# COMPARING THE WORKING PATTERNS OF OLDER PEOPLE TO THOSE OF YOUNGER PEOPLE: STATIC AND DYNAMIC EMPIRICAL ANALYSES IN SELECTED ECONOMIES

by

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## ABSTRACT

With an increasing proportion of older people in a population, older people have a greater potential to be part of the future labour force. Their employment patterns therefore deserve governments' attention. This thesis compares the employment patterns of older people to those of younger people in selected economies. In the first study we differentiate between the effects of explained and unexplained factors on age-employment gaps using data from the US CPS and UK LFS in the 2000s and Hong Kong Census and By-Census data from 1991 to 2006. Our non-linear Oaxaca-Blinder decompositions show that explained factors explain nearly the entire age-employment gaps in the U.S. and Hong Kong but not in the U.K. In the second study, we extend the work of Lissenburgh and Smeaton (2003) by investigating job preferences in addition to employment outcomes using the UK LFS from 2001q2 to 2012q1. Our binomial logit models on working part-time involuntarily show that part-time employment is more likely to be a voluntary choice regardless of gender and age. In the third study we use the UK BHPS from 1991 to 2008 to estimate competing risks Cox proportional hazards models on unemployment and various types of employment spells. We find that the older an individual is when he or she starts an unemployment spell, the longer he or she remains unemployed before getting a full-time or part-time job. However, the trend of decreasing hazards from leaving unemployment spells to part-time employment reverses after the spell starting age of 54. In addition, the older an individual is when he or she starts any type of employment spell, the longer he or she remains employed.

**DEDICATION**

To my dearest family and grandmother

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# ABBREVIATIONS

| | |
|---|---|
| ADEA | Age Discrimination in Employment Act |
| ASEC | Annual Social and Economic Supplement (ASEC) Supplements |
| BHPS | British Household Panel Survey |
| BLS | (U.S.) Bureau of Labour Statistics |
| CAEAS | Contingent and Alternative Employment Arrangements Supplements |
| CHNS | China Health and Nutrition Survey |
| COEP | Canadian Out of Employment Panel |
| CPS | Current Population Survey |
| CSU | Central Survey Unit of the NISRA |
| CWBH | Continuous Wage and Benefit History |
| DWS | Displaced Worker Supplements of the CPS |
| ECHP | European Community Household Panel |
| ECPF | Spanish Continuous Family Expenditure Survey |
| ECVT | Spain's Working and Living Conditions Survey |
| EPSEM | Equal probability of selection method |
| ESDS | Economic and Social Data Service |
| ESRC | Economic and Social Research Council |
| EU | European Union |
| FTE | Full-time employment |
| GHS | General Household Survey |
| GSOEP | German Socio-Economic Panel |
| HR | Hazard ratios |
| HRS | Health and Retirement Study |
| ILO | International Labour Office |
| ISER | Institute for Social and Economic Research |
| JSA | Jobseeker's Allowance |
| LFS | Labour Force Survey |
| LII | Living in Ireland Survey |
| LPM | Linear probability models |
| MMPH | Mixed proportional hazards model |
| NBER | National Bureau of Economic Research |
| NISRA | Northern Ireland Statistics and Research Agency |
| NLS | National Longitudinal Survey of Young Men |
| NLSOM | National Longitudinal Survey of Older Men |
| OECD | Organisation for Economic Co-operation and Development |
| OLS | Ordinary least squares |
| ONS | Office for National Statistics |
| PGM | Prentice-Gloeckler-Meyer proportional hazards model |
| PSID | Panel Study of Income Dynamics |
| PTE | Part-time employment |
| RHLS | Social Security Administration Retirement History Longitudinal Survey |
| RHS | Retirement History Study |

| | |
|---|---|
| SE | Self-employment |
| SHARE | Europe Survey of Health, Ageing and Retirement |
| SIWH | Survey on Income and Wealth of Households |
| SPA | State pensionable age |
| UE | Unemployment |
| UI | Unemployment insurance |
| U.K./UK | United Kingdom |
| UKHLS | United Kingdom Household Longitudinal Study |
| ULMS | Ukrainian Longitudinal Monitoring Survey |
| ULSC | UK Longitudinal Studies Centre |
| U.S./US | United States |
| WERS | Workplace Employment Relations Survey |
| WLS | Weighted least squares |
| 2SLS | Two stage least squares |

# GENERAL INTRODUCTION

## Research background

Over the twentieth century, decreasing fertility rates and longer life expectancy have given rise to population ageing. This has led to a "demographic time bomb" of changing population dynamics described as a "baby boom". According to Mirkin and Weinberger (2000), the global number of older people in 2050 will be five times as large as that in 2000. There has been a growing concern on the consequences of population ageing in many economies. On one hand, population ageing gives rise to continuous shrinking of the labour force, which in turn increases the dependency ratios. For example, starting from 1975 there has been an increasing trend in the US dependency ratio and this is projected to continue into 2018 (Toossi, 2009). On the other hand, average family saving rates will decrease when there is a larger proportion of retirees spending their savings. Capital supply in the economy will decrease, which in turn increases the interest rate. The supplies of labour and capital will become more expensive and hence slow down the pace of export growth.

Many economies have been considering various measures to deal with the issue of population ageing. For example, Taiwan provides subsidies to citizens for giving birth. Singapore has set lower immigration criteria to attract foreign professionals. Hong Kong is considering encouraging older people to migrate to nearby less-densely populated provinces for retirement. These measures focus on enlarging the younger labour force or alleviating the consequences of population ageing on the economies. Nevertheless, there are some economies treating older people as a potential labour force rather than a burden to their societies. Many European countries have increased their retirement ages so as to encourage older people to stay in the labour market. Older people can be a potential labour

force rather than a "problem" of population ageing. For instance, Toossi (2009) noted that those aged 55 or over will account for nearly 90% of the additional workers in the US labour force in next 10 years. This group will become a quarter of the US labour force by 2018. Older people working longer can offset some negative consequences of population ageing, such as a shrinking labour force, increased public expenditures associated with early retirement and increasing need for employers to replace retired workers (Keese, 2006).

Several issues deserve special attention if we want to promote longer working lives among older people. Are there any differences in employment probabilities between younger and older people? If so, do unknown factors such as age discrimination account much for differential employment probabilities by age? What are the differences in job preferences and employment outcomes between younger and older people? Do the employment and unemployment durations of older people differ from those of younger people? This thesis addresses the above issues.

## Research motivation and relevance

Despite more attention being paid to the age issue in the U.S. compared to other economies, there still exist few economic studies on differential employment probabilities by age in the US labour market. Studies on employment probabilities among older people are common, but they often ignore the effect of unknown factors such as age discrimination on differential employment probabilities by age (Peracchi and Welch, 1994). Friedman (1984) explained that evidence of discrimination against older people is less convincing than that for other demographic groups. Economic analyses measuring gender or racial discrimination often control for productivity-related factors and attribute the unexplained part as a consequence of discrimination. This approach may not be

appropriate in the study of age discrimination.

Moreover, Johnson and Neumark (1997) stated that working experience and deterioration of skills can affect the comparability of productivity between younger and older workers. They deal with these two problems by analysing self-reported age discrimination. However, there may be bias in drawing conclusions from qualitative data. A quantitative analysis, which can differentiate contributions of differences in observable and unobservable characteristics to the differential employment probabilities between older and younger workers, is needed. The analysis of these new results can be used as a reference for governments to assess the competitiveness of older people compared to their younger counterparts in different economies.

Also worthy of attention are the job preferences over and outcomes of flexible employment (such as part-time employment and self-employment) among older people. Laczko and Phillipson (1991) noted that, after the age of 50, employment status is likely to be characterized by greater flexibility, such as in the mode of part-time employment or self-employment. Nonetheless, despite the increasing worldwide popularity of various kinds of flexible employment among older people, there are few studies on this specific theme. Most studies on employment prospects of older people focus on regular full-time employment. There is little evidence on factors influencing older people's preferences over and outcomes of various employment modes. Moreover, part-time employment might be an involuntary choice for older people if they cannot find their preferred employment mode such as full-time work. The voluntary and involuntary nature of flexible employment therefore deserves special attention (Hakim, 1987; Falzone, 2000; Morris and Mallier, 2003). All these features have implications for government policies aimed at helping older people find their favourite employment mode.

There are various duration studies focusing on more detailed information on when an individual leaves their original state and transits into another. Some of these focus on the duration of more than one type of economic activity (Theeuwes *et al.*, 1990; Hunt, 1999; Martinez-Granado, 2002). However, unemployment and employment durations of older people are still understudied. The limited number of papers such as Chan and Steven (2001), Haardt (2006) and Tatsiramos (2010) focus on employment in general without distinguishing employment modes. There are few studies on older people focusing on unemployment duration before transiting into various types of employment or inactivity, or the durations of various types of employment. Under population ageing, how to help older workers stay in their chosen employment mode for longer deserves policy makers' attention.

## Thesis structure

This thesis presents three studies within six core chapters plus this introduction and a conclusion. For each study, the first chapter presents a literature survey and the second presents new empirical results.

The first study (Chapters 1 and 2) provides new insights on differential employment probabilities by age with two specific research objectives. Firstly, we provide new insights on the employment probabilities of older people in the U.S., the U.K. and Hong Kong. The first two are well-known developed western economies, whereas Hong Kong is a multi-cultural economy with both Chinese and western elements. A comparison among these three economies can shed light on any differences of older people's employment patterns in different ageing societies. Secondly, we investigate the neglected aspect of gender. As pointed out by Ginn and Arber (1996) and Duncan and Loretto

(2004), researchers have focused on the employment of older males rather than older females. This may conceal important patterns on the issue. The labour force in the three economies under analysis has become older and more feminine. It is important to investigate whether there are any differences in employment probabilities between older males and older females. Chapter 1 provides a literature survey on the employment of older people in the aforementioned three economies which are known to be facing population aging. We first analyse the statistics on labour force participation rates and unemployment rates of older people, for the sake of learning more about the changes in the willingness of older people to work and their employment situation in the early 2000s. We then discuss empirical studies on employment probabilities of older people and studies on gender dimension. Lastly we summarise the various approaches under this theme.

Chapter 2 discusses the data used, the empirical framework and the analysis results on the employment probabilities of older versus younger people in the first study. We first discuss the background and treatment of the data used in each analysis for the three economies and the summary statistics for the samples. The U.S. has the best and most steady level of labour force quality among the three. The qualities of the labour force in the U.K. and Hong Kong have improved over the last century. We then explain the estimation framework for the logit models and non-linear Oaxaca-Blinder decompositions and discuss the results. Five research questions are addressed in Chapter 2. Firstly, which is the most important factor affecting the employment probabilities of younger and older people? Secondly, what is the magnitude of the difference in employment probabilities between younger and older people? Thirdly, to what extent are the differential employment probabilities attributable to explained factors (differences in observable characteristics) and unexplained factors (differences in unobservable

characteristics)? Fourthly, do the answers to the above three questions differ for males and females? Fifthly, do the answers to the above four questions differ in the U.S., the U.K. and Hong Kong? The decomposition results for the U.S. and Hong Kong show that the differences in observable characteristics (explained factors) can explain nearly the whole negative employment gap. In contrast, there are many more uncontrolled factors in our models which affect the UK age-employment gap.

The second study (Chapters 3 and 4) focuses on the U.K. because richer information for the analysis purposes of this study is available in the UK Labour Force Survey (LFS). Also, the U.K. acts as a benchmark between heavily regulated economies like Europe and less regulated economies like the U.S. (Ajayi-Obe and Parker, 2005). We provide new insights on the issues of flexible employment modes among older versus younger people with three research objectives. Firstly, we study the preferences of older versus younger unemployed job-seekers over various employment modes. Secondly, we update the analysis on the entry of older people into various employment modes by considering more than one type of flexible employment, using a long time-span of data and considering the neglected issue of gender. Thirdly, we investigate the voluntary and involuntary nature of part-time employment. Chapter 3 provides a literature survey on the flexible employment of all workers but especially older ones. We first discuss the nature of three major types of flexible employment, namely: part-time employment, self-employment and temporary employment. Statistics on the employment rates of each flexible employment mode in the U.K. is also discussed for understanding the changes in the flexible employment situation. All types of flexible employment are more popular among older people than among younger people. We then review studies on each flexible employment mode and studies on more than one flexible employment mode. Lastly we summarise the approaches to this theme.

Chapter 4 discusses the data, the empirical framework and the analysis results on the preferences over and outcomes of flexible employment modes for older versus younger people in the second study. We discuss the background and treatment of the data and summary statistics for the samples. Younger people are more likely to prefer full-time work and work full-time, whereas older people are more likely to prefer flexible employment and work flexibly. Moreover, males have a higher preference for self-employment and females for part-time work. We then present the estimation framework for the three analyses of multinomial logits and binomial logits and discuss the empirical results. There are five research questions in Chapter 4. Firstly, what are the significant factors affecting older people's preferences over each type of employment? Secondly, what are the significant factors affecting older people's entry into a particular mode of employment? Thirdly, what are the significant factors leading older people to work part-time involuntarily? Fourthly, are the answers to the above questions different from those for younger people? Fifthly, do the results above differ between males and females? We find that people with a particular attribute may have a higher preference for a particular employment mode but they may have a higher probability of entering a different employment mode. Furthermore, both males and females are more willing to work part-time as they age. Part-time employment is therefore more likely to be a voluntary choice regardless of gender and age.

The third study (Chapters 5 and 6) analyses the unemployment and employment durations for older people and compares their situation to that of younger people with two specific research objectives. Firstly, we study the duration of four economic modes, namely unemployment, full-time employment, part-time employment and self-employment. Secondly, we investigate the various exit states out of various economic modes. Thirdly, we aim to investigate the effect of spell starting age if it is after the age

of statutory retirement. Chapter 5 provides a deepening on the literature survey on employment in Chapter 3 by considering duration studies on various types of economic activity. We first discuss past empirical studies based on the initial economic state. We then discuss studies specific to older people and summarise the various approaches under this theme.

Chapter 6 carries out empirical analyses on the ideas discussed in Chapter 5 by using competing risks Cox proportional hazards models on unemployment durations and employment durations. We first discuss the background and treatment of our spell data before discussing the summary statistics for the samples. Different patterns in each type of spell by exit state are identified. We present the estimation framework for the competing risks Cox proportional hazards models and then discuss the estimation results on various spells. Five research questions are addressed in Chapter 6. Firstly, what are the significant factors affecting the cause-specific hazards of exiting from spells of unemployment, full-time employment, part-time employment or self-employment into various exit states? Secondly, are there any differences in the effect of a particular factor on the cause-specific hazards of exiting from a particular spell into various states? Thirdly, what are the directions of the effects of age on the cause-specific hazards of exiting from each type of spell into various states? Fourthly, what are the differences (if any) of the effect of retirement age on exiting into various economic states? Lastly, do these results differ between males and females? In contrast to the common finding that duration dependences of unemployment or employment are negative, we find that the hazard rates of any types of spells except self-employment spells decrease during the early stage of spells and increase in the later stage. The older an individual is when he or she starts a unemployment spell, the longer he or she remains unemployed before getting full-time or part-time jobs. In addition, the older an individual starts any type of employment spell,

the longer time he or she remains employed. This shows the higher stability for older individuals to remain employed compared to the youngest group.

