approximately 5,500 households recruited in 1991. In principle, each individual over the age of 16 within the household is interviewed each year. Where a respondent's household has moved, attempts are made to trace them to their new address. Equally, if a respondent household withdraws from the survey, attempts are made to replace them with another household. Each year a number of core questionnaires are used, and include detailed information on income, labour market behaviour, household composition, education, etc.

At each interview, respondents are asked detailed information on employment since the last interview. From this data we construct a complete sequence of labour market spells recorded to the nearest calendar month for all individuals with at least three consecutive interviews. Inconsistencies in this data arise primarily from differences between what individual recall about their employment status at the previous interview and what was actually recorded at the previous interview. We reconcile these problems following Upward (1999) by applying the principle that information recorded closest to any particular event is

the most reliable. We also use information collected at each interview on personal and job characteristics, hours worked and earnings. From this, hourly wages can be imputed for each individual's job when interviewed (Sloane and Theodossiou 1996). However, it is not possible to impute wages for jobs that start and end between consecutive interviews so these spells are dropped from the analysis. As a result, the analysis is likely to underestimate the extent of low pay jobs of very short duration. However, arguably this improves upon previous studies of low pay that assume that individuals spend the entire time between interviews either in or out of low pay (Stewart and Swaffield, 1998). Individuals where data was missing on hours worked, earnings or other variables used in the analysis were also dropped from the sample. The resulting panel dataset consisted of information on 3,621 individuals with one or more spell of low pay.

While there is no single definition of what constitutes an urban labour market in the UK, additional information made available by the Institute for Social and Economic Research allow us to use urban and rural definitions based on Local Authority District of residence. Local Authority Districts are classified into Remote Rural, Accessible Rural, Coalfield, and Urban and Metropolitan areas using the definition recently applied by the UK Government (Cabinet Office, 1999; Tarling et al, 1993). The key observed difference between urban and rural areas to be exploited is that the latter are characterised by population sparsity and distance from urban centres (Cabinet Office, 1999). Hence, urban labour market density effects on low pay duration would be expected to occur in the urban sample only. It is important therefore to distinguish between those living in rural areas but within commuting distance to urban centres from those in remoter rural locations. To ensure those in the urban commuter belt are excluded, the rural sample consists only of those individuals resident in remoter rural districts, while the urban sample includes only those resident in districts defined to be urban or metropolitan. This separation maximises potential differences between the

samples so that any differences in low pay duration can be more clearly linked to labour market density effects.

There is also no generally agreed way to define 'low pay', either in terms of the measure of pay, or the threshold at which low pay begins. While the thresholds most commonly used are defined with reference to the median wage, the actual value chosen varies considerably, ranging from the bottom decile to two-thirds the median wage (Gosling et al 1997; Stewart and Swaffield 1998; Sloane and Theodossiou 1996). Here, what might be considered the upper bound is used, namely, the bottom third of the hourly pay distribution of the BHPS sample in each year. Although urban and rural wage distributions may differ, we use a common threshold for both samples, principally because policy makers make no spatial distinction in either defining what constitutes low pay or in measures such as the minimum wage. However, to provide some indication as to the robustness of the results to these assumptions, we also make limited use of two alternative low pay definitions, namely, a single threshold equal to two-thirds the median hourly wage, and, second, a split threshold equal to the bottom third of the hourly pay distribution in each year calculated separately for the urban and rural samples.

Descriptive statistics

Using these definitions provided a basic sample of 5,317 urban low pay spells and 747 rural spells. A useful way to describe these low pay spells is the *survivor function*, denoted *S(j)*. This is the probability that a low pay spell lasts beyond month *j*, estimated by counting the number of spells which end on or before *j* compared to the total number of spells, where *j* indicates the elapsed number of months that an individual has been in a low pay spell, and not a calendar month. The survivor function is more informative than a comparison of the average length of spells in the rural and urban samples, because it summarises the whole

distribution: we can choose any month *j* and see whether a larger proportion of low pay spells in the urban sample have ended. Estimates of S_j were calculated for both samples separately.[1] These are illustrated in Figure 1, which shows that the proportion of low pay employment spells remaining at time *j* is always smaller in the urban sample. This evidence is supported statistically with the equality of the survival functions rejected at 1% significance using the log rank test (StataCorp, 2001).

Table 1 describes other characteristics of the low pay spells and certain characteristics of those individuals experiencing low pay. As is typical with data on durations, a proportion of the spells are censored (28.9% in the urban sample and 25.2% in the rural sample). These are spells of low pay employment which are still in progress when the sample period ended. We do not know when these spells ended, but we do know how long they had been in progress at the end of the sample period. It is important in the statistical modelling that we take account of these spells, because longer spells are more likely to be censored. The remaining spells are described as "uncensored".