# CHAPTER 1

# THE PROBABILITIES OF EMPLOYMENT FOR OLDER PEOPLE: A LITERATURE REVIEW

## 1.1 Introduction

Over the second half of last century population aging has been a growing concern in many economies. Reday-Mulvey (2005) suggested that some firms may encounter the problem of labour shortage due to the shrinking of younger labour force. Governments have been focusing on older people as a potential source of labour supply (Gunderson, 2003). Employment rates for older people in many developed economies have been rising. For example, in the U.K. from 1998 to 2002 employment rates among people aged 50 or over rose which was in contrast to the downward trend before the mid-1990s (Disney and Hawkes, 2003). The reasons behind increasing employment rates among older people deserve governments' attention if they want to promote healthy and productive ageing.

This chapter provides a literature survey on the employment of older people in the U.S., the U.K. and Hong Kong, which are known to be facing population aging. The U.S. and the U.K. are well-known western developed economies, whereas Hong Kong is a multi-cultural economy with both Chinese and Western culture. A comparison among these three economies can shed light on any differences of older people's employment patterns in different societies. We first explain the models of life-cycle labour supply in Section 1.2 to aid the discussion hereafter. By analysing labour force participation rates and unemployment rates of older people in Sections 1.3 and 1.4, we can learn more about the changes in the willingness of older people to work and their employment situation in the early 2000s. Section 1.5 discusses the pension arrangements and retirement age in the U.S., the U.K. and Hong Kong. Sections 1.6 and 1.7 discuss empirical studies on

employment probabilities of older people. Section 1.8 summarises the approaches for analyses on this theme. A final section concludes.

## 1.2 The model of life-cycle labour supply

**Figure 1.1: Graphical illustration of life-cycle allocation of time**

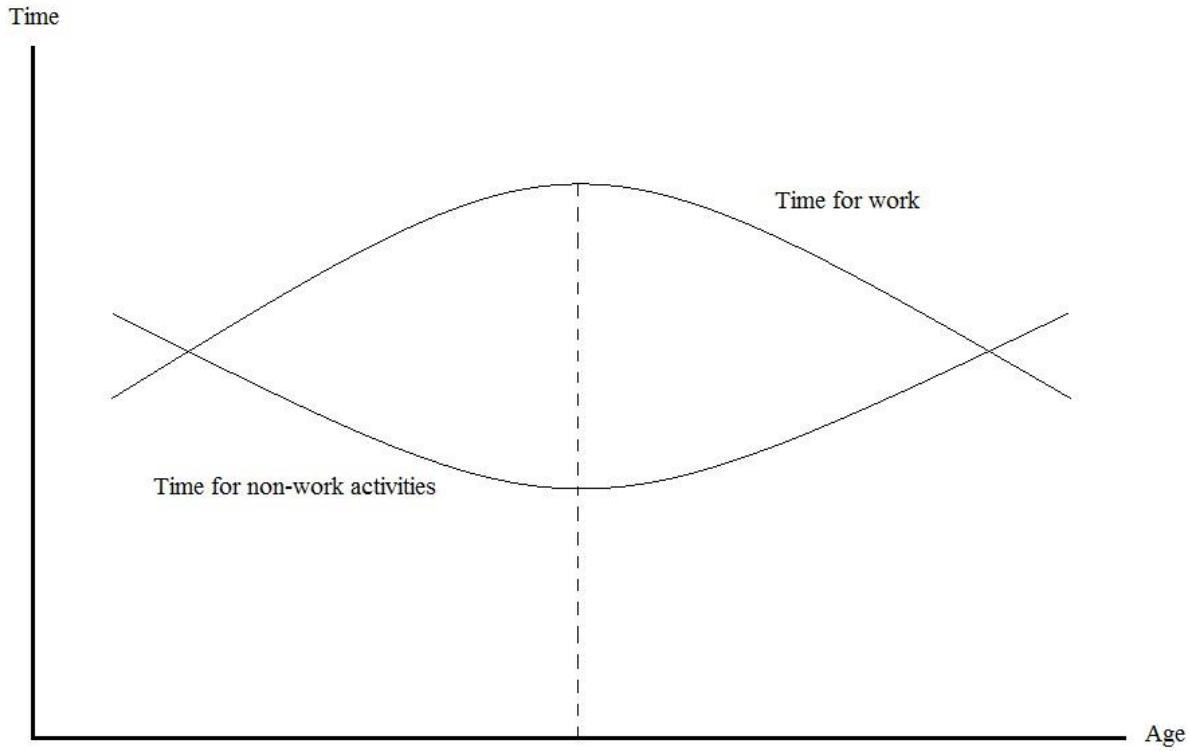
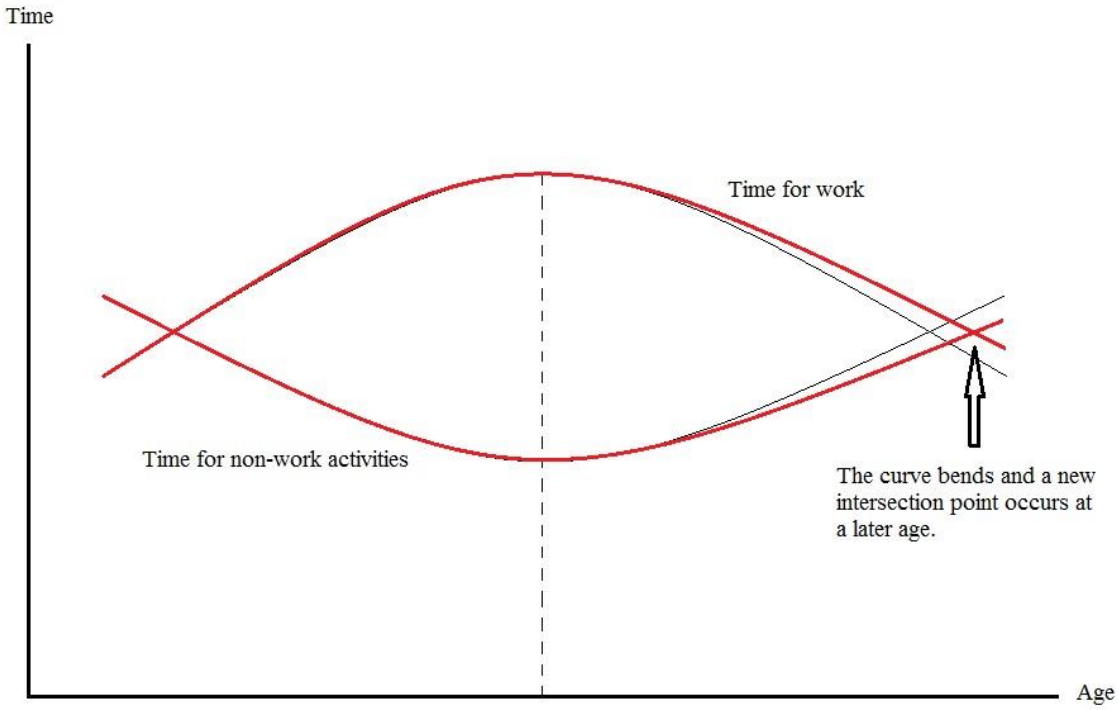



Figure 1.1 shows an individual's life-cycle allocation of time (Ehrenberg and Smith, 2006). Individuals' preferences for work and non-work activities vary over their own life time and so do the time they supply to the labour market. In early years, individuals devote relatively less time on work for more leisure and schooling than in later years because their productivity is low in young adult years and they need to accumulate human capital. When they age and their productivity rises, their time spent on work increases whereas their time spent on non-work activities decreases. This trend reverses when they further age and retire. Older people nowadays are more willing to continuously participate in the

labour market, for which we will discuss in next section. As shown in Figure 1.2, compared to the traditional model, individuals in their later years are willing to devote more time on work before they participate more in non-work activities.

**Figure 1.2: Graphical illustration of life-cycle allocation of time**




## 1.3 Changes in labour force participation rates for older people

### 1.3.1 The United States

As noted by Osberg (1993) and Hofacker (2010), the labour force participation rates of older people in the U.S. (and some other European countries) have decreased since the end of the Second World War. The trends reversed in 1996 and the participation rates are increasing (Mosisa and Hipple, 2006; Sok, 2010). Table 1.1 shows the US labour force participation rates by age group and gender from 2003 to 2010. As predicted by the model discussed in Section 1.2, it is unsurprising that the participation rates of the middle-age

group is the highest, followed by those of younger people and then of older people. The participation rates of the younger and the middle age groups are decreasing. In contrast, the participation rates of all people over 50 increased gradually from 2003 to 2010, despite the economic recession starting in 2007. This trend has also been noted by Gendell (2008), Toossi (2009) and Sok (2010).

The overall participation rates of males have decreased from 2003 to 2010. This is the same for the participation rates of the youngest male age group (16 to 24) from 2005. The participation rates of middle-aged males fluctuated in the 2000s, whereas the participation rates of older males increased gradually. For females, the participation rates by various age groups show similar trends as those of the males. The increase in the older females' participation rates is larger than that of older males. This shows that older females are increasingly more willing to work than older males.

**Table 1.1: US labour force participation rates by age and gender**

| Group | Labour force participation rates (%) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **2003** | **2004** | **2005** | **2006** | **2007** | **2008** | **2009** | **2010** |
| **Total** | | | | | | | | |
| **16 or over** | 68.09 | 67.77 | 67.71 | 67.61 | 67.84 | 67.71 | 67.21 | 66.74 |
| **16 to 24** | 58.35 | 57.70 | 58.20 | 57.67 | 56.93 | 56.13 | 54.30 | 52.40 |
| **25 to 49** | 83.83 | 83.45 | 83.45 | 83.51 | 83.87 | 83.90 | 83.50 | 83.28 |
| **50 or over** | 48.09 | 49.06 | 49.21 | 49.70 | 50.71 | 51.32 | 51.59 | 51.57 |
| **Male** | | | | | | | | |
| **16 or over** | 75.02 | 74.81 | 74.70 | 74.81 | 74.78 | 74.55 | 73.68 | 73.09 |
| **16 to 24** | 59.89 | 59.99 | 60.23 | 60.04 | 58.63 | 58.25 | 55.90 | 54.28 |
| **25 to 49** | 92.01 | 91.92 | 91.94 | 92.24 | 92.48 | 92.12 | 91.42 | 91.23 |
| **50 or over** | 55.75 | 56.24 | 56.43 | 57.02 | 57.87 | 58.42 | 58.51 | 57.95 |
| **Female** | | | | | | | | |
| **16 or over** | 61.93 | 61.46 | 61.42 | 61.11 | 61.57 | 61.56 | 61.37 | 60.96 |
| **16 to 24** | 56.79 | 55.42 | 56.12 | 55.25 | 55.21 | 54.02 | 52.67 | 50.49 |
| **25 to 49** | 76.50 | 75.90 | 75.89 | 75.68 | 76.17 | 76.54 | 76.43 | 76.10 |
| **50 or over** | 41.49 | 42.88 | 42.99 | 43.38 | 44.47 | 45.16 | 45.57 | 46.01 |

Note: Labour force participation rate:
the proportion of labour force in the population in the respective age group
Source: My own calculation using data from the CPS

### 1.3.2 The United Kingdom

As noted by Laczko and Phillipson (1991), the UK labour force participation rates of older people have decreased since the end of the Second World War. The trends reversed in the early 1990s and the participation rates continued to increase (Lluberas, 2007; Benito, 2011). Table 1.2 shows the UK labour force participation rates by age group and gender from 2001 to 2010. The participation rates of the middle age group have a gradual increasing trend, while those of the younger age group show a declining trend. The participation rates of all people over 50 also increased gradually but to a larger extent.

**Table 1.2: UK labour force participation rates by age and gender**

| Group | Labour force participation rates (%) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **2001** | **2002** | **2003** | **2004** | **2005** | **2006** | **2007** | **2008** | **2009** | **2010** |
| **Total** | | | | | | | | | | |
| **16 or over** | 80.93 | 81.14 | 81.31 | 81.32 | 81.71 | 82.08 | 82.19 | 82.47 | 82.36 | 82.30 |
| **16 to 24** | 85.20 | 84.62 | 83.94 | 83.90 | 83.45 | 83.59 | 83.42 | 83.54 | 83.38 | 83.05 |
| **25 to 49** | 84.21 | 84.37 | 84.21 | 84.18 | 84.67 | 85.03 | 84.91 | 85.32 | 85.47 | 85.30 |
| **50 or over** | 72.70 | 73.33 | 74.61 | 74.85 | 75.41 | 76.00 | 76.66 | 76.75 | 76.44 | 76.82 |
| **Male** | | | | | | | | | | |
| **16 or over** | 86.63 | 86.72 | 86.92 | 86.65 | 86.76 | 86.99 | 86.91 | 86.92 | 86.45 | 86.38 |
| **16 to 24** | 92.55 | 91.71 | 91.47 | 91.14 | 90.72 | 90.42 | 90.03 | 90.79 | 90.14 | 90.20 |
| **25 to 49** | 92.43 | 92.58 | 92.47 | 92.09 | 92.19 | 92.75 | 92.66 | 92.72 | 92.67 | 92.43 |
| **50 or over** | 74.31 | 74.71 | 76.01 | 76.15 | 76.51 | 76.54 | 76.68 | 76.37 | 75.83 | 76.34 |
| **Female** | | | | | | | | | | |
| **16 or over** | 75.30 | 75.63 | 75.77 | 76.06 | 76.71 | 77.26 | 77.56 | 78.07 | 78.31 | 78.27 |
| **16 to 24** | 77.84 | 77.62 | 76.37 | 76.60 | 76.10 | 76.82 | 76.85 | 76.52 | 76.43 | 75.73 |
| **25 to 49** | 76.80 | 76.98 | 76.89 | 77.18 | 77.96 | 78.20 | 78.09 | 78.70 | 79.12 | 79.05 |
| **50 or over** | 70.78 | 71.67 | 72.91 | 73.28 | 74.10 | 75.34 | 76.64 | 77.22 | 77.18 | 77.41 |

Note: Labour force participation rate:
the proportion of labour force in the population in the respective age group
Source: My own calculation using data from the LFS

The overall participation rates of male age groups fluctuated, which is in contrast to the increasing trend of females' participation rates. Only the participation rates of older males show an increasing trend, whereas the participation rates of both middle-aged and older females increase. The increase in the participation rates of older females is much larger than that of the older males. This shows that older females are increasingly more willing to work than older males in the U.K.

### 1.3.3 Hong Kong

Chiu and Ngan (1999) noted that the decline in the labour force participation rates of older people started in the 1970s. The trends reversed in the early 1990s and the participation rates increased. This is similar to the situations in the U.S. and the U.K. Table 1.3 shows the labour force participation rates by age group and gender in Hong Kong in 2000 and from 2005 to 2010. The participation rates of the younger age group have a decreasing trend. The rate of decrease became larger after the start of the 2007 global financial crisis. In contrast, the participation rates of people over 50 show an increasing trend. The global financial crisis did not affect older people's willingness to work.

The general participation rates of males show a decreasing trend, which is in contrast to those of females. For males, only the participation rates of older males show an increasing trend. This differs from the situation for females. As noted by Chiu and Ngan (1999), the participation rates of females over 60 decreased from 21.7% in 1986 to 12.5% in 1995. This results in a relative decrease of 42.4% over 10 years, which is double the relative decrease in older males' participation rates. Nonetheless, the participation rates of middle-aged and older females increased in the 2000s. The increase in the participation rates of older females is much larger than that of older males. This shows that older females are increasingly more willing to work than older males.