While the overall length of low pay spells is of interest, it does mask possible differences across exit types. For example, spells which end with a move to a higher-paid job might be longer than spells which end with an exit to unemployment. Table 1 therefore disaggregates low pay exits into four types: high pay employment, unemployment, out of the labour force and self-employment. Amongst uncensored spells the percentage exiting to high paid employment is higher in the urban sample, the percentage exiting to unemployment is similar across both samples, and the percentage exiting to self-employment out of the labour force is higher in the rural sample. The average duration of spells exiting to high pay

[1] Strictly, we calculate the non-parametric maximum-likelihood Kaplan-Meier estimate of the survivor function (Kaplan & Meier 1958).

employment and unemployment are both lower in the urban sample. This is consistent with the theory discussed in Section 2.

Some urban-rural differences are evident in the composition of those in low pay spells. Individuals in low pay spells in urban areas tend to be younger, are more likely to have a mortgage, to be working in the public sector and to be in a workplace covered by a union agreement. Individuals in low pay spells in rural areas are more likely to be female, married and working in small firms.

4 Econometric Modelling

The concept of a *hazard function*, denoted *h(j)*, is central to the analysis of duration data.[2] In this context, the hazard is defined as the probability of leaving a low pay employment spell in elapsed month *j*, conditional on not having left until month *j*.[3] For example, *h(4)* denotes (approximately) the probability of leaving a low pay employment spell sometime during the fourth month of that spell, having remained in that spell for the first three months.

As discussed in Section 2, low pay employment spells can end in a number of ways. Because the underlying processes may differ across exit types it is important to allow for multiple exit types in the modelling. For example, the probability of exiting to a high-paid job might increase with *j*, while the probability of exiting to unemployment might decrease. Imposing the same hazard function on both exits would in this case produce misleading results. The standard method for dealing with multiple exits is the *competing risk hazard model*. Each of the four exit types is a "risk", and they compete in the sense that once a spell

[2] The use of the word "hazard" and "survivor" reflects one of the origins of these statistical methods in medical statistics, where the analysis is often of the duration of a medical condition which might result in death. Although rather inappropriate for the study of economic durations, its use is ubiquitous and we continue to use it here.

[3] The standard description in the literature assumes continuous time. In our data duration is measured in discrete months, so throughout the descriptions apply to discrete data.

has ended because of a particular risk *r* it cannot also end with any other type of risk. We denote the hazard to risk *r* as $h_r(j)$, where *r* is one of the four possible exit routes: high pay employment, unemployment, out of the labour force and self-employment. In each period the overall hazard is the sum of the four hazards to each risk (exit type).

It is not sufficient to simply compare estimates of $h_r(j)$ between the rural and the urban samples. This is because the two samples are likely to differ in terms of the types of individuals who experience low pay employment spells. For example, Table 1 shows that those experiencing low pay spells in urban areas are younger. If younger individuals exit low pay spells more quickly, then a simple comparison of $h_r(j)$ between the rural and the urban samples would show the urban sample exiting more quickly just because (on average) they are younger. The effect of observed differences between the rural and urban samples is modelled by making the *proportional hazard* assumption that a particular characteristic shifts the hazard up or down proportionately for all values of *j*. Hence, the hazard is written as a function of the number of elapsed months (*j*) and a set of characteristics of each individual *i*, denoted $\mathbf{x}_i$:

$$(1) \qquad h_r(j;\mathbf{x}_i) = h_r^0(j)\exp(\mathbf{x}_i\boldsymbol{\beta}_r)$$

The term $h_0(j)$ is the *baseline hazard*, and is common to all individuals. In the model $h_0(j)$ is estimated non-parametrically: we do not impose a particular shape on the baseline hazard. This is done by creating a set of dummy variables which define each elapsed time period *j*. However, to identify a month-specific hazard rate we need a low pay exit to each destination in each month. Because of data thinning, i.e. fewer exits at later months, this is not possible for all months so we define a series of grouped dummy variables at longer intervals. Specifically, the baseline hazard is allowed to vary across 17 different intervals, namely, one for each of the first 12 months of a low pay spell, then constant within six month intervals

until month 24 of the spell, then for twelve month intervals until month 72, and constant thereafter.

The parameters to be estimated, $\boldsymbol{\beta}_r$, tell us what effect each characteristic has on the baseline hazard for each risk *r*. If an element of $\boldsymbol{\beta}_r$ is positive, then that characteristic shifts the hazard up, increasing the probability that an individual leaves a low pay employment spell.

As it stands, Equation (1) does not allow $\boldsymbol{\beta}_r$ to vary between the rural and urban samples. The discussion in Section 2 suggests that we should allow this. We therefore let the estimated parameters on some characteristics, denoted $\mathbf{z}_i$, to vary between the urban and rural samples. We do this by defining a dummy variable d_i which equals one if the individual is in the rural sample, and zero otherwise. We now write:

$$(2) \qquad h_r(j;\mathbf{x}_i,\mathbf{z}_i) = h_r^0(j)\exp(\mathbf{x}_i\boldsymbol{\beta}_r + d_i\mathbf{z}_i\boldsymbol{\delta}_r)$$

Specifically, the vector of covariates $\mathbf{x}_i$ contains all the variables reported in Table 1, i.e. education, age, gender, industry etc plus regional and time dummy variables. The $\mathbf{z}_i$ vector includes those variables where the discussion in Section 2 suggests that their effect may vary by urban-rural location, namely, education levels, gender and demographics, housing variables. Hence, the $\boldsymbol{\delta}_r$ coefficients represent the difference between the impact of the covariates contained in $\mathbf{z}_i$ in the rural sample and the impact of these covariates in the urban sample for any given exit type.

Some of the differences between the rural and urban samples are observable in the data, such as age. Other differences may not be observable. These unobservable differences are usually described as "unobserved heterogeneity". It is well-known that failure to control for such unobserved heterogeneity may result in misleading estimates of $h_r(j)$ (Heckman

1981). In order to allow for unobserved heterogeneity we must make some additional assumptions which are quite standard in this literature (Wooldridge 2002 p.703–706). The unobserved heterogeneity is assumed to enter the hazard multiplicatively and to be independent of the observed characteristics of the individuals. The final model is written as

(3) $$h_r(j;\mathbf{x}_i) = h_r^0(j)v_i\exp(\mathbf{x}_i\boldsymbol{\beta}_r + d_i\mathbf{z}_i\boldsymbol{\delta}_r)$$

where the v_i is a variable capturing the heterogeneity such that $u = \log(v)$ is normally distributed.[4]

While the estimates of $\boldsymbol{\beta}_r$ and $\boldsymbol{\delta}_r$ are of interest, we also want to consider their effect on the duration of low pay employment spells and the probability of each type of exit. However, because the overall hazard function depends on the hazards to all four exit types, it is difficult to assess the impact of a covariate on these quantities from the estimated coefficients for a single exit type. Rather we must consider explicitly the two quantities of interest, namely, the probability of exit via exit type r, Π_r and the expected low pay duration given an exit of type r, E_r. These can be shown to be (Thomas, 1996):

(4) $$\Pi_r = \sum_{j=1}^{\infty} h_{rj}S_{j-1}$$

(5) $$E_r = \frac{1}{\Pi_r}\sum_{j=1}^{\infty} jh_{rj}S_{j-1},$$

with overall expected low pay duration simply $\sum_{r=1}^{4}\Pi_r E_r$. Using these formulae, the marginal effect of any specific covariate on exit probabilities, conditional expected waiting

[4] The choice of the Normal distribution for the unobserved heterogeneity is somewhat arbitrary, and is adopted here because it allows the parameters in Equation (3) to be estimated using standard software. Stewart (1996) investigates the use of different heterogeneity distributions using similar data to ours (on unemployment durations). He finds that "both the estimated individual hazard elasticities and likelihood test statistics between competing specifications see fairly robust to the choice of mixing distribution".

times by exit type and unconditional expected waiting can be approximated numerically (for particular covariate values).

The parameters in the hazard function in Equation (3) may be estimated using standard software provided the data are organised in a suitable way. For more details, see Prentice and Gloeckler (1978); Han and Hausman (1990), Jenkins (1995), Stewart (1996) and StataCorp. (2001).

5 Results

Parameter estimates

As described above, the competing risk model is estimated separately for each exit type. Table 2 presents estimates for the explanatory variables where the potential effect is allowed to vary by urban-rural location, i.e. age, education, gender, number of children and housing tenure. Urban-rural differences in the impact of the industry, firm size and trade union coverage were also considered. However, none of these differences were found to be statistically significant for any exit type. *All* estimations also included dummy variables for working in the public sector, covered by trade union, in a firm with fewer than 25 employees, and the industry dummies as defined in Table 1 plus a set of regional and time dummies, where the dummies for primary industries, energy and extraction, and the South-East region were used as omitted categories. Finally, the results presented are restricted to exits to high pay, unemployment and out of the labour force. Lack of data on low pay exits to self-employment meant a separate estimate of the parameter vector $\boldsymbol{\delta}_r$ for this exit type was not possible, i.e. we estimated a pooled model with $\boldsymbol{\delta}_r = \mathbf{0}$ for this exit type. Even though no urban effect was allowed for self-employment exits, as can be seen from equations (4) and

(5), the estimates from this equation are still required to calculate the overall survival function, exit probabilities and expected durations.

Overall, the regression evaluation measures provide some validation for the modelling approach taken. For all four regressions (including the results for exits to self-employment), the joint test of significance of the covariates is rejected at less than 0.1% significance, while there is evidence of duration dependence with the hypothesis that the baseline hazard is constant rejected at 1%. The reported estimate of σ_u^2 provides an indication as to whether unobserved heterogeneity is important. The results suggest that this is important for exits to unemployment and to out of the labour force, with the test that this variance is zero rejected at 1% significance. However, for exits to high pay (and self-employment), the hypothesis that this variance is zero and that therefore unobserved heterogeneity is not important cannot be rejected for any standard significance level. Why there should be these differences across exits types is difficult to explain. Formally, it simply suggests that the observed variables capture the variation across individuals sufficiently for exits to high pay (and self-employment), while there appear to be significant additional unobserved factors which determine the exit rates to unemployment and non-employment