**Table 1.3: Hong Kong labour force participation rates by age and gender**

| Group | Labour force participation rates (%) | | | | | | |
|---|---|---|---|---|---|---|---|
| | 2000 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
| **Total** | | | | | | | |
| **15 or over** | 61.4 | 60.9 | 61.2 | 61.2 | 60.9 | 60.7 | 59.7 |
| **15 to 24** | 64.7 | 62.2 | 61.5 | 60.8 | 59.2 | 57.6 | 54.6 |
| **25 to 49** | 81.7 | 83.1 | 83.5 | 84.1 | 83.9 | 84.3 | 83.6 |
| **50 or over** | 55.8 | 57.4 | 58.1 | 58.5 | 59.6 | 59.8 | 59.6 |
| **Male** | | | | | | | |
| **15 or over** | 73.5 | 71.1 | 70.9 | 70.5 | 69.7 | 69.4 | 68.6 |
| **15 to 24** | 64.2 | 59.8 | 59.7 | 57.9 | 56.7 | 56.2 | 53.7 |
| **25 to 49** | 97.0 | 95.9 | 95.8 | 96.0 | 95.5 | 95.5 | 95.4 |
| **50 or over** | 73.2 | 73.7 | 73.7 | 74.0 | 74.6 | 74.8 | 74.5 |
| **Female** | | | | | | | |
| **15 or over** | 49.9 | 51.8 | 52.6 | 53.1 | 53.1 | 53.1 | 52.0 |
| **15 to 24** | 65.0 | 64.4 | 63.1 | 63.4 | 61.6 | 59.0 | 55.5 |
| **25 to 49** | 69.2 | 73.0 | 74.0 | 74.9 | 75.3 | 76.0 | 75.0 |
| **50 or over** | 37.6 | 41.8 | 43.6 | 43.9 | 45.4 | 45.6 | 46.0 |

Note: Labour force participation rate:
the proportion of labour force in the population in the respective age group
Source: Hong Kong Annual Digest of Statistics 2011

## 1.4 Changes in unemployment rates for older people

### 1.4.1 The United States

The U.S. Bureau of Labor Statistics (1999) noted that the unemployment rates for older people are usually lower than those of younger ones. This is true for the U.S. in the 2000s. Table 1.4 shows the US unemployment rates by age group and gender from 2003 to 2010. As noted by Sok (2010), the unemployment rates for all age groups decreased until 2007 and then rose sharply at the start of the 2007 recession. Younger and middle-aged people are less willing to find jobs during economic recessions, as shown by the decreasing labour force participation rates for these two groups in Table 1.1. In contrast, older people's willingness to find jobs are unaffected by the increasing unemployment rates. Sok (2010) suggested that older people in the U.S. tend to remain unemployed longer than their younger counterparts. The trends for males and females are similar to those of the general workforce.

**Table 1.4: US unemployment rates by age and gender**

| Group | Unemployment rates (%) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **2003** | **2004** | **2005** | **2006** | **2007** | **2008** | **2009** | **2010** |
| **Total** | | | | | | | | |
| **16 or over** | 6.13 | 5.76 | 5.32 | 4.82 | 4.55 | 5.16 | 8.67 | 9.75 |
| **16 to 24** | 13.44 | 12.84 | 12.68 | 11.58 | 10.85 | 12.35 | 17.60 | 19.37 |
| **25 to 49** | 5.26 | 4.99 | 4.37 | 4.04 | 3.82 | 4.39 | 7.85 | 8.98 |
| **50 or over** | 4.27 | 3.85 | 3.71 | 3.12 | 3.12 | 3.54 | 6.52 | 7.34 |
| **Male** | | | | | | | | |
| **16 or over** | 6.68 | 6.15 | 5.71 | 5.03 | 4.91 | 5.61 | 10.05 | 11.12 |
| **16 to 24** | 14.92 | 14.24 | 14.54 | 12.54 | 12.07 | 13.75 | 20.72 | 22.42 |
| **25 to 49** | 5.62 | 5.20 | 4.45 | 4.02 | 4.03 | 4.67 | 9.11 | 10.14 |
| **50 or over** | 4.84 | 4.18 | 4.09 | 3.46 | 3.47 | 3.94 | 7.41 | 8.45 |
| **Female** | | | | | | | | |
| **16 or over** | 5.53 | 5.33 | 4.88 | 4.60 | 4.14 | 4.68 | 7.15 | 8.24 |
| **16 to 24** | 11.83 | 11.31 | 10.61 | 10.50 | 9.52 | 10.83 | 14.15 | 15.99 |
| **25 to 49** | 4.86 | 4.76 | 4.29 | 4.06 | 3.60 | 4.09 | 6.49 | 7.72 |
| **50 or over** | 3.62 | 3.48 | 3.27 | 2.73 | 2.72 | 3.09 | 5.52 | 6.12 |

Note: Unemployment rate:
the proportion of unemployed people in the labour force in the respective age group
Source: My own calculation using data from the CPS

### 1.4.2 The United Kingdom

Table 1.5 shows the UK unemployment rates by age group and gender from 2001 to 2010. The unemployment rates of all people over 16 had a decreasing trend until 2004 and later increased. The rates rose sharply by nearly 2% from 2007 to 2008 and remained over 6% in 2000. The unemployment rates of younger people increased gradually and then rose sharply between 2008 and 2009. The unemployment rate trend for middle-aged people is similar to that of older people, which decreased until 2004 and then rose afterwards. However, the rising unemployment rates seem to have no negative effect on the middle-aged and older people's willingness to work. The trends for unemployment rates of males and females are similar to those of the general unemployment rates.

**Table 1.5: UK unemployment rates by age and gender**

| Group | Unemployment rates (%) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **2001** | **2002** | **2003** | **2004** | **2005** | **2006** | **2007** | **2008** | **2009** | **2010** |
| **Total** | | | | | | | | | | |
| **16 or over** | 4.32 | 4.44 | 4.18 | 3.83 | 3.95 | 4.37 | 4.28 | 4.69 | 6.46 | 6.67 |
| **16 to 24** | 10.30 | 10.68 | 10.72 | 10.60 | 11.33 | 12.20 | 12.31 | 13.05 | 17.05 | 17.58 |
| **25 to 49** | 3.96 | 4.00 | 3.72 | 3.33 | 3.42 | 3.97 | 3.76 | 4.12 | 5.85 | 6.14 |
| **50 or over** | 2.84 | 3.04 | 2.82 | 2.50 | 2.51 | 2.60 | 2.65 | 3.11 | 4.42 | 4.51 |
| **Male** | | | | | | | | | | |
| **16 or over** | 4.84 | 4.96 | 4.69 | 4.21 | 4.36 | 4.71 | 4.54 | 5.14 | 7.46 | 7.60 |
| **16 to 24** | 11.75 | 12.31 | 11.97 | 11.76 | 12.98 | 13.91 | 13.83 | 15.24 | 19.68 | 19.79 |
| **25 to 49** | 4.22 | 4.28 | 4.04 | 3.45 | 3.52 | 4.00 | 3.63 | 4.21 | 6.38 | 6.66 |
| **50 or over** | 3.58 | 3.71 | 3.43 | 3.11 | 3.07 | 3.08 | 3.22 | 3.68 | 5.69 | 5.67 |
| **Female** | | | | | | | | | | |
| **16 or over** | 3.73 | 3.85 | 3.60 | 3.40 | 3.49 | 4.00 | 4.00 | 4.19 | 5.36 | 5.67 |
| **16 to 24** | 8.58 | 8.79 | 9.21 | 9.21 | 9.35 | 10.22 | 10.54 | 10.53 | 13.85 | 14.88 |
| **25 to 49** | 3.68 | 3.71 | 3.38 | 3.20 | 3.31 | 3.93 | 3.91 | 4.02 | 5.29 | 5.60 |
| **50 or over** | 1.92 | 2.21 | 2.05 | 1.73 | 1.83 | 2.02 | 1.95 | 2.42 | 2.93 | 3.12 |

Note: Unemployment rate:
the proportion of unemployed people in the labour force in the respective age group
Source: My own calculation using data from the LFS

### 1.4.3 Hong Kong

Table 1.6 shows the unemployment rates by age group and gender in Hong Kong in 2000 and from 2005 to 2010. It is not surprising to see that the unemployment rates of the youngest age group are the highest compared to those of other age groups. Most youngsters aged 15 to 19 have not completed their education and so have little working experience. Thus they are often not preferred by potential employers. Unemployment rates decreased until the start of the 2007 global financial crisis and then rose. Nevertheless, the general unemployment rates dropped again from 2009 to 2010. There was a decrease in the willingness of younger and middle-aged people to find jobs after 2008. Similar to the situation of the U.S. and the U.K., older people's willingness to find jobs are unaffected by changes in economic conditions. The trends for males and females are similar to that of the general workforce.

**Table 1.6: Hong Kong unemployment rates by age and gender**

| Group | Unemployment rates (%) | | | | | | |
|---|---|---|---|---|---|---|---|
| | **2000** | **2005** | **2006** | **2007** | **2008** | **2009** | **2010** |
| **Total** | | | | | | | |
| **15 or over** | 4.9 | 5.6 | 4.8 | 4.0 | 3.6 | 5.4 | 4.4 |
| **15 to 19** | 23.7 | 21.9 | 21.9 | 19.8 | 16.0 | 21.8 | 20.8 |
| **20 to 29** | 5.8 | 6.2 | 5.6 | 4.6 | 4.6 | 7.2 | 6.6 |
| **30 to 39** | 3.2 | 3.8 | 3.4 | 2.9 | 2.4 | 3.9 | 3.1 |
| **40 to 49** | 4.3 | 5.3 | 4.3 | 3.5 | 3.1 | 4.6 | 3.5 |
| **50 to 59** | 6.0 | 6.9 | 5.5 | 4.6 | 3.7 | 5.3 | 4.2 |
| **60 or over** | 2.9 | 3.9 | 2.6 | 2.5 | 1.9 | 3.0 | 2.8 |
| **Male** | | | | | | | |
| **15 or over** | 5.6 | 6.5 | 5.7 | 4.6 | 4.1 | 6.2 | 5.1 |
| **15 to 19** | 23.9 | 24.2 | 24.8 | 20.7 | 18.1 | 23.8 | 22.9 |
| **20 to 29** | 6.8 | 8.2 | 7.3 | 6.0 | 5.8 | 9.3 | 8.2 |
| **30 to 39** | 3.7 | 4.6 | 4.2 | 3.4 | 2.7 | 4.4 | 3.6 |
| **40 to 49** | 4.8 | 5.7 | 4.7 | 3.7 | 3.3 | 5.1 | 4.0 |
| **50 to 59** | 7.1 | 7.7 | 6.3 | 4.9 | 4.3 | 6.1 | 4.9 |
| **60 or over** | 3.3 | 4.3 | 3.0 | 2.8 | 2.2 | 3.2 | 3.2 |
| **Female** | | | | | | | |
| **15 or over** | 4.1 | 4.4 | 3.8 | 3.4 | 3.0 | 4.4 | 3.6 |
| **15 to 19** | 23.4 | 19.0 | 18.6 | 18.7 | 13.7 | 19.5 | 18.2 |
| **20 to 29** | 4.8 | 4.4 | 4.1 | 3.5 | 3.6 | 5.4 | 5.1 |
| **30 to 39** | 2.7 | 3.1 | 2.7 | 2.4 | 2.1 | 3.4 | 2.6 |
| **40 to 49** | 3.5 | 4.6 | 3.6 | 3.1 | 2.9 | 4.1 | 2.9 |
| **50 to 59** | 3.3 | 5.5 | 4.1 | 4.0 | 2.7 | 3.9 | 3.1 |
| **60 or over** | 1.3 | 2.4 | **nil**[1] | 1.5 | 0.9 | 2.3 | 1.4 |

Note: Unemployment rate: the proportion of unemployed people in the labour force in the respective age group
Source: Hong Kong Annual Digest of Statistics 2011 and Hong Kong Census and Statistics Department (2012)

## 1.5 Pension arrangements and statutory retirement age

Pension arrangements have implications on older people's incentives to work and their retirement age. If older workers value leisure over work and they have no special financial difficulties forcing them to work, they would leave the labour market once they reach the age when pension benefits are available (Gruber and Wise, 2010) Workers may

[1] The statistics is unpublished because of large sampling error (Census and Statistics Department, 2012).

invest part of his savings in terms of private or public pensions for different reasons. This allows portfolio diversification of his or her savings (Handa, 1994).

**Table 1.7: Pension arrangements and statutory retirement age for each economy**

| | **The U.S.** | **The U.K.** | **Hong Kong** |
|---|---|---|---|
| **Public pensions** | OASDI: Old-Age, Survivors, and Disability Insurance program:<br><br>- Runs on a pay-as-you-go basis<br>- 84% from social security taxes by employers and employees<br>- 14 % from interest in accumulated trust funds reserves<br>- 2% from tax revenues by upper-income social security beneficiaries | 3 components:<br><br>- The Basic State Pension<br>- The State Second Pension<br>- The Pension Credit | 2 forms of the Social Security Allowance (SSA) Scheme:<br><br>- Normal Old Age Allowance for people aged 65 to 69 (mean-tested)<br>- Higher Old Age Allowance for those aged 70 or over (not mean-tested)<br><br>Comprehensive Social Security Assistance (CSSA) Scheme:<br><br>- allows retirees over 60 to receive social security benefits while settle in nearby provinces |
| **Occupational pensions** | - 60% of the labour force are eligible for retirement schemes in the private sector<br>- Defined contribution (DC) schemes cover 40%, whereas defined benefit (DB) schemes cover 20% | - Voluntary occupational pension system<br>- DC schemes become more and more common than DB schemes | - Mandatory Provident Fund (MPF) scheme (DC in nature) started in 2000 and is mandatory for employees aged 18 to 65<br>- Occupational retirement Schemes Ordinance (ORSO), which started in 1993 and can be of DB, DC or mixed type, continued to operate |
| **Statutory retirement age** | - 65-67 | - 65 for males and 60 for females | - 65 |
| **Possible legislative changes** | - Ten states carried out reforms on their pension systems in | - The 3-components public pension system will be replaced by a | - Fine-tuning on the transparency and fund operation of the |

| | | | |
|---|---|---|---|
| | 2012, such as switching from DB to DC or mixed plan, raising employees' contribution rates or retirement age | full new State Pension (140 pounds a week)<br>- The Pension Protection Fund was set up in 2006 for compensating DB-scheme members when there are not enough assets in their pension scheme<br>- Retirement age will be raised to 67 by 2028 regardless of gender | MPF system |

Sources:
Pension Funds Online (http://www.pensionfundsonline.co.uk/content/country-profiles);
GOV.UK (https://www.gov.uk/new-state-pension);
GovHK (http://www.gov.hk/en/about/abouthk/factsheets/docs/mpf.pdf)

Table 1.7 shows the pension arrangements and statutory retirement age for each economy. In all the three economies, DC schemes prevails over DB schemes in occupational pension arrangements. Compared to the U.S. and the U.K., "public pension" systems in Hong Kong are actually social security schemes which aim at providing safety net. In addition, the MPF schemes have started its operation for fourteen years only. Older people may not have enough funds for supporting their retirement, especially those who have been unemployed for long. Moreover, the possibility of increasing the retirement age and encouraging delayed retirement have been raised in the other two economies so as to lessen the demand on public financial security. All these encourage older people to continue staying in the labour market and can explain the strengthened commitment of older people to labour market activity in the 2000s.