The first panel of Table 2 reports the estimated values of $\boldsymbol{\beta}_r$ and $\boldsymbol{\delta}_r$, plus their associated t-values. Hence, the estimates in column 1, 3 and 5 represent the impact of each variable on the particular exit hazard or conditional exit probability, while columns 2, 4, and 6 report the rural-urban difference in the estimate. For example, as might be expected, being an urban female decreases the hazard of exiting to high paid employment or unemployment but increases the hazard of exiting to out of the labour force with all these coefficients statistically significant at 5%. Being a rural female has similar impacts on the exit hazards (conditional exit probabilities). The rural exit hazard to high paid employment exit is negative but larger in absolute value than the urban one (-0.252=-0.062-0.190), the exit hazard to unemployment

negative but smaller in absolute terms, while the exit hazard to out of the labour force is positive and larger in absolute value. The t-values below the estimated urban-rural differences indicate that only the difference in the exit hazard to out of the labour force is statistically significant from zero.

Generally, the estimated urban coefficients are well determined with the expected signs. For example, consistent with the hypothesis that the education level increases wage growth, the impact of increasing levels of education is to increase the exit hazard to both high pay and unemployment. Not surprisingly, the variable female*number of children increases the hazard of an exit to out of the labour force but it also decreases the hazard of an exit to high pay employment or unemployment. As in previous studies (Boheim and Taylor, 2002), the housing variables are important in mobility. Relative to owning or holding a mortgage, being in public housing decreases the hazard of an exit to high pay, and increases the hazard of an exit to unemployment or out of the labour force. Being in privately rented accommodation also increases the hazard for exits to unemployment and out of the labour force but there is no significant effect on exits to high pay employment.

The model accounts for urban-rural differences in personal and job characteristics with differences in observed characteristics captured via the covariate vector $\mathbf{x}_i$, while any residual unobserved differences controlled for via the unobserved heterogeneity term v_i. Hence, if urban-rural differences in low pay durations are simply due to urban-rural differences in personal and job characteristics, the impact of the covariates should be identical for both samples and hypotheses of the form $H_o : \boldsymbol{\delta}_r = \mathbf{0}$ should not be rejected for any exit type. From the results of the hypotheses tests of this type there appears little evidence of systematic differences in the dynamics of exits to unemployment, but stronger evidence of significant urban-rural differences in the impact of the explanatory variables for exits to high pay employment and to out of the labour force.

Consider first exits to high pay employment. Although none of the individual coefficients is significantly different at 10%, neither the joint test that all the urban-rural differences are zero nor the test that the differences on the three education dummies are zero can be rejected at 5%. For exits to out of the labour force, the hypothesis of equality of all urban and rural coefficients is rejected at 10%. There are also significant differences in a number of individual coefficients. The impact of age on the out of labour force exit hazard is significantly different across the urban and rural samples. In the urban sample, the exit hazard is lowest in the over 55 age group, whereas in the rural sample, it is highest lowest for this age group. Being female increases the out of the labour force exit hazard in urban areas but this is significantly lower than the effect of this variable in the rural sample. Conversely, the variable female*number of children has a positive (but insignificant effect) on the urban out of the labour force exit hazard but decreases the hazard in the rural sample. There is also some weak evidence that the impact of being a private renter differs, increasing the out of labour force exit hazard in the urban sample but decreasing it in the rural case.

Marginal Effects

As discussed in Section 4, the interdependence between exit types mean that we cannot directly judge the overall implications of urban-rural differences in parameter estimates reported in Table 2. To provide an initial evaluation of the potential impact of these differences we use the urban and rural estimated coefficients to calculate the marginal effects for each variable where the impact varies by location. To do this we use equations (2) and (3) to calculate the approximate overall exit probabilities and (conditional) expected low pay duration for each variable when the variable is equal to zero and compare this with the values when the variable is equal to one, with all other variables held at their mean values. The results of these calculations are reported in Tables 3. For example, holding all other variables at their mean values, the marginal effect of being an urban female is to increase the

probability of an exit to out of the labour force by 0.13, to increase the expected duration of a low pay spell – conditional on an out of the labour force exit - by 8.4 months, and to increase the unconditional expected duration of a low pay spell by 1.6 months.

The results do not provide unambiguous support for the a priori expectations of differing impacts of the variables in the urban and rural samples. Although there are some clear urban-rural differences in the impact of age, in education, for women, and private renters, these are not entirely consistent with the a priori claims. Rather, they suggest that differences in urban and rural labour markets induce more complex differences in the typical low pay experience.

Consistent with the suggestion that young people are particularly disadvantaged in rural labour markets, the results show that the marginal effect of being in one of the youngest two age groups is to lengthen low pay duration by substantially less in the urban than the rural case. However, although being young significantly increases the probability of an exit to high pay in both samples, the urban effect is substantially less than the rural one. Urban-rural differences are also evident in the impact of increasing education and gender. However, again there is a contrast between the effect on expected durations and exit probabilities. Below degree level higher education levels increase the probability of an exit to high pay to a greater extent in the urban market, but expected low pay durations decrease by slightly less than in the rural case. The impact of being female and urban increases (decreases) slightly the probability of a exit to high pay (unemployment), but increases overall low pay duration. In contrast in the rural case, the overall expected duration falls marginally while the probability of an exit to high pay is significantly reduced.

The results for the housing tenure variables provide somewhat more unambiguous support for claim that the mobility enjoyed by private renters in urban areas is not matched in rural markets. Being a private renter does reduce the overall expected low pay duration by

slightly more in the urban sample (5.5 months versus 3.5 months). More significant, is the difference in the effect on the probability to a low pay exit to unemployment, which increases by only 0.01 in the urban market but by 0.14 in the rural case. In contrast, the reduction in mobility associated with being in public housing appears rather similar across both samples.

Predicted Low Pay Duration and Probabilities

The marginal effects presented in Table 3 provide evidence on whether the urban-rural differences in the dynamics of low pay found from the estimation results are consistent with a priori expectations. However, they do not provide any information on how important urban-rural differences in the dynamics of low pay are in the typical low pay experience for urban and rural workers. Nor do they answer the question of whether, as suggested by some of the qualitative evidence (Hodge et al, 2002), the effect of these urban-rural differences is concentrated on certain types of individuals. To address these issues, we use the model estimates with equations (2) and (3) to calculate approximate exit probabilities and (conditional) expected low pay duration for urban and rural individuals with particular characteristics. These results are reported in Table 4.

For comparative purposes, the first set of results in Table 4 considers the predicted exit probabilities and expected durations using the overall urban sample mean values for the variables. While this does not represent any specific individual type it provides an indication on average as to the importance of urban-rural differences in low pay dynamics in explaining the observed differences in the incidence and duration of low pay in urban and rural labour markets. The results suggest that, after controlling for difference in urban and rural characteristics, 'on average' there are differences in the low pay experience but these are relatively small. Consistent with a priori expectations there is evidence that expected urban low pay duration is shorter (16.4 months versus 19.5 months) and the urban probability of an

exit to high pay larger than for rural individuals (0.57 versus 0.54). However, the urban probability for unemployment exits is in fact slightly lower than the rural one, and all the differences are rather small. To test the robustness of these results we re-estimated the model and calculated the associated predicted probabilities and expected durations for two other low pay threshold definitions, namely, a common low pay threshold at 2/3 of the median wage and secondly a split threshold where urban (rural) low pay was defined as pay falling in the bottom third of the urban (rural) wage distribution. These results indicate that, after controlling for urban-rural differences in characteristics, the conclusion, that 'on average' the differences in the low pay experience are rather small, is relatively robust.

The second panel of Table 4 reports results of specific individual types thought likely to be particularly affected by differences in the operation of urban and rural labour markets, e.g. those with no qualifications, young workers, and women. For example, the representative female used is assumed to be an individual with no qualifications, who is unmarried with no children, aged less than 25 years old, who is living in the South West region and in privately rented accommodation, and who works in a small firm in the non-unionised service sector. The representative male is similar except he is assumed to be working in manufacturing.

The results of this exercise do indeed suggest that the differences in the operation of urban and rural labour markets affect certain types of individuals most. Hence, the expected low pay duration for the representative female is predicted to be 40 percent less in the urban labour market, with a somewhat higher probability of exiting to high pay and a significantly lower (higher) probability of exiting to unemployment (out of the labour force). For the second case of an unqualified woman in the 26-35 age group who is married with 2 children, the expected low pay duration is again substantially lower for the urban case, although the differences in the exit probabilities are much reduced. However, not all types of urban women are predicted to have significantly shorter low pay durations. In the final three

individual female types reported, the differences in the expected durations are small and in the latter two cases, the predicted expected low pay durations are in fact higher for urban women. Although there is some suggestion from these results that the difference in expected low duration diminishes as education level increases for women, larger differences emerge for these types in the predicted probabilities of exits to high pay employment and out of the labour force, with a better educated urban woman much more likely to move eventually to a high pay job than an equivalent rural woman.

There are also substantial differences in the predicted expected duration of low pay for young men without qualifications. However, again these differences diminish with age and qualifications. There is less evidence in the male case that there are substantial differences in the exit probabilities for men as education increases.

6 Conclusions

The results from the analysis show that there are statistically significant differences in the dynamics of low pay across urban and rural labour markets, particularly in terms of exits to high pay and out of the labour force. These results imply that even after controlling for different personal and job characteristics across markets, low pay durations is shorter on average, with a slightly higher probability for urban workers of moving to high pay.

Nevertheless, the overall extent of these differences is rather small. Rather, the results suggest that the effects of differences in low pay dynamics tend to be felt by particular types of individuals, particularly women and young workers. However, the marginal analysis and the prediction of the typical low pay experience for particular types of individual suggests that the extent to which such urban workers are advantaged by denser urban labour markets is more complicated and subtle than predicted. For example, the marginal analysis suggest that the increase of low pay duration for urban younger workers is less than for rural ones, yet the

marginal impact on the probability of a high pay exit for rural young workers is higher than urban ones. The analysis of the predicted low pay durations and exit probabilities tends to confirm this, with significantly smaller expected low pay durations for young urban workers, and for urban women with few qualifications. However, the nature of any urban advantage is not consistent. For example, for more educated women, there is no urban advantage (and sometimes a disadvantage) in terms of time spent in low pay, but the probability of exiting to high pay employment is substantially greater.