## 1.6 Studies on employment probabilities of older people

### 1.6.1 The United States

Studies on how different factors affect older people's employment probabilities in the U.S. are common. Hu (2003) examined how firm size affects the age at hire. Hu (2003)

first estimated OLS regressions[2]. His results show that workers hired by the largest firms (with more than one thousand employees) are on average, *ceteris paribus*, 1.89 years younger than those hired by the smallest firms (with less than twenty-five employees). Furthermore, Hu (2003) plotted a curve of mean age-at-hire against mean training cost by industry and found a negative relationship. This suggests that the higher the training cost, the lower the hiring age is. Nevertheless, in our view Hu (2003) only shows how firm size and training cost affect the age at hire separately. Although he provided evidence that training investment increases with firm size, there is no direct evidence to test the theory that larger firms tend to invest more in firm-specific human capital and hence prefer to hire younger workers.

As suggested by Hutchens (1988), there are some jobs in which employers find difficulty in monitoring employees' performance. Employers may deal with the problem by offering delayed payment contracts to shift the compensation to the end of the employees' service period. Employees who work hard and stay in the firm in order to get the high wage reward at a later stage. Those who shirk would risk in getting fired before reaping their final compensation. This can discourage workers from leaving too early or shirking and thus induce higher productivity. Also, younger workers who are paid below their productivity level under this scheme know that their wage will increase over time. This gives them a sense of comfort in their jobs (Reday-Mulvey, 2005). Reday-Mulvey (2005) suggested that such implicit contracts are common in countries such as Belgium, France and Germany. Implicitly, the higher wages of older workers are subsidized by their younger colleagues.

Hutchens (1986) noted that deferred compensation scheme incorporates a fixed cost

[2] The data adopted are from the Benefits Supplements to the CPS in 1979, 1983, 1988 and 1993.

in the employment relationship. As firms pay the cost each time they hire a new worker, they prefer to have long-term employment relationships with younger workers so as to minimize hiring costs. Thus firms do not prefer to hire older workers. In addition, Reday-Mulvey (2005) suggested that older workers are often paid more than their productivity and are often the first groups of workers to be made redundant. This creates an obstacle to longer working lives.

Hutchens (1986) is one of the early study on the above issue. He computed an index to identify jobs which did not hire older people (Hutchens, 1986, p.452)[3] where $i$ indexes the industry and $j$ indexes the occupation:

$$I\,(i,j) = \frac{(Recent\ hires\ aged\ over\ 55/All\ recent\ hires)_{ij}}{(Workers\ aged\ over\ 55/All\ workers)_{ij}}$$

As pointed out by Hirsch *et al.* (2000), the denominator measures the age structure of an occupation, while the numerator reflects the types of occupations in which older people are hired. The latter measure can be a misleading indicator of employment probabilities because it shows the preferences of both employers and employees. Nevertheless, a low value of *I* implies that the number of new hires of older people relative to the total employment of older people in that occupation are small (Hirsch *et al.*, 2000). Occupations such as lawyers and janitors have low and high *I* index values respectively.

Hutchens (1986, p. 453) further argued that if the occupations in which older people are employed but not hired have characteristics of a deferred compensation scheme, workers in occupations with low index values should have "long job tenures, high wages, pensions and should be subject to mandatory retirement". He then estimated two logit

[3] The data sources are the 1970 census and the National Longitudinal Survey of Men aged 45-59.

models on dummy for receiving pensions and dummy for mandatory retirement and two OLS models on job tenure and log wage. The index is one of the control variables. The empirical result supports the above argument. Also, employment of older people is concentrated in sectors without deferred compensation schemes, implying that they have less job opportunities than younger people.

Hutchens (1988) also investigated the hypothesis that job opportunities decline with age. If older people really have limited job opportunities, newly hired older workers should be less evenly distributed, over different industries and occupations, than newly hired younger workers. In addition, if older people are discouraged from certain occupations, newly hired older workers should be less evenly distributed than all older workers over different industries and occupations. Hutchens used the 1983 CPS and tested the above two hypotheses by comparing segregation curves of different groups of workers[4]. If the hypotheses are valid, the segregation curves of newly hired older workers should be below those of newly hired younger workers and of all older workers. His results support the two hypotheses and provide evidence that job opportunities decline with age.

Hirsch *et al.* (2000) extended the work of Hutchens (1988) in two ways. Firstly, they examined whether Hutchens's findings are valid by using more years of data[5] to plot segregation curves and compute Gini measures of occupational segregation. Secondly, they examined whether age segregation across industries and occupations has changed between 1983 and 1998. Their results supported the finding in Hutchens (1988) that

[4] A segregation curve is similar to a Lorenz curve, which gives the cumulative fraction of group 1 people on the vertical axis and group 2 people on the horizontal axis. Fractions are ranked from low to high values. One segregation curve is "less equal" than the other if it lies all points below or at some points below the other. See Hutchens (1988).

[5] In addition to the 1983 CPS, Hirsch *et al.* (2000) used CPS data from 1987, 1991, 1996 and 1998.

occupational segregation of newly hired older workers is greater than that of newly hired younger workers and of all older workers. Descriptive statistics for age structures of selected occupations shows that older workers' hiring opportunities are fewer in occupations with steep wage-age profiles, pension benefits, and computer usage (a proxy for skills).

In addition to the above issues, economists have paid attention to the employment patterns of older people after job loss. As suggested by Chan and Stevens (1999), unemployed older people may have lower expectations of finding new jobs and so choose to retire. Nevertheless, there are some early studies such as Rones (1983) showing that retirement may not be a voluntary choice among older workers. Unemployed older people may find greater difficulty in getting a new job than younger workers and so more likely to withdraw from the labour market (Hutchens 1988).

The papers discussed so far studied the economic reasons that can lead to lower employment probabilities for older workers. If firms prefer to hire younger people for pure economic considerations, we cannot say that they are discriminating against older workers. Johnson and Neumark (1997) are among the few papers which studied the effects of age discrimination on job separations[6] and spells of non-employment by analyzing self-reported age discrimination. The data are from the National Longitudinal Survey of Older Men (NLSOM) which collected information on men aged 45 to 59 from 1966 to 1983. Questions include whether they had a feeling of being discriminated against in the workplace on the grounds of age.

Johnson and Neumark (1997) compared the employment status of older people who

[6] The term "job separation" in Johnson and Neumark (1997) refers to quitting the job and leaving the employer.

claimed they experienced discrimination with those who did not. Three percent of the sample reported they had experienced age discrimination in the workplace. The authors estimated discrete-time hazard models for job separations and employment status. They found that older people who reported age discrimination are more likely to be fired and to remain unemployed. There was no robust evidence that age discrimination results in longer spells of unemployment or early retirement. Johnson and Neumark (1997) pointed out a problem of their study that respondents may differ in their willingness to report discrimination. They dealt with this problem by comparing the respondents' responses at different points of time. Another problem about the data, in our view, is that only information on male workers is collected. The conclusions may not be applicable to older female workers.

Since the implementation of the Age Discrimination in Employment Act (ADEA) in 1967, researchers have been interested in the effect of the legislation on labour market efficiency (Adams, 2004). The legislation is effective if it can increase employment or reduce unintended retirement of older workers. Nonetheless, there may be unintended consequences. If workers above or below a certain age range are excluded from the law coverage, firms may substitute uncovered younger workers with older covered workers. This may lead to higher unemployment rates among uncovered workers (see Adams, 2004).

Neumark and Stock (1999) investigated the effect of age discrimination legislation on the employment of both covered and uncovered workers. They estimated linear probability models (LPM) using the US census data in 1940, 1950, 1960, 1970 and 1980. Different specifications are used to control the effect of variation in different states and changes in federal legislation over the years. Their results show that the legislation has a

positive employment effect for older, protected workers without affecting the employment of younger, unprotected workers.

Adams (2004) pointed out that Neumark and Stock (1999) did not include those above the protected age range in their analyses. Adams provided a more comprehensive study by including workers above the protected age range[7]. His difference-in-difference analysis showed that in states with anti-discrimination legislation the probability of employment for covered workers increased by 2.75 percent. There was also a decrease in retirement among covered workers. In contrast, there were reductions in employment and increases in retirement for uncovered workers.

Scott *et al.* (1995) noted that anti-discrimination legislation may increase health insurance costs to employers. The ADEA requires all the workers having the same experience within a firm to receive the same fringe benefits including health insurance. Facing potentially costly benefits, employers may avoid hiring older people as this may raise the insurance costs. Scott *et al.* (1995) studied the effects of fringe benefit provision such as health insurance on firms' decision to hire older workers[8]. Their tobit and probit estimates show that the probability of hiring a new worker aged 55-64 is much lower in firms with health care schemes or firms with costly fringe benefit plans.

Garen *et al.* (1996) conducted a similar study using another US dataset[9] and focused on the role of pensions in the compensation structure of firms. The two kinds of pension plans are "defined contribution pensions" and "defined benefit pensions". Defined

[7] The data comes from the annual demographic files of the CPS from 1964 to 1967.
[8] The data used are the nationwide survey of employers in 1991 and the Employee Benefits Supplement of the CPS in 1979, 1983, 1988 and 1993.
[9] Garen et al. (1996) collected the data by conducting a nationwide survey of employers in 1991. They obtained information on the employment experiences of older workers, characteristics of the firms they are working in, etc.

contribution pensions are tax-deferred savings plans which require both employer and employee to make contributions. For defined benefit pensions, employees' retirement benefits are determined based on employees' service years, salary and a generosity factor (see Garen *et al.*, 1996). Their tobit model estimates show that firms offering defined contribution pensions hire workers regardless of their age. However, firms offering defined benefit pensions are willing to keep older workers, but they tend not to hire them at entry level. This practice is similar to firms offering deferred compensation schemes.

### 1.6.2 The United Kingdom

UK studies on employment probabilities for older people are much fewer than those for the U.S. Campbell (1999) is a detailed study on these issues. Using statistics derived from the LFS and the British Household Panel Survey (BHPS), he found that two-fifths of workers aged 55 to 65 were unemployed and displaced older workers found re-employment difficult. Campbell (1999) then investigated five features contributing to the fall in employment rates among older workers. He investigated the increase in the voluntary retirement of older workers, more limitations on job choices, more widespread availability of occupational pensions (OP), skill-biased technological change and increasing age discrimination. From his statistical analysis, he found that only the first four played a significant role in reducing older workers' employment.

For the fifth factor of age discrimination, Campbell (1999) cited a qualitative study of McKay and Middleton (1998) and presented percentages of older people who feel that they have been discriminated against on the grounds of age. He concluded from the results of McKay and Middleton (1998) that age discrimination is relatively rare and so it is unlikely to be a major cause of the fall in older workers' employment. Nonetheless, in our view this conclusion is not convincing as the author did not carry out any direct tests on

the effects of age discrimination. Moreover, as suggested by Campbell (1999), people can be discriminated against without being aware of it. Others may even attribute any undesired treatment received in the workplace to age discrimination. This creates biases on drawing conclusions from qualitative data.

Similarly to Hutchens (1986, 1988) and Hirsch *et al*. (2000), Daniel and Heywood (2007) explored how deferred compensation schemes affect the hiring of older workers[10]. They used the proportion of newly hired workers over 50 as the dependent variable in ordinary least squares (OLS) models. The coefficient on the dummy for firms using deferred compensation had a significant negative sign, suggesting that firms adopting deferred compensation schemes hired a smaller share of older workers.

McQuaid *et al.* (2004) examined whether the UK labour market policies effectively targeted the unemployed job seekers. 306 unemployed job seekers were initially drawn from 13 Employment Service Job Centres in Bathgate and Edinburgh. After a follow-up survey, 169 responses were finally traced successfully and the data was analysed. Their binary logistic models show that being older and long-term unemployed is negatively associated with finding a job[11]. McQuaid *et al.* (2004) suggested that older people deserve special attention for reasons such as age discrimination. Government employment policies often target the long-term unemployed workers but provide no special measures for older job seekers.

### 1.6.3 Hong Kong

Studies on employment probabilities of older people in Hong Kong are much fewer

[10] They used individual and establishment level data based on the Workplace Employment Relations Survey (WERS) in 1998 for their analysis.
[11] McQuaid *et al.* (2004) studied different groups of job seekers with different demographic background. We only discuss their findings on older workers.

than those in western economies. Heywood *et al.* (1999) studied the determinants of older workers' employment probabilities such as deferred compensation schemes. They conducted a survey in 1996 and collected information on the age structure of employment, education levels by occupation and other characteristics. They computed the opportunity *I* index developed by Hutchens (1986)[12] with 35 as the cut-off between younger and older people instead of 55. This allowed them a closer look at the hiring probabilities of younger workers. The index was regressed against a series of independent variables and their results show that long-term employment and the use of deferred compensation schemes are correlated with lower hiring probabilities of older workers. One of their findings was that larger firms seem to be more willing to hire older workers, which differs from the result found by Hu (2003). Heywood *et al.* (1999) also estimated probit models on managers' preference for hiring younger workers. The dependent variable was one if a manager hired a younger worker and zero otherwise. Most of the estimated coefficients were positive, which supports their OLS regression results, showing that older people are less likely to be hired.

Ho *et al.* (2000) compared the employment and unemployment conditions between younger and older people in the labour market[13]. The claim is that the major challenges faced by the unemployed are "longer unemployment duration, fewer job-offers, and lower wage expectations" and the challenges faced by the employed are "a relative paucity in the opportunities for promotion and for training offered by their employers" (Ho *et al.*, 2000, p.284). Their OLS results show that unemployment duration increases with age and that job offers received by unemployed people aged between 45 and 54 are less than those

[12] The study of Hutchens (1986) is discussed in sub-section 1.3.1. For the definition of the index, see the paragraph on Hutchens (1986).
[13] Data from the Public Survey and the Job Centre Survey in 1996 were used for analysis.

by younger age groups[14]. Ho *et al.* (2000) also estimated probit models on employment status, presence of promotion and training opportunities. They found that older people are more likely to be unemployed and less likely to get promotion and training. To summarise, they presented evidence that older people are disadvantaged compared to younger people in Hong Kong. However, they did not resolve the riddle of whether the disadvantage arises from pure economic motives or anything else.

## 1.7 Studies on the gender dimension

Many studies on employment probabilities focus on either the gender aspect (Johnson, 1983; Mohanty, 1998; Chen and Hamori, 2008, 2010) or the age aspect (Johnson and Neumark, 1997; McKay and Middleton, 1998). Not many of these address both the gender and age dimension. As pointed out by Ginn and Arber (1996), researchers have put emphasis on the employment of older males rather than older females. One of the origins for such bias is the intermittent nature of female employment (Duncan and Loretto, 2004). Female workers may leave the labour market temporarily during instances such as child rearing. This distracts researchers' attention from studying older females. Nonetheless, Ginn and Arber (1996) noted that the female labour force participation rate is high when women are in their 40s but drops remarkably afterwards. This draws attention to the difference in employment probabilities between younger and older females.

Peracchi and Welch (1994) used the matched and unmatched March Current Population Survey (CPS) to study the changes in participation rates of US older male and female workers in the 1970s and 1980s. Their descriptive statistics show that there was a

[14] Further discussion on studies on unemployment and employment durations is made in Chapter 5.

decreasing trend in labour force participation among men of all ages. This might be the result of early retirement and fewer opportunities for less skilled workers[15]. The participation rates of female workers increased since the 1970s except for those aged 60 or over. Peracchi and Welch (1994) predicted that when those younger female workers in the 1970s and 1980s got older in later years, they should have more working experience and became more competent than any previous cohorts. Thus they would be more willing to stay in the labour market. The participation rates of older female workers would increase afterwards. However, Mosisa and Hipple (2006) noted that the participation rate of older females was steady in the 1990s, which differed from the prediction of Peracchi and Welch (1994).

## 1.8 Approaches to studying employment probabilities

### 1.8.1 General overview

The studies discussed above used various regression techniques to examine older workers' employment probabilities. For example, Adams (2004) applied a difference-in-difference approach to study the effects of age discrimination legislation on employment. Hirsch *et al.* (2000) run weighted least squares (WLS) regressions to study the employment opportunities of male and female older workers. Among the different methods, probability models are most commonly used to estimate the employment probabilities of older workers. For instance, Scott *et al.* (1995) used tobit and probit models to study the effects of fringe benefit provision, such as health insurance, on US firms' decisions to hire older workers. Neumark and Stock (1999) estimated LPMs to investigate the effect of US age discrimination legislation on the employment of older

[15] Peracchi and Welch (1994) did not pay attention to the possible effect of age discrimination.

and younger workers. Heywood *et al.* (2010) used German data to estimate probit models on the relationship between deferred compensation schemes, training, and hiring of older people using data in Germany. Many of the above studies found that older people have lower employment probabilities. Nonetheless, they cannot tell whether this is purely due to factors under their control because other uncontrolled factors such as age discrimination can also affect employment probabilities (Peracchi and Welch, 1994; Scott *et al.*, 1995; Ho *et al.*, 2000).

The complex link between age and workers' performance makes the analyses of unknown factors difficult. There are no standard regression approaches to study the effect of unknown factors on employment probabilities (Adams and Neumark, 2006). Johnson and Neumark (1997) provided two explanations on this point. Firstly, older people generally have more working experience and hence higher productivity, which differentiates them from their younger counterparts. Secondly, there may be skill deterioration as workers become older (Hellerstein *et al.*, 1996). The two effects may cancel out each other and produce complex results (Adams and Neumark, 2006).

Researchers may rely on specially designed surveys to study the effect of otherwise unidentifiable factors. Levitt (2004) and Adams and Neumark (2006) discussed the use of audit studies to detect racial and gender discrimination in employment. Information on matched pairs of similar job applicants is sent to employers for entry assessment. Any differential treatment is attributed to discrimination. Adams and Neumark (2006) commented that this approach is not appropriate for studying the effect of unknown factors on differential employment probabilities by age for two reasons. Firstly, audit studies are often conducted for positions requiring simple hiring decisions such as entry-level positions. This may not be relevant for older people who already have many years

of working experience and tend to apply for senior positions. Secondly, masking the differences between older and younger people on paper is difficult. Employers can tell the approximate age of applicants from job-related information such as working experience.

Johnson and Neumark (1997) provided an alternative way of investigating the issue. They analysed self-reports of age discrimination and estimated discrete-time hazard models of job separations and employment status. However, there may be spurious correlations between self-reported age discrimination and negative labour market outcomes (Adams and Neumark, 2006). Workers who are fired due to their bad performance but not age discrimination may report something negative about their previous employers. Conclusions drawn from the analyses of survey data are not highly convincing. As suggested by Johnson and Neumark (1997), finding alternative approaches to study the issue should be the focus for future research. An approach, which can differentiate contributions of differences in observable and unobservable characteristics to the differential employment probabilities between older and younger workers, is needed. The Oaxaca-Blinder decomposition technique can provide a way of doing so.

### 1.8.2 Oaxaca-Blinder decomposition

The Oaxaca-Blinder decomposition, proposed by Blinder (1973) and Oaxaca (1973), is a common technique used to study wage gaps (or other inter-group differences at mean levels) between two groups of people such as whites and blacks or males and females in the labour market. It is also commonly used in other fields to study group differences in any outcome variable. For instance, Chung, Lim and Lee (2010) applied the decomposition methods to study the gender differences in smoking in South Korea. The

technique decomposes the outcome into contributions of the differences in observable characteristics under control and those in unobservable characteristics such as discrimination. The procedure only requires estimates from linear regressions on the outcome of interest and the sample means of independent variables (Fairlie, 2005). The conceptual framework discussed hereafter is based on Chi *et al.* (2007) with some modifications. Suppose workers' wages are the outcome of interest. The first step in the Oaxaca-Blinder decomposition involves OLS estimation on the wages of the two groups:

$$(1)\quad Y_i = X_i\widehat{\beta_i} + \widehat{e_i}$$

where $i$ indexes workers in group 1 or group 0, $X_i$ is the row vector of workers' characteristics, $\beta_i$ is the parameters and $\widehat{e_i}$ is the residual term. Three mean wage vectors usually in logarithmic form, $\overline{Y_1}$, $\overline{Y_0}$ and $\overline{Y_c}$, are defined. $\overline{Y_1}$ is the mean log-wage vector with both workers' characteristics and wage structure in group 1 as follows:

$$(2)\quad \overline{Y_1} = \overline{X_1}\widehat{\beta_1}$$

where $\overline{X_1}$ is the row vector of average workers' characteristics in group 1 and $\widehat{\beta_1}$ is the estimated parameters for workers in group 1. The residual term drops out by definition because the mean value of residuals is zero. $\overline{Y_c}$ is the counterfactual mean wage vector with workers' characteristics in group 1, but the wage structure in group 0[16]. The decomposition of workers' mean wage gap is carried out as follows:

$$(3)\quad \overline{Y_1} - \overline{Y_0} = (\overline{Y_1} - \overline{Y_c}) + (\overline{Y_c} - \overline{Y_0})$$

[16] Depending on which group is chosen as the reference, the counterfactual wage vector can be defined alternatively as a mean wage vector with workers' characteristics in group 0, but wage structure in group 1 (Jann, 2008a).

$$= (\overline{X_1}\widehat{\beta_1} - \overline{X_1}\widehat{\beta_0}) + (\overline{X_1}\widehat{\beta_0} - \overline{X_0}\widehat{\beta_0})$$
$$= \overline{X_1}\,(\widehat{\beta_1} - \widehat{\beta_0}) + \widehat{\beta_0}\,(\overline{X_1} - \overline{X_0})$$

The first term measures the mean wage difference due to differences in unobservable characteristics such as discrimination, and the second term measures the mean wage difference due to differences in observable characteristics under control. Many studies such as Neuman and Oaxaca (1998), Chi *et al.* (2007) and Richard (2007) adopted this method to investigate the issue of wage gaps.

In recent years, the technique has been extended by Gomulka and Stern (1990) and Nielsen (1998) to allow for decompositions based on logit or probit models respectively. The conceptual framework discussed hereafter is based on Gomulka and Stern (1990) with some modifications. Consider the probability of employment conditional on a set of independent variables $X$ and model parameters $\beta$:

(4) $\Pr(y = 1 \mid X) = \mathrm{P}(\beta, X)$

The estimated sample average is shown as follows:

(5) $\hat{y} \equiv \mathrm{P}(\hat{\beta}, \bar{X})$

where $\mathrm{P}(\hat{\beta}, \bar{X})$ is the average predicted probability in the sample using the estimated parameters $\hat{\beta}$ and average $X$. The decomposition of the difference in average value between group 1 and group 0 can be carried out as follows:

(6) $\widehat{y_1} - \widehat{y_0} = [\mathrm{P}(\widehat{\beta_1}, \overline{X_1}) - \mathrm{P}(\widehat{\beta_0}, \overline{X_1})] + [\mathrm{P}(\widehat{\beta_0}, \overline{X_1}) - \mathrm{P}(\widehat{\beta_0}, \overline{X_0})]$

The first term measures the difference in probability of employment due to differences in unobservable characteristics such as discrimination. The characteristics of younger and

older people are assumed the same here. The second term measures the difference in probability of employment due to differences in observable characteristics. The parameters of younger and older people are assumed to be the same. Fairlie (2005) compared the Oaxaca-Blinder decomposition results on probit models and those on LPM by studying the difference in computer ownership between blacks and whites in the U.S. The estimates do not differ substantially. Nonetheless, Fairlie (2005) noted that the Oaxaca-Blinder decomposition on LPM may not perform well when the gap is located near the tails of the distribution, or the differences in independent variables between the two groups are very large. Also, under the LPM the estimated results may be larger than 1 or less than 0, which are difficult to interpret in terms of probability. Oaxaca-Blinder decompositions on probit or logit models do not have these problems.

Studies using this technique have become common. Fairlie (1999) used the US Panel Study of Income Dynamics (PSID) from 1968 to 1989 to examine the causes of differences in self-employment between blacks and whites. His results of decompositions on logit models show that African-American men are less likely to be self-employed than white men by two-thirds. Wealth levels and probabilities of having self-employed fathers are the factors contributing to a large part of the difference in the self-employment rate. However, the two factors do not contribute to the gap in the exit rate.

Livanos *et al.* (2009) used data from the Greek and U.K. LFSs in the early 2000s to study the gender-based employment discrimination. Their results for decompositions on logit models show that a large residual gap of unemployment between males and females exists for both countries. One explanation for the more favourable position of males is gender discrimination in the labour market.

Chen and Hamori (2010) used pooling data of the 2004 and 2006 China Health and

Nutrition Survey (CHNS) to examine the difference between male and female formal employment in urban China. Their decomposition results on univariate probit models show that about 87% of the difference in formal employment probability is explained by discrimination against females. Nevertheless, the decomposition on bivariate probit models gave a different result. The differences in observable characteristics accounts for about 72% of the probability differential in formal employment.

## 1.9 Final remarks

To summarise, older people in all the three economies had a strengthened commitment to labour market activity in the 2000s. Facing higher unemployment rates after the 2007 start of the global financial crisis, only younger and middle-aged people are less willing to participate in the labour market. Changes in economic conditions do not affect older people's willingness to find jobs in the three economies. Furthermore, older females in all the three economies experienced a larger increase in willingness to work than older males. This supports the suggestion of Reday-Mulvey (2005) that the labour force in many European economies, such as the U.K., has becomes older and more feminine. The U.S. and Hong Kong have faced a similar situation. An increase in the retirement age in the U.S. and the U.K. and unreliability of the "pension system" in Hong Kong are the possible causes of this situation. It is therefore important to study to what extent older people, especially older females, remain competitive in getting jobs compared to their younger counterparts.

There are more studies on employment probabilities in the U.S. than in the other two economies for two reasons. First, micro-level labour force data are more widely available in the western economies than in Hong Kong. Governmental data such as the US CPS are freely available, whereas governmental data in Hong Kong is available only upon

purchase. Second, there was earlier concern about the issue in the U.S. than in the other two economies. Age discrimination and employment prospects of older people have aroused public concern in the U.S. before the enactment of anti-discrimination legislation in 1967. In the U.K., age-related legislation was enacted in the 2000s (Gaster, 2002). There is no age discrimination legislation in Hong Kong. A comparative study of older people's employment probabilities among these three economies is therefore meaningful. Also, the gender aspect on the issue or age-related work patterns should be investigated because ignoring these gender differences may conceal important patterns.

Despite more attention being paid to the age issue in the U.S., there still exist few economic studies on differential employment probabilities by age in the US labour market. Studies on employment probabilities among older people are common, but they often ignore the effect of unknown factors such as age discrimination on differential employment probabilities by age (Peracchi and Welch, 1994). Friedman (1984) provided an explanation for the lack of studies on age discrimination in economics. Evidence of discrimination against older people is less convincing than that for other demographic groups. Discrimination is suspected in the labour market when workers' employment is affected by factors unrelated to productivity. Thus economic analyses measuring gender or racial discrimination often control for productivity-related factors and attribute the unexplained part because of discrimination. However, this approach may not be appropriate in the study of age discrimination. Johnson and Neumark (1997) stated that two factors, working experience and deterioration of skills, can affect the comparability of productivity between younger and older workers.

Nonetheless, in our view these two factors do not really cause a serious problem. Working experience is often controlled for in many statistical analyses. The matter here

is how working experience is measured, which can affect the accuracy of capturing the effect of experience[17]. The second issue is related to the quality of workers' skills, which is often a potential problem commonly found in labour research but is not a problem unique to the study of age discrimination. Studies, such as Johnson and Neumark (1997), deal with these two problems by analysing self-reported age discrimination. However, as pointed out before, there is bias in drawing conclusions from qualitative data. A quantitative analysis is needed which can differentiate contributions of differences in observable and unobservable characteristics to the differential employment probabilities between older and younger workers. The Oaxaca-Blinder decomposition on employment probabilities is a possible method for doing so. The next chapter discusses our empirical framework to address this issue and the estimation results.

[17] The information on working experience may be absent in some datasets and researchers may need to derive this measure from other variables in the dataset. An example of such datasets is the Hong Kong Census and By-census. A more detailed account is provided in the next chapter.

# CHAPTER 2

# OLDER VERSUS YOUNGER PEOPLE'S EMPLOYMENT PROBABILITIES: AN EMPIRICAL ANALYSIS

## 2.1 Introduction

This chapter discusses the data used, the empirical framework and the analysis results on the employment probabilities of older versus younger people. We suggested in the previous chapter that, despite the increase in labour force participation rates of older people in ageing societies such as the U.S., the U.K. and Hong Kong, so far there are few economic studies on differential employment probabilities by age. This study aims to provide new insights on this issue with two specific research objectives. Firstly, it aims to provide new insights on the employment probabilities of older people in the U.S., the U.K. and Hong Kong. As suggested in the previous chapter, there are more studies on employment probabilities in the U.S. than in the other two economies because more attention has been paid to this issue in the U.S. Many studies found that older people have lower employment probabilities than younger people. However, they cannot tell whether this is purely due to the factors under the control in the analyses because other uncontrolled factors such as age discrimination can also affect employment probabilities (Peracchi and Welch, 1994; Scott *et al.*, 1995; Ho *et al.*, 2000).

We use the Oaxaca-Blinder decomposition to differentiate contributions of differences in observable and unobservable characteristics to the differential employment probabilities between older and younger people. The framework for Fuller Working Lives proposed by the Department for Work and Pensions in June 2014 finds that in 2013 the UK economy would have been boosted by 18 billion pounds if the employment gap between people aged 40s and those aged 50s to SPA had been halved (Department for

Work and Pensions, 2014). The decomposition results can be used as a reference by governments to assess the competitiveness of older people compared to their younger counterparts in different economies and help narrow age-employment gaps.