The results therefore provide support for prior qualitative evidence suggesting that urban advantage (and rural disadvantage) is concentrated on certain types of individuals. They also emphasise the individualized way in which the differences in low pay dynamics manifest themselves. So while one might conclude there is evidence that women in urban areas are advantaged relative to their rural counterparts, the nature of that advantage depends upon each individual's characteristics.

The results do then suggest that the effectiveness of polices designed to combat low pay employment will differ across space. However, the individualized nature of the effects emphasise the need to avoid 'blanket' polices directed either at urban or rural labour markets. Rather they reiterate the need for individually directed policy.

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Table 1: Summary Statistics

		Urban	Rural
Number of low pay spells		5317	747
% Censored		28.9	25.2
% Exits		71.1	74.9
Of which	High paid employment	44.3	38.2
	Unemployment	28.9	29.6
	Out of Labour Force	22.2	25.4
	Self-employment	4.7	6.8
Conditional Mean Duration (Months)			
Exit to	High paid employment	15.1	17.4
	Unemployment	11.4	12.6
	Out of Labour Force	15.3	20.5
	Self-employment	19.9	19.1
Age			
Age $\leq$ 25		0.374	0.319
25 < Age $\leq$ 35		0.291	0.277
35 <Age $\leq$ 45		0.172	0.177
45 < Age $\leq$ 55		0.123	0.159
Age > 55		0.040	0.068
Housing Tenure			
Owned		0.098	0.102
Mortgage		0.525	0.483
Private rented		0.147	0.214
Public rented		0.229	0.201
Highest Education Level Attained			
O-level/A-levels		0.517	0.514
Nursing/other higher qualifications		0.194	0.206
Degree		0.117	0.098
Other Characteristics			
Female		0.550	0.578
Married		0.588	0.683
Number of children		0.540	0.614
Public sector		0.185	0.167
Union Coverage		0.175	0.150
Firm Size less than 25 employees		0.416	0.511
Industry			
Primary Sector, Energy and Extraction		0.072	0.102
Metal Goods, Engineering and Vehicles Industries		0.081	0.048
Other Manufacturing Industries		0.104	0.112
Construction		0.039	0.047
Distribution, Hotels and Catering, Repairs.		0.283	0.309
Transport and Communication		0.058	0.037
Banking, Finance, Insurance etc		0.123	0.063
Other Services		0.241	0.274

Table 2: Competing Risks Estimates: Urban-Rural Differences

	High Pay Employment		Exit Type Unemployment		Out of Labour Force	
	Urban (β)	*Rural-Urban* (δ)	*Urban* (β)	*Rural-Urban* (δ)	*Urban* (β)	*Rural-Urban* (δ)
Rural Dummy		-0.131		-0.213		0.308
		(0.22)		(0.42)		(0.56)
Age $\leq$ 25	0.847	-0.039	-0.038	-0.384	0.227	-1.337
	(4.15)	(0.07)	(0.2)	(0.81)	(5.19)	(2.63)
25 < Age $\leq$ 35	0.969	-0.183	-0.296	-0.384	0.247	-0.610
	(4.78)	(0.33)	(1.49)	(0.8)	(7.29)	(1.2)
35 <Age $\leq$ 45	0.722	0.225	-0.539	-0.037	0.264	-0.573
	(3.5)	(0.4)	(2.6)	(0.07)	(8.47)	(1.06)
45 < Age $\leq$55	0.371	0.338	-0.444	-0.497	0.235	-0.828
	(1.74)	(0.59)	(2.12)	(0.98)	(6.55)	(1.68)
O-level/A-levels	0.474	-0.077	-0.237	0.230	0.134	0.105
	(5.43)	(0.3)	(2.31)	(0.77)	(0.28)	(0.29)
Nursing etc	0.704	-0.278	-0.116	0.124	0.170	0.599
	(7.4)	(0.97)	(0.94)	(0.35)	(1.89)	(1.4)
Degree	0.838	0.477	-0.192	0.850	0.201	-0.247
	(7.97)	(1.56)	(1.26)	(1.95)	(0.75)	(0.41)
Female	-0.062	-0.190	-0.518	0.142	0.126	0.799
	(1.15)	(1.11)	(5.69)	(0.62)	(6.15)	(2.31)
Married	0.072	0.028	-0.273	-0.015	0.111	-0.076
	(1.33)	(0.15)	(3.36)	(0.06)	(2.53)	(0.25)
Female*Number of children	-0.130	0.107	-0.413	0.139	0.086	-0.342
	(3.36)	(1.05)	(5.31)	(0.78)	(8.26)	(2.24)
Private rented	0.025	-0.203	0.217	0.347	0.142	-0.612
	(0.36)	(1.03)	(2.03)	(1.36)	(4.5)	(1.75)
Public rented	-0.155	0.056	0.489	0.120	0.117	0.215
	(2.35)	(0.25)	(5.17)	(0.45)	(2.36)	(0.63)
Variance σ_u^2 (p-value)	0.0009 (>0.999)		1.156 (<0.001)		1.338 (<0.001)	
Log Likelihood	-9353.6		-6497.8		-5434.7	
Wald Hypothesis Tests	p-value		p-value		p-value	
All coefficients zero	<0.001		<0.001		<0.001	
Baseline Hazard Constant	<0.001		<0.001		<0.001	
All urban and rural coefficients equal	0.038		0.638		0.083	
Urban and rural age coefficients equal	0.208		0.683		0.082	
Urban and rural education coefficients equal	0.021		0. .237		0.361	
Urban and rural housing coefficients equal	0.721		0.598		0.114	