Secondly, this study aims to investigate the neglected aspect of gender in this context. As suggested in the previous chapter, many studies on employment probabilities focus on either gender (Johnson, 1983; Mohanty, 1998; Chen and Hamori, 2008, 2010) or age (Johnson and Neumark, 1997; McKay and Middleton, 1998). Not many of these address both the age and gender dimension. Ginn and Arber (1996) and Duncan and Loretto (2004) pointed out that researchers focus on the employment of older males rather than older females. This may conceal important patterns. As suggested in the previous chapter, the labour force in those three economies has become older and more feminine. It is important to investigate whether there are any differences in employment probabilities between older males and older females.

The two research dimensions identified above lead us to apply the binomial logit models and the non-linear Oaxaca-Blinder decomposition to investigate five specific research questions. Firstly, which is the most important factor affecting the employment probabilities of younger people and older people? Secondly, what is the magnitude of the difference in employment probabilities between younger people and older people? Thirdly, to what extent are the differences in employment probabilities attributable to the explained factors (differences in observable characteristics) and the unexplained factors (differences in unobservable characteristics)? Fourthly, do the answers to the above three questions differ for males and females? Fifthly, do the answers to the above four questions differ between the U.S., the U.K. and Hong Kong?

The remainder of this chapter is organized as follows. Section 2.2 provides a

discussion on the background and treatment of the data. Section 2.3 discusses the summary statistics for the samples. Section 2.4 presents the estimation framework for our analyses. Section 2.5 and 2.6 discuss the estimation results. Section 2.7 concludes.

## 2.2 Data

All the datasets for the three economies are time-series of independently pooled cross-sectional data. The datasets of each economy are constructed by pooling data of the same population at various points of time. This increases the sample size so as to strengthen the robustness of the estimation results (Wooldridge, 2006). Many studies in labour economics, such as Gomulka and Stern (1990) and Chen and Hamori (2010), use independently pooled cross-sectional data. The background to the data of each economy is introduced in the following sub-sections[18].

### 2.2.1 The United States: The Annual Social and Economic (ASEC) Supplements to the Current Population Survey (CPS)

The CPS is a monthly household survey sponsored jointly by the U.S. Census Bureau and the U.S. Bureau of Labour Statistics (BLS) since the 1940s. It collects monthly socio-demographic data for 60,000 US households sampled from all the US states. The households are surveyed once within a four-month period, are excluded in the next eight months and then are surveyed again once within a four-month period before leaving the sample permanently. This sampling scheme allows for constant replenishment of the sample and avoids exerting excessive burden on respondents. The respondents are interviewed either face to face or by telephone (see U.S. Census Bureau, n.d. and U.S.

[18] All the data sources are acknowledged in the References.

Bureau of Labour Statistics, n.d.).

In addition to the basic monthly CPS files, supplementary CPS files are available. These have the same data as the basic files plus supplemental data gathered periodically (National Bureau of Economic Research, 2012). The supplementary files include information relevant for the analyses of labour markets such as work activity (U.S. Census Bureau, n.d.). CPS supplementary files are widely used for research. Peracchi and Welch (1994) used the matched and unmatched March CPS to study changes in the labour force participation rate of older male and female workers in the 1970s and 1980s. Hu (2003) used the Benefits Supplement to the CPS to examine how firm size affects the age at hire. Fairlie (2005) used the Computer and Internet Use Supplement to the CPS in August 2000 to estimate racial gap in home computer rates. The CPS is widely used for various purposes such as constructing economic indicators and conducting econometric analyses for the U.S. (Hutchens, 1988; Hirsch *et al.*, 2000; Adams, 2004).

We use the Annual Social and Economic Supplement (ASEC) Supplements to the CPS from 2003 to 2010 for our analyses. We cannot use earlier years because the race variables before 2003 are not comparable to those from 2003 onwards. As noted by the National Bureau of Economic Research (2012), the ASEC Supplement was formerly known as the Annual Demographic File. It contains the basic data included in the basic monthly files plus additional data relevant for this study such as income, noncash benefits, and migration. The data are accessed from the National Bureau of Economic Research (NBER) website.

### 2.2.2 The United Kingdom: The Labour Force Survey (LFS)

The LFS, conducted by the Social and Vital Statistics Division of the Office for

National Statistics (ONS) and the Central Survey Unit (CSU) of the Northern Ireland Statistics and Research Agency (NISRA), is a quarterly household survey designed to collect socio-demographic data on the UK population. It ran on a biennial basis between 1973 and 1983, on an annual basis between 1984 and 1991, and a quarterly basis since the spring of 1992. To comply with EU regulations, the LFS moved from seasonal quarters (spring, summer, autumn, winter) to calendar quarters (January-March, April-June, July-September, October-December) in 2006 (UK Data Archive Study Group, 2009). According to ESDS Government (2011a, 2011b), each quarterly sample consists of five waves with roughly 57,000 households. Each wave has around 12,000 households. Each wave of households is interviewed in five consecutive quarters. All adults within a household are interviewed face to face when they are included in the survey for the first time. They are interviewed by telephone in the next four successive waves. The LFS is widely used for econometric analyses (Campbell, 1999; Livanos *et al.*, 2009). We use the LFS from 2001q2 to 2010q4 for the analysis of the U.K because the data prior to 2001q2 do not have any ethnicity variables. The data are accessed from the UK Data Archive website.

### 2.2.3 Hong Kong: The Population Census and By-census

As described by the Hong Kong Census and Statistics Department (2007b), the Hong Kong Population Census is a citywide survey conducted by the Hong Kong Census and Statistics Department since 1961. They collect socio-demographic data of the Hong Kong population. Respondents provide their information by completing questionnaires during interviews. The By-census, which is a smaller-scale version of census and has an incomplete headcount of the population, has been being conducted since 1966. The Population Census is conducted every ten years and the By-census is conducted in the middle of the intercensal period (see Hong Kong Census and Statistics Department,

2007b). According to Hong Kong Census and Statistics Department (1992, 1997, 2002, 2007a), the original samples of the censuses and by-censuses do not strictly follow the principle of EPSEM[19]. Proper action has been taken by the department statisticians to ensure that individuals in all districts have an equal probability of being selected for interviews. The Hong Kong Census and By-census are widely used for econometric analyses of labour markets (Lui and Suen, 1998; Chan, Sung and Zhang, 2001; Ng, 2001; Lui, 2008).

We use four Population Census and By-census 5% sample datasets from 1991 to 2006 for the analyses on Hong Kong. The number of observations included is not as large as those in the U.S. and the U.K.[20] This is due to the limitation of the data frequencies and the consideration of providing an up-to-date analysis. The data were purchased from the Hong Kong Census and Statistics Department.

### 2.2.4 Variables and data treatment

The choice of variables is based on the literature and availability of relevant information in the datasets (Chan and Steven, 2001; Adams, 2004; Daniel and Heywood, 2007; Chen and Hamori, 2008; Livanos *et al*., 2009). Table 2.1 shows the categories of variables included in the regression analyses for each economy. The variables included cover the demographic, human capital and household characteristics of the respondents. Most variables related to the demographic and human capital characteristics can be found in the regression equations of all the three economies. Although the same variables may have different categories and definitions in different economies, we standardise these

[19] EPSEM (Equal Probability of SElection Method) is a principle of selecting sample so that every individual within the population has an equal chance of being selected (Healey, 2005).
[20] Tables 2.3 to 2.5 in the Appendix show the number of observations for analysis of each economy.

variables for comparison among the three economies.

**Table 2.1: Categories of independent variables included in the regression analyses for each economy**

| Regressions for: | **The U.S.** | **The U.K.** | **Hong Kong** |
|---|---|---|---|
| **Demographic characteristics** | | | |
| Gender | ✓ | ✓ | ✓ |
| Marital status | ✓ | ✓ | ✓ |
| Nationality | ✓ | ✓ | ✓ |
| Ethnicity | ✓ | ✓ | |
| Health status | | ✓ | |
| **Human capital characteristics** | | | |
| Education | ✓ | ✓ | ✓ |
| Working experience | ✓ | ✓ | ✓ |
| **Household characteristics** | | | |
| Number of dependent children aged 4 or less | | ✓ | |
| Number of dependent children aged between 5 and 9 | | ✓ | |
| Number of dependent children aged between 10 and 15 | | ✓ | |
| Total unearned income | ✓ | | ✓ |
| Region of residence | ✓ | ✓ | |
| **Others** | | | |
| Year dummies | ✓ | ✓ | ✓ |

The analyses for Hong Kong do not include the ethnicity dummies due to the absence of the ethnicity information in the 1990s datasets. The analyses for each economy include different sets of household variables subject to the availability of information. As noted by Wooldridge (2006), the distribution of the population may change over time in pooled cross-sectional data. Thus, year dummies are included to reflect the possible changes in year-specific effects.

**Table 2.2: Description for the variables**

| | |
|---|---|
| | **Dependent variable** |
| ***Employed*** | Employment dummy for being employed |
| | **Independent variables** |
| ***Male*** | Male gender |
| ***MS_Married**** | Marital status for being married |
| ***MS_Single*** | Marital status for being single |
| ***MS_Separ_Divor*** | Marital status for being separated or divorced |
| ***MS_Widowed*** | Marital status for being widowed |
| ***Foreign*** | Nationality for being foreigner |
| ***Ethn_White**** | Ethnicity for being White |
| ***Ethn_Black*** | Ethnicity for being Black |
| ***Ethn_Asian*** | Ethnicity for being Asian |
| ***Ethn_Mixed*** | Ethnicity for being mixed |
| ***Ethn_Other*** | Ethnicity for being in other ethnic group |
| ***Health_problems*** | Health-status for having health problems limiting kinds of work |
| ***Qual_Degree*** | Qualification for having a university degree or above |
| ***Qual_Postsec*** | Qualification for having a college or associate degree |
| ***Qual_Secondary*** | Qualification for having a secondary school qualification |
| ***Qual_Primary**** | Qualification for having a primary school qualification or below |
| ***Exp*** | Potential working experience = (age at the time of survey minus age completed education) |
| ***ExpSq*** | Square term of working experience |
| ***#KidsAged_0to4*** | Number of dependent children in family aged 4 or less |
| ***#KidsAged _5to9*** | Number of dependent children in family aged 5 to 9 |
| ***#KidsAged_10to15*** | Number of dependent children in family aged 10 to 15 |
| ***UnearnedY_per1000*** | Total unearned income = (total family income minus total personal income)/1000 |
| ***R_South**** | Region of residence for living in the South (for the U.S.) |
| ***R_West*** | Region of residence for living in the West (for the U.S.) |
| ***R_Midwest*** | Region of residence for living in the Midwest (for the U.S.) |
| ***R_Northeast*** | Region of residence for living in the Northeast (for the U.S.) |
| ***R_England**** | Region of residence for living in England (for the U.K.) |
| ***R_Wales*** | Region of residence for living in the Wales (for the U.K.) |
| ***R_Scotland*** | Region of residence for living in Scotland (for the U.K.) |
| ***R_NorthIreland*** | Region of residence for living in North Ireland (for the U.K.) |
| **(Year dummies)** | Survey year (the earliest year is the control group) |

* Denotes control variables

Table 2.2 provides the descriptions for the variables. Data on actual working experience is not available in all three economies. We calculate the *potential* working experience (*Exp*) as the substitute of the actual working experience, which is equal to the age of the respondents when they are surveyed minus the age they completed education.

It is assumed that an individual starts gaining working experience as soon as he or she has graduated. The age at which education is completed is inferred from the corresponding year of achieving the highest educational qualification[21]. Our method of calculating the potential working experience is similar to the common practice of subtracting age by years of schooling and the value 6[22] (Lui and Suen, 1998; Ng, 2001; Boudarbat and Lemieux, 2007).

In theory, the level of family income affects an individual's employment probability. However, individual's personal income is included within the family income, which is affected by one's employment status. Thus the variable on family income is endogenous in the regressions on employment probability. We use the variable on the total unearned income (*UnearnedY/1000*), which is equal to the total family income minus the total personal income and then divided by 1000, as an instrumental variable of the total family income to control for endogeneity. The division by 1000 is to scale the estimated coefficients. The estimated parameter on *UnearnedY/1000* should in theory be negative, which is the same as that on family income. The values of *UnearnedY/1000* are deflated to 2010 prices[23].

There is no consensus on the cut-off age between being younger or older in the literature. Some studies defined the cut-off as 55 (Hutchens, 1986), while others defined it as 35 (Duncan and Loretto, 2004). There are a few studies using 45 as the cut-off age (Osberg, 1993; Johnson and Neumark, 1997). The most widely used cut-off age is 50 (Peracchi and Welch, 1994; Hirsch *et al*., 2000; Chan and Stevens, 2001; NOP Social and

[21] The inference is done for the data of the U.S. and of Hong Kong only. The data of the U.K. has the variable on age completed education ready for use.
[22] The age completed education should be equal to the years of schooling plus the number of 6, assuming an individual started his or her education at the age of 6.
[23] The composite price index data from the Bureau of Labor Statistics in the US Department of Labor and the Hong Kong Census and Statistics Department are used for the price adjustment of data in the U.S. and Hong Kong respectively.

Political, 2001; Adams, 2004; Chou and Chow, 2005). Thus we use age 50 as the cut-off between younger and older people.

We exclude any data irrelevant for the analysis. Firstly, people who are below the minimum employment age are excluded[24]. Secondly, data with inconsistencies and incomplete answers are excluded. Thirdly, a "top-coding" problem, that any data above an upper bound is censored, may arise for some continuous variables such as *UnearnedY/1000*. These data are top-coded to protect the respondents' privacy. Since the proportion of top-coded data is extremely small, we exclude these. We include both economically active and inactive people to avoid any sample-selection bias arisen from excluding the economically inactive. After dropping irrelevant cases, the final samples for the U.S., the U.K. and Hong Kong consist of 1,208,032 individuals, 2,627,852 individuals and 988,183 individuals respectively.

## 2.3 Summary sample statistics

Tables 2.3 to 2.5 in the Appendix show the summary statistics of the samples in the U.S., the U.K. and Hong Kong. The values for the categorical variables represent the proportion of people with that characteristic in the corresponding samples. The total numbers of valid cases in the U.S., the U.K. and Hong Kong are 1,208,032, 2,627,852 and 988,183 respectively. They are all individuals over the minimum working age of the economy they belong.

The employment gaps being decomposed are based on differences in average employment rates derive from the variable *Employed*. For instance, in Table 2.3, 71.77%

[24] The minimum working age in the U.S. is 14 and those in the U.K. and Hong Kong are 16.

of the younger people and 47.95% of the older people are employed in the pooled US sample. The non-linear decomposition technique decomposes the difference of $0.4795 - 0.7177 = -0.2382$ into an explained part (due to differences in observable characteristics under control) and an unexplained part (due to differences in unobservable characteristics). Section 2.6 discusses the decomposition results in more detail.

The U.K. has the largest proportion of employed people across the three economies in all kinds of sub-samples. In all three economies, it is not surprising to see that there is a larger proportion of younger people with a job compared to older people. The proportion of employed is larger for males than that of females. The mean ages of the individuals in all the three economies are roughly the same (the range of mean age is 42 to 44). As for gender, the proportion of older females is larger than that of younger females only in the U.K. All the three economies have more female workers than male workers across both age groups. This matches the results by Reday-Mulvey (2005) that the labour force in many European economies has become older and more feminine. Hong Kong also has the same situation. Nevertheless, there is a larger proportion of older males under employment than older females in the U.K. This may be due to the earlier retirement age of females[25]. Older males can stay in the UK labour market longer.