Absolute t values in brackets below estimated coefficients. *All* estimations also included dummy variables for whether in public sector, covered by trade union, in a firm with fewer than 25 employees, a set of industry dummies (as defined in Table 1) plus regional and time dummies.

Table 3: Marginal Effects

	Exit probability				Expected Duration				
	Self Employ-ment	High Paid Employ-ment	Unem-ployment	Out of Labour Force	Self Employ-ment	High Paid Employ-ment	Unem-ployment	Out of Labour Force	Overall
Age <=25									
Urban	-0.04	0.31	-0.06	-0.21	-1.9	5.2	-4.3	-14.3	3.4
Rural	-0.04	0.43	-0.08	-0.31	-1.2	22.6	-1.5	-18.2	15.1
25<Age<=35									
Urban	-0.02	0.37	-0.11	-0.24	-1.0	5.7	-5.5	-15.2	4.4
Rural	-0.01	0.42	-0.13	-0.28	0.0	21.5	-4.1	-17.5	15.2
35<Age<=45									
Urban	-0.01	0.34	-0.12	-0.21	-0.5	8.7	-4.9	-12.5	8.5
Rural	-0.02	0.42	-0.14	-0.27	-1.0	13.0	-6.4	-18.5	10.4
45<Age<=55									
Urban	0.01	0.22	-0.09	-0.15	0.7	10.5	-2.7	-9.0	9.3
Rural	0.01	0.38	-0.16	-0.23	0.8	18.2	-6.9	-15.9	15.0
O-level/A-levels or equivalent									
Urban	0.02	0.14	-0.10	-0.05	0.2	-1.4	-6.9	-6.0	-1.8
Rural	0.02	0.08	-0.06	-0.04	0.2	-4.3	-7.0	-7.4	-4.6
Nursing or equivalent etc									
Urban	0.01	0.19	-0.09	-0.11	-0.3	-3.7	-6.5	-9.5	-2.5
Rural	0.03	0.07	-0.06	-0.03	-0.1	-6.6	-7.0	-6.8	-5.7
Degree or equivalent									
Urban	0.01	0.19	-0.12	-0.08	-0.8	-7.7	-7.7	-8.7	-5.2
Rural	-0.02	0.22	-0.04	-0.16	-3.0	-14.3	-10.1	-16.6	-10.9
Female									
Urban	-0.04	0.01	-0.10	0.13	-1.8	0.8	-3.5	8.4	1.6
Rural	-0.07	-0.11	-0.08	0.26	-4.0	-7.6	-5.0	16.9	-1.7
Married									
Urban	0.01	0.07	-0.05	-0.03	0.8	4.6	-1.1	-1.2	3.0
Rural	0.02	0.08	-0.05	-0.05	1.6	6.6	-1.1	-2.1	3.3
*Female*Number of Children*									
Urban	0.00	-0.05	-0.08	0.13	-0.1	-3.0	-3.4	7.7	-1.1
Rural	0.00	-0.01	-0.06	0.07	-0.2	-1.1	-3.4	4.9	-0.2
Private Rented									
Urban	-0.01	-0.07	0.01	0.07	-0.8	-8.1	-2.0	1.1	-5.3
Rural	-0.01	-0.12	0.14	-0.01	-0.6	-7.4	5.1	-2.1	-3.5
Public Rented									
Urban	-0.03	-0.11	0.11	0.03	-1.4	-6.1	3.1	1.0	-3.3
Rural	-0.05	-0.12	0.12	0.05	-3.1	-10.7	2.0	0.2	-5.2

Derived from Table 2 estimation results. Approximate Marginal effects are calculated by simulating the probabilities and expected durations when the variable is equal to zero and one, with all other variables held at their mean values.