The values for the education categories and the variable *Exp* capture the employability of the individuals in the samples. In Hong Kong, over 50% of the full sample and younger sub-sample completed secondary school. However, the proportion is much smaller in the older people sample. Most older people in Hong Kong only completed primary school. This shows that Hong Kong had an improvement in the quality of its labour force over the last century. The U.K. also had an improvement in the quality

[25] The retirement age in the U.K. is 65 for males 60 for females.

of its labour force, as shown by the larger proportions of younger people in the top three education categories compared to those of older people. In the U.S., the proportion of people among the four education categories is similar in the younger people and the older people samples. This shows that the U.S. had a steady level of labour force quality over the last century.

It is not surprising to see that older people have many more years of working experience than younger people in all the three economies. The U.K. has the highest mean years of working experience in the younger sub-sample, whereas the older people in Hong Kong have the highest mean years of working experience across the three economies. The U.S. has the best and most steady level of labour force quality among the three economies. The qualities of the labour force in the U.K. and Hong Kong have improved over the last decade. Moreover, the difference in the proportion of those employed between the younger and the older sub-sample is the largest in Hong Kong. The maturity of the labour market between Hong Kong and the other two economies differs. The next two sections discuss the results of the binomial logit models and the non-linear decompositions.

## 2.4 Estimation framework

In Chapter 1, we discussed the background of the Oaxaca-Blinder decomposition for linear and nonlinear models. This section explains how we apply the decomposition approach. All the estimation procedures are carried out using Stata. Consider the probability of employment conditional on a set of independent variables $X$ and model parameters $\beta$, which was shown in Chapter 1:

(7) $\Pr(y = 1 \mid X) = \mathrm{P}(\beta, X)$

The estimated sample average is defined as:

(8) $\hat{y} \equiv \mathrm{P}(\hat{\beta}, \bar{X})$

where $\mathrm{P}(\hat{\beta}, \bar{X})$ is the average predicted probability in the sample using the estimated parameters $\hat{\beta}$ and average X. In this study $\mathrm{P}(y = 1 \mid X)$ is the employment dummy for being employed (*Employed*). $\mathrm{P}(\hat{\beta}, \bar{X})$ is estimated by binomial logit modelling with the log-likelihood function *l* as follows (Nielson, 1998; Livanos *et al*., 2009):

(9) $l(\beta, \delta) = \sum_{i=1}^{N_0}\{y_{0i}\ln F[X_{0i}\beta] + (1 - y_{0i})\ln(1 - F[X_{0i}\beta])\}$
$+ \sum_{i=1}^{N_1}\{y_{1i}\ln F[X_{1i}(\beta + \delta)] + (1 - y_{1i})\ln(1 - F[X_{1i}(\beta + \delta)])\}$

where $F$ is the logistic cumulative density function, $y$ is the indicator variable which is the variable *Employed* in our study, $X$ is the set of independent variables and $N$ is the sample size. Subscripts 0 and 1 indicate the group 0 (younger people) and group 1 (older people). Subscript $i$ indexes the individuals. Maximisation of Equation (9) gives $\hat{\beta}$ (the estimated parameter vector for younger people) and $\hat{\delta}$ (the estimated parameter vector for older people).

The logit model is preferred over the probit model for two reasons. Firstly, in a logit model, the proportion of the occurrence of the dependent variable in the sample is equal to the predicted probability $\mathrm{P}(\hat{\beta}, \bar{X})$. The decomposition equation, which is Equation (10) below, holds exactly (Nielson, 1998; Fairlie, 2005). Secondly, maximum likelihood estimation is asymptotically normal in large samples, which means that the advantage of following normal distribution for probit models is less important. Thus probit models do not have any comparative advantage over logit models in carrying out the decompositions.

The results of the binomial logit models on employment probabilities are expressed in terms of marginal effects for ease of inference[26]. This implies that the estimated parameters can be directly interpreted as the change in employment probabilities contributed by a unit change in an independent variable. Including a gender dummy as one of the independent variables is not enough in studying gender differences. The problem is that this implicitly assumes the effects of all other variables to be the same for males and females (Berndt, 1990). We therefore estimate three sets of binomial logit models in the pooled, male and female samples with age dummies included. The estimates on the age dummies can shed light on the effect of various age bands on employment probabilities. We also estimate six sets of binomial logit models on younger or older people in the pooled, male and female samples separately for each economy, leading to a total of twenty-seven estimated logit models.

The decomposition of the difference in average employment probability between younger people (denoted as group 0) and older people (denoted as group 1) is carried out as follows:

$$(10)\ \widehat{y_1} - \widehat{y_0} = [\mathrm{P}(\widehat{\beta_1}, \overline{X_1}) - \mathrm{P}(\widehat{\beta_0}, \overline{X_1})] + [\mathrm{P}(\widehat{\beta_0}, \overline{X_1}) - \mathrm{P}(\widehat{\beta_0}, \overline{X_0})]$$

The first term measures the difference in probability of working due to differences in unobservable characteristics such as discrimination. The characteristics of younger and older people are assumed to be the same. The second term measures the difference in probability of working due to differences in observable characteristics. The parameters of younger and older people are assumed to be the same. Three sets of decomposition results

[26] We calculate the marginal effects by using the command "mfx" in Stata.

are generated for each economy based on the samples: pooled, male and female.[27]

## 2.5 Binomial logit model estimates on employment probabilities

Tables 2.6, 2.7 and 2.8 show the marginal effects from the binomial logits for the employment probabilities on the younger and older samples in the U.S., the U.K. and Hong Kong respectively. The results of interest are with respect to individuals' gender, marital status, nationality, education, working experience, number of children and year. Most estimated parameters are statistically significant at the 1% level. As often predicted in other studies such as Livanos *et al.* (2009) and Loretto and Vickerstaff (2011), males have higher employment probabilities than females regardless of age and location. The gender employment gaps among younger people are larger than those among older people in the U.S. and the U.K. In contrast, the gender employment gaps in Hong Kong, regardless of age, are larger than those in the two western economies. Also, older people have larger gender employment gaps than younger people in Hong Kong.

It is not surprising to find that single, separated/divorced or widowed males have lower employment probabilities than married males in all the three economies. This is because married males often have more financial needs and responsibilities towards their families. Also, there is evidence that married workers are more productive than unmarried workers (Hellerstein *et al.*, 1996). In contrast, single or separated/divorced females, regardless of age, have higher employment probabilities than married females in the U.S. and Hong Kong.

[27] The Stata program package "oaxaca" created by Jann (2008b) is used to estimate the decomposition parameters. As explained by Jann (2008a), the "oaxaca" command first estimates the individual group models using any specified estimation command (which is "logit" in our case). The command "suest" and "mean" are then applied to calculate the combined variance-covariance matrix of the models and the group means of the regressors. The last step of the "oaxaca" command is to generate the various decomposition results and the standard errors.

In the U.S., the employment probabilities of the younger foreigners are lower than those of the younger locals in the pooled sample. Locals are often more familiar with the local labour market than foreigners and so get a job more easily. Nevertheless, the older foreigners are 3.02% more likely to be employed than the younger locals. A possible explanation is that the older foreigners have been in the U.S. for a long time. They are well acquainted with the labour market and so they have no disadvantages in seeking jobs compared to the locals. It is interesting that male foreigners have higher employment probabilities than male locals, whereas the opposite is true for females regardless of age. A possible explanation is that male foreigners are over-represented in some industries, such as finance, or take up senior positions. They will emigrate only when they have secured a job. In the U.K., foreigners have lower employment probabilities than locals regardless of age and gender, which is opposite to the situation in Hong Kong.

Both younger and older people with higher education tend to have higher employment probabilities in the U.S. and the U.K. However, the opposite is true for older people in Hong Kong. The returns to degree and postsecondary education are actually negative in Hong Kong. This implies that the deterioration of education for older people in Hong Kong is much more serious than in the two western economies. In addition, the difference in the effect of education between the younger people and the older people is larger for higher education in all the three economies. As noted by many studies, such as Reday-Mulvey (2005) and Keese (2006), the skills learnt by older people may become outdated. Their higher education does not earn them the same levels of employment probability as their younger counterparts.

The estimated parameters on the education dummies in the male and female samples show similar patterns as those in the pooled sample. Females generally have higher

employment probabilities than males at the same education level in all the three economies. This implies that education can effectively reduce the employment gap between males and females regardless of age. The premiums in employment probability decrease with higher education for older males (the parameter estimate of older males completed degree or above in the U.K. is even negative). This implies that higher education cannot earn older males higher employment probabilities compared to those completed primary education or with no qualification. In contrast, older females can still enjoy premiums in employment probabilities with higher education in the western economies.

The estimated parameters on *Exp* and *ExpSq* show the expected signs (positive and negative respectively) for the younger people regardless of gender in all the three economies This shows a concave shape of employment probabilities over one's life time similar to the typical age-earning profile. For older people, the signs of estimates of both *Exp* and *ExpSq* are negative for the older people in the U.S. because most over-50s are at the later stage of their working life. Older females still have the typical age-employment profile. In the U.K. and Hong Kong, the signs of *Exp* and *ExpSq* for older people are opposite to the typical age-employment profile. Older people may have a reverse trend in having higher employment probabilities with more working experience.

We include number-of-children variables for the UK analyses. Having younger children are commonly believed to reduce the employment probabilities (especially for most women), whereas having older children increases the employment probabilities. Nevertheless, our results show that the more children one has regardless of the children's age, the lower employment probabilities he or she has. However, if one has more older children, his or her employment probabilities decrease less. Females, regardless of age,

have much lower employment probabilities than males when they have one more children.

In the U.S. and the U.K., both younger and older people in the pooled sample have higher employment probabilities after the early 2000s. Only in the U.S. do younger people have lower employment probabilities after the start of the global financial crisis in the late 2000s. In the U.S., older males have lower employment probabilities after the start of global financial crisis, whereas older females' employment probabilities are not affected. The financial tsunami seems to decrease the employment probabilities in the U.K.'s older people regardless of gender. In Hong Kong, compared to people in 1991, people (except younger females) in later years have lower employment probabilities. It is not surprising because Hong Kong experienced a series of economic downturn such as the Asian Financial Crisis in 1998 and the SARS in 2003.

Tables 2.9 to 2.11 show the marginal effects within the binomial logits for the employment probabilities in the U.S., the U.K. and Hong Kong respectively. The differences between these sets of results with those in Tables 2.6 to 2.8 are that there is no splitting of younger and older samples and, instead, age dummies are included in the regressions. The estimates on the age dummies can shed light on the effect of various age bands on employment probabilities. The U.S. has the largest employment probabilities over all age bands regardless of gender. Its age employment profile shows a typical inverted U-shape and the peak occurs in the age band 45 to 49. The peak for the U.K. occurs in a slightly younger age band (40 to 44). In contrast, the position of the peak differs between males and females in Hong Kong. Females' employment probabilities peak at the 45 to 49 age band, whereas males' employment probabilities rise to the peak in the 25 to 29 age band but drop thereafter.

The decreasing trend of employment probabilities reverses over the age of 65 in the

U.S. for both genders. There is a possibility that flexible work arrangements allow older people to continue their working lives after they have reached their retirement age and have left their main career. Nevertheless, the decreasing trend continues over the age of 65 in the U.K. and Hong Kong and some age effect estimates even turn negative. The employment probabilities of Hong Kong females remain stable after the age of 60.

## 2.6 Non-linear Oaxaca-Blinder decompositions on employment gaps

As introduced in Section 2.4, the differences in the mean values of *Employed* between younger and older people are the employment gaps to be decomposed. The differences are calculated by subtracting the employment probability of older people from that of younger people. Negative values mean lower employment probabilities of older people than younger people, and vice versa. Each employment gap is decomposed into two parts: the explained part and the unexplained part. The explained part is due to differences in observable characteristics. The unexplained part is due to differences in unobservable characteristics such as discrimination.

Detailed results of the decompositions are presented beneath the overall results in Tables 2.12 to 2.14. These detailed results describe the marginal contribution of each individual characteristic. The explained estimates represent the marginal effects on employment probabilities purely due to differences in observable characteristics $[\overline{\mathrm{P}}\,(\widehat{\beta_0}\,,\overline{X_1}) - \overline{\mathrm{P}}\,(\widehat{\beta_0}\,,\overline{X_0})]$. The unexplained estimates represent the marginal effects on employment probabilities due to differences in unobservable characteristics such as discrimination $[\overline{\mathrm{P}}\,(\widehat{\beta_1}\,,\overline{X_1}) - \overline{\mathrm{P}}\,(\widehat{\beta_0}\,,\overline{X_1})]$. The counterfactual employment probability $\overline{\mathrm{P}}\,(\widehat{\beta_0}\,,\overline{X_1})$ is the probability with younger people's parameters but older people's characteristics. Negative values in the decompositions imply effects of enlarging

the employment gap, and vice versa.

The summary statistics and the results of the logit models help explain the signs of the detailed decomposition parameters. For example, on one hand males enjoy higher employment probabilities in the U.S. (as shown in Table 2.6). The status of being a male benefits the age group with a larger proportion of males, which is the younger age group (as shown in Table 2.3). Thus the variable *Male* enlarges the employment gap in the explained part (with the same parameters for the younger and older people). The explained estimates of *Male* show a negative effect in Table 2.12. On the other hand, younger males have a larger premium of employment probabilities than older males (as shown in Table 2.6). Thus assuming the proportions of younger and older people to be the same, the variable *Male* enlarges the employment gap in the unexplained part (with the same characteristics for the younger and older people). The unexplained estimates of *Male* show a negative sign in Table 2.12. Our discussion will focus on the overall results and compare the total contributions of the observable characteristics and the unobservable characteristics on employment gaps.

### 2.6.1 The United States

Table 2.12 shows the Oaxaca-Blinder decompositions for older versus younger employment probabilities in the U.S. In the pooled sample, the employment probabilities are 0.4795 for older people and 0.7177 for younger people, yielding an employment gap of -0.2382. The total explained part explains nearly all the employment gap. The differences in observable characteristics enlarge the employment gap between younger and older people by 24%. The total unexplained part, which is related to differences in unobservable characteristics, helps little in narrowing the gap.

The employment gaps in the male and the female samples have similar magnitudes as that in the pooled sample. The employment gap for females is slightly larger than that of males (-0.2446 > -0.2273). For males, differences in observable characteristics enlarge the employment gap by nearly 36%, whereas differences in unobservable characteristics narrow the gap by 13%. This shows that the lower employment probabilities of older males compared to younger males are largely due to differences in observable characteristics. For females, both differences in observable and unobservable characteristics enlarge the employment gap. The effect of unobservable characteristics is slightly larger than that of observable characteristics by 2.68%.

### 2.6.2 The United Kingdom

Table 2.13 shows the Oaxaca-Blinder decompositions for the older to younger differences in employment probabilities in the U.K. In the pooled sample, the employment probabilities are 0.6606 for older people and 0.8011 for younger people, yielding an employment gap of -0.1405. Differences in observable and unobservable characteristics enlarge the employment gap by 7.53% and 6.52% respectively.

The employment gap in the male sample is larger than that in the pooled sample (-0.1773 > -0.1405), whereas that in the female sample is smaller (-0.1131 < -0.1405). Both differences in observable and unobservable characteristics enlarge the employment gaps of males and females. The male employment gap is larger than the female gap mainly due to differences in observable characteristics.