Table 4: Predicted Exit Probabilities and Expected Durations

	Exit probability				Expected Duration				
	Self Employ-ment	High Paid Employ-ment	Unem-ployment	Out of Labour Force	Self Employ-ment	High Paid Employ-ment	Unem-ployment	Out of Labour Force	Overall
Average Urban Characteristics									
Urban	0.04	0.57	0.22	0.16	1.9	22.3	8.6	10.5	16.4
Rural	0.05	0.54	0.24	0.17	2.9	26.4	11.8	13.6	19.5
Average Urban Characteristics - 2/3 Median Wage									
Urban	0.04	0.55	0.26	0.15	1.2	17.1	6.2	7.8	12.3
Rural	0.04	0.51	0.29	0.15	1.8	20.5	9.1	10.1	14.8
Average Urban Characteristics: split urban-rural threshold									
Urban	0.04	0.57	0.22	0.17	2.1	22.2	8.8	10.9	16.5
Rural	0.05	0.56	0.23	0.16	2.5	24.3	10.5	11.8	18.0
*Representative female**									
Urban	0.02	0.25	0.29	0.44	0.6	7.2	8.1	20.8	13.3
Rural	0.03	0.21	0.39	0.36	1.9	11.8	22.3	31.2	22.6
Representative female + Age 26-35 , Married, 2 children									
Urban	0.04	0.23	0.07	0.66	1.2	5.4	1.7	25.3	18.1
Rural	0.07	0.22	0.13	0.57	3.9	11.1	6.8	44.9	29.4
Representative Female + 0/A levels, age 25-35 , married , 2 children, living in public housing									
Urban	0.04	0.33	0.08	0.55	1.3	9.3	2.2	25.5	17.3
Rural	0.04	0.25	0.10	0.61	1.4	7.3	2.7	28.4	19.4
Representative Female + Nursing level, Age 36-45 , Married , 2 children, Mortgage holder									
Urban	0.14	0.50	0.06	0.30	7.9	24.6	2.9	24.2	20.8
Rural	0.13	0.41	0.07	0.39	6.2	17.2	3.1	26.8	18.5
Representative Female + Age over 55, Married, Living in Public Housing									
Urban	0.02	0.09	0.28	0.61	0.6	2.0	5.8	22.3	15.5
Rural	0.01	0.04	0.16	0.79	0.1	0.4	1.4	10.3	8.3
Representative male - Split urban-rural low pay threshold									
Urban	0.07	0.22	0.57	0.14	2.6	6.6	16.7	7.4	12.1
Rural	0.11	0.22	0.63	0.05	6.6	11.5	33.9	4.1	24.6
Representative Male + O/A levels, Age 26-35, Married, Living in Public Housing									
Urban	0.20	0.36	0.20	0.25	9.0	14.3	7.8	16.4	12.5
Rural	0.23	0.38	0.23	0.15	14.1	20.2	12.5	13.0	15.9
Representative male + O/A levels, Age over 55 , Married, Living in Public Housing									
Urban	0.16	0.17	0.36	0.32	6.3	6.0	12.4	18.3	12.2
Rural	0.13	0.13	0.34	0.41	3.8	3.2	8.3	17.2	10.7

*Representative female. No qualifications, Aged less than 25 , living in South West region in Private rented Accomodation, Unmarried, No children, Employee of small firm, Working in the Distribution, Hotels, Catering or Repairs Sector (sic6), Nonunion **Representative Male. As for representative female except working in Other Manufacturing (sic4).

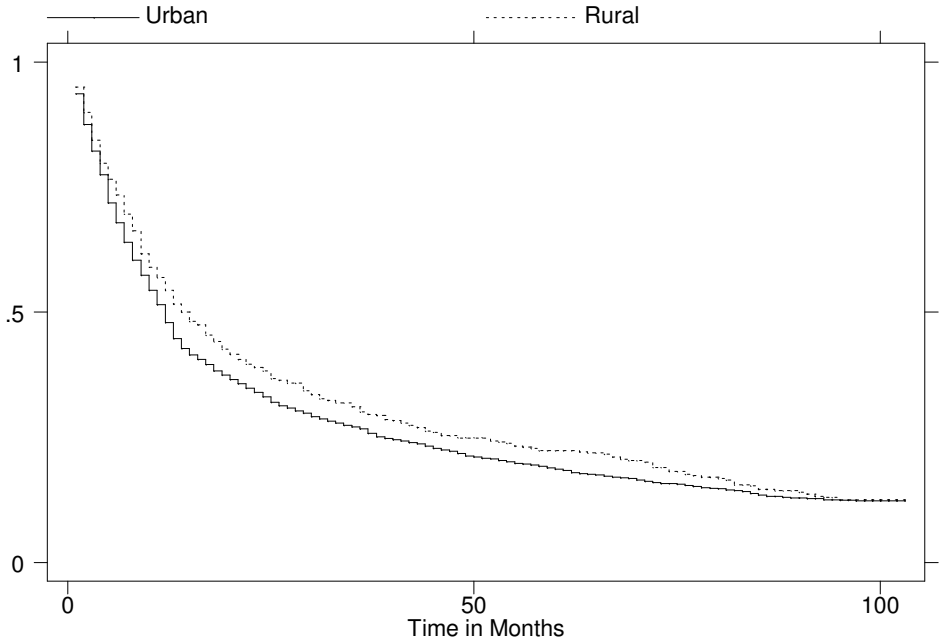

Figure 1: Kaplein Meier Survivor Functions