### 2.6.3 Hong Kong

Table 2.14 shows the Oaxaca-Blinder decompositions for older to younger differences in employment probabilities in Hong Kong. In the pooled sample, the

employment probabilities are 0.3326 for older people and 0.7477 for younger people, yielding an employment gap of -0.4151. Similar to the results in the U.S., the total explained part can explain nearly all the employment gap. The differences in observable characteristics enlarge the gap by over 50%, whereas the differences in unobservable characteristics only narrow the gap by 9.6%.

The employment gap in the male sample is smaller than that in the pooled sample (-0.3745 < -0.4151), whereas that in the female sample is larger (-0.4584 > -0.4151). The differences in observable characteristics explain nearly all the employment gaps in both the male and the female samples. The differences in unobservable characteristics narrow the male gap by a large portion (17.9%). However, it helps narrow the female gap by only 4.9%.

### 2.6.4 Comparison among the three economies

In the pooled sample, the employment probabilities of older people are lower than those of younger people in all three economies. In the U.S. and Hong Kong, the negative employment gaps are largely due to the differences in observable characteristics. This implies that the factors under control explain almost all of the employment gaps. Differences in unobservable characteristics narrow the employment gaps to a small extent. In contrast, both differences in observable and unobservable characteristics contribute to the negative employment gap in the U.K. The factors under control can explain slightly more than half of the negative employment gap. Compared to the U.S. and Hong Kong, there are much more uncontrolled-for factors in our UK models which affect the age-employment gaps.

The employment probabilities of older males are also lower than those of younger

males in all three economies. The negative male employment gaps in all the three economies are largely due to the differences in observable characteristics. The factors under control explain almost all of the employment gaps. Differences in unobservable characteristics help to narrow the employment gaps in the U.S. and Hong Kong. In the U.K., the differences in unobservable characteristics enlarge the male employment gap. However, the effect of unexplained part is much smaller than that of the explained part. The factors under control explain most of the negative male employment gap.

Similar to the results in the pooled and the male sample, the employment probabilities of older females are lower than those of younger females in all three economies. Both differences in observable and unobservable characteristics enlarge the employment gaps in the U.S. and the U.K. There are significant portions of the negative employment gaps unaccountable by the factors under control. Differences in unobservable characteristics narrow the employment gap in Hong Kong, but the effect is small.

## 2.7 Conclusion

Population ageing has been a growing concern in many economies. Many studies have found that older people have lower employment probabilities than younger people. Nonetheless, they cannot tell whether this is purely due to the observable characteristics because other unexplained factors such as age discrimination can also affect employment probabilities. By applying binomial logit models and a non-linear version of the Oaxaca-Blinder decomposition, this study provides new insights on the age-employment gaps in the U.S., the U.K. and Hong Kong. The decomposition method decomposes the differential employment probabilities between older and younger people into two parts: one due to differences in observable and the other due to unobservable characteristics.

This allows us to be surer about the extent of our model specifications in explaining the employment gaps. The gender dimension on this issue is also investigated. Our results can be used as reference for governments to assess the competitiveness of older people compared to their younger counterparts in different economies. We note the significant results and provide some policy recommendations.

Our binomial logit models show that the gender employment gap in Hong Kong is the largest among the three economies. Marital status seems to be an important factor in affecting males' employment probabilities in all the three economies. It is surprising that education rather than marital status affects females' employment probabilities the most. The gender employment gaps for younger people are slightly larger than those of older people in the U.S. and the U.K. However, the opposite is true for Hong Kong. It is not surprising that economic cycles can affect people's employment probabilities in all the three economies, especially a small open economy like Hong Kong. The exceptions are older females in the U.S. and older males and females in the U.K. Their employment probabilities are unaffected by the global financial crisis.

Education is believed to be an important factor in affecting people's employment probabilities. However, the logit model results show that higher levels of education do not give older males significantly higher employment probabilities. Some estimates of higher education qualifications even show negative effects. This may be due to deterioration in skills for older males. The deterioration in skills may be more serious for higher education, leading to a lower employment premium for highly educated older males. In contrast, older females can enjoy higher employment probabilities of higher education in the U.S. and the U.K. Older females in Hong Kong do not gain from having higher education. The returns of degree are even negative. This implies that, for older

females, skill deterioration is greater for older females in Hong Kong than those in the U.S. and the U.K.

The typical age-employment profile shows a concave shape of employment probabilities over one's lifetime. The signs of estimates of *Exp* and *ExpSq* should typically be positive and negative respectively for younger people, and all negative for older people. The result for younger people matches the typical age-employment profiles. However, older females in Hong Kong still have the same age-employment profile as that of younger people. Both older males and females in the U.K. and older males in Hong Kong have an age-employment profile opposite to the typical one. This implies that it is possible for older people to gain from their high working experience when they find for jobs.

Hong Kong has the largest employment gap between younger and older people among all the three economies. The decomposition results of the U.S. and Hong Kong show that the differences in observable characteristics (explained factors under control) can explain nearly the whole negative employment gap. In contrast, there are many more uncontrolled-for factors in our UK models of age-employment gaps. In the U.K., there are other unobserved factors which further enlarge the employment gap for males and females.

There are two suggestions for raising the employment probabilities of older people, which are especially relevant for Hong Kong. Firstly, as noted by McGregor and Gray (2002), older people tend to be disadvantaged by lack of education. However, our logit results show that highly educated older people may suffer from serious deterioration of skills rather than lack of education and so find difficulties in obtaining jobs. Older people can emphasise their greater working experience rather than their education when they look for jobs. Secondly, governments can provide subsidies to employers who recruit and

provide training for older people, or set up training programs for older people to update their skills.

The application of binomial logit models and Oaxaca-Blinder decompositions has low data requirements and provides a good start for the investigation on the employment prospect of ageing workforces. Older people who search for flexible employment such as part-time jobs may have different employment patterns from full-time job seekers. Further research on different employment modes of older people is carried out in the next four chapters.

# CHAPTER 3

# FLEXIBLE EMPLOYMENT FOR OLDER PEOPLE: A LITERATURE REVIEW

## 3.1 Introduction

Flexible employment[28] modes are becoming increasingly more common than traditional full-time employment. In the U.S., the proportion of part-time workers in the total labour force has been rising gradually since the mid-1950s. In 1993, nearly 20% of the total workforce worked part-time (Falzone, 2000). In 1980, self-employment accounted for around 10% of the total labour force in many developed countries such as the U.S. and the U.K. (Martinez-Granado, 2002; Parker, 2004). About 9% of workers in the U.S. were self-employed in 1994 (Bregger, 1996). This ratio rose to 11% in 2009 (Hipple, 2010). From 1983 to 1991, the average proportion of temporary workers in the European Union increased by 5.4% (De Grip *et al.*, 1997).

There is a stereotype on the kind of people who find flexible work. For example, part-time workers are often believed to be younger, less skilled and less experienced than full-time workers because part-time jobs often pay lower wages (Falzone, 2000). Deutermann and Brown (1978) suggested that the increasing proportion of females and school-age youths in the labour force increased the part-time labour supply significantly. However, studies such as Johnson and Zimmermann (1993) and Delsen and Reday-Mulvey (1998) show that many older people do not follow the traditional employment profile over time: working as regular full-time workers and then retiring. Increased life

[28] Similar to De Grip *et al.* (1997) and Lissenburgh and Smeaton (2003), we use the term "flexible employment" as a collective label for part-time employment, self-employment and temporary employment. We do not imply that all types of employment we discuss share the same kind of flexibility. Section 3.2 discusses the meanings of "flexible" employment commonly defined in the literature.

expectancy has led to increased participation rates for older people and they tend to work more flexibly (Ruhm, 1990; Kim and DeVaney, 2005).

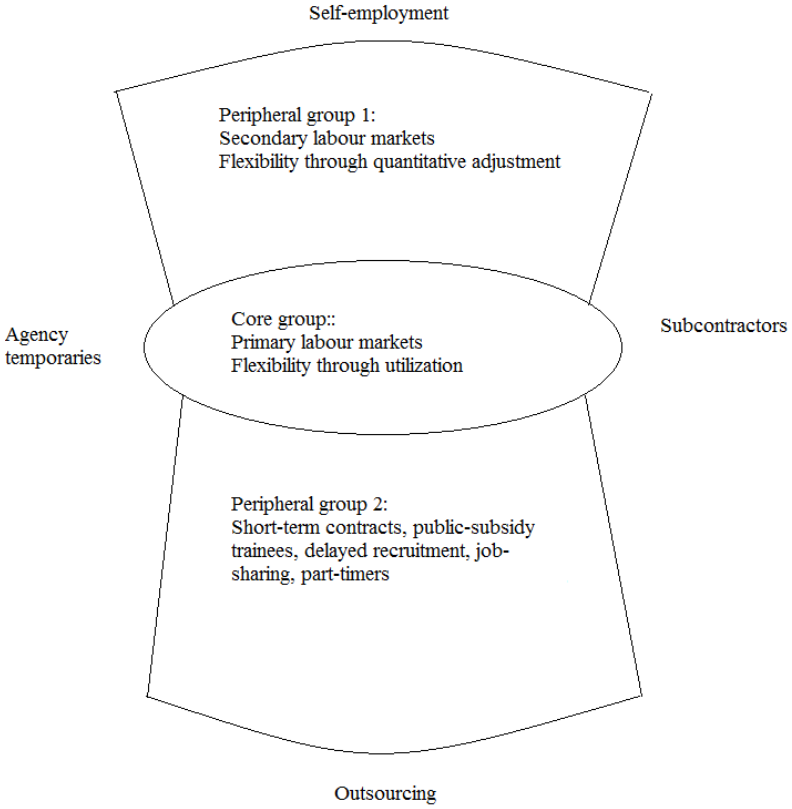
Christensen (1990) and Ajayi-Obe and Parker (2005) noted that many older people seek flexible employment because this earns them greater freedom to control their working hours and working environment than full-time employment does. Older people consider flexible employment a suitable bridge to transit from a full-time work life to retirement. We have reviewed studies on employment of older people in Chapter 1 and most of them focus on the regular full-time employment of older people. Little attention has been paid to the diversity of older people's employment options such as flexible employment. This is an important issue if we wish to help older people achieve their favourite employment mode.

This chapter provides a literature survey on the flexible employment of all workers but especially older ones. Section 3.2 discusses the meaning of "flexible" employment in the literature. Section 3.3 extends the discussions of Section 1.2 on life-cycle labour supply by considering flexible employment as bridge employment between career employment and non-work activities. Sections 3.4 to 3.6 discuss the nature of, and studies on, three major types of flexible employment, namely: part-time employment, self-employment and temporary employment. We use the U.K. as an example for discussing the changes in the rates of those three types of flexible employment by age. Section 3.7 discusses the studies on more than one type of flexible employment. Section 3.8 summarises the approaches for analyses on this theme. Final overall remarks on the whole literature survey are made in the last section.

## 3.2 What is meant by "flexible" employment?

Early studies such as Atkinson (1984) predicted that under the trend of changes in labour supply and training costs and advancement in technology, many firms would switch to adopting a more flexible approach to workforce management. Companies around the world have been increasingly adopting flexible employment practices for lowering labour costs, increasing employee retention and attracting new desirable employees (Raghuram, London and Larsen, 2001). Literature discussing the process of employment change for facilitating greater levels of flexibility are therefore abundant (Cook, 1998).

**Figure 3.1: Atkinson's model of employment**




Note: Figure from Humphreys, Fleming and O'Donnel (2005)

As shown in Figure 3.1, Atkinson (1984) proposed a model on segmenting the workforce into three categories, namely the core centre, two peripheral groups and an outer circle. The key activities of a firm are undertaken by the fixed and full-time positions in the core centre. Changes in demand distinguish the peripheral groups from the core centre. Employees in the peripheral group 1 have permanent contracts but less job security and chances for career advancement than those in the core centre, whereas those in the peripheral group 2 have flexible contracts. The outer circle relates to the management of trivial tasks or outsourcing (MacVaugh and Evans, 2012).

Atkinson suggested that firms can achieve three kinds of flexibility through strategic segmentation of their workforce. The first one is functional flexibility which refers to the possibility for employers to distribute labour among different tasks and redefine job demarcations (Cook, 1998; MacVaugh and Evans, 2012). It stress innovations in production and new management skills such as team working and multi-skilling (Crompton, 2002). The second one is numerical flexibility in which employers adjust the number of workers so as to correspond with labour demand (Cook, 1998). It focuses on reducing the costs of factors of production giving rise to efficiency gain (Crompton, 2002). The third one is financial flexibility which allows the reflection of demand in the external labour market by employment costs (Dyer, 1998). Actions taken to achieve functional and numerical flexibility can facilitate the objectives of financial flexibility (MacVaugh and Evans, 2012). As shown in Table 3.2, full-time employment is the least flexible, whereas self-employment show all the three kinds of flexibility.

**Table 3.1: Degree of flexibility for each type of employment**

| | Functional flexible? | Numerical flexible? | Financial flexible? | Position in Atkinson's model |
|---|---|---|---|---|
| Full-time employment | Yes | No | No | Core group |
| Part-time employment | Yes | No | Yes | Peripheral group 2 |
| Self-employment | Yes | Yes | Yes | Outer Circle |
| Temporary employment | No | Yes | Yes | Peripheral group 2 |

Note: from MacVaugh and Evans (2012)

Many studies define flexible employment from the perspective of employers similar to Atkinson (1984). Cook (1998) classified flexible employment as achieving either functional or numerical flexibility. Reilly (2000) distinguished four dimensions of flexible employment, namely the number of employees (numerical flexibility), the working hours (temporal flexibility), the workplace (spatial flexibility) and income (financial flexibility). There are differences in the range of activities subsumed under each dimension such as employment contracts, working hours, work location, remuneration arrangement and job tasks (Chiu, So and Tam, 2008). Temporal employment *per se* is actually part-time employment. Numerical flexibility, which is defined similarly as Cook (1998), Crompton (2002) and MacVaugh and Evans (2012), relates to any work arrangements which allow employers to adjust the number of employees to correspond with demand, such as the period of employment or the switch of employment status (Cook, 1998; Chiu, So and Tam, 2008).

From the perspective of older people as the labour supplier, there are five main advantages for them to work part-time (Lissenburgh and Smeaton, 2003; Morris and Mallier, 2003; Reday-Mulvey, 2005; Loretto *et al.*, 2009; Gannon and Roberts, 2011). Firstly, reduced working hours in part-time employment allows them to work with reduced stress and so have better health. Secondly, part-time employment can be a bridge between career employment and full retirement. Thirdly, part-time employment enables older people to enjoy the social integration offered by the working environment, which is absent from retiring. Fourthly, part-time employment provides older people more time to carry out their parenting or grand-parenting duties at home. Finally, the income earned from part-time employment can be a supplement to their savings for sustaining retirement. Self-employment provides the second and the fifth benefit to older people. In addition, it allows workers have more autonomy over their working hours, work schedule and content. Temporary employment provides similar sets of benefits to older people. We discuss each type of employment in more details in Sections 3.4 to 3.6.

## 3.3 The life-cycle labour supply hypothesis revisited

As discussed in Section 1.2 on life-cycle labour supply, compared to the traditional model, individuals in their later years are willing to devote more time on work before they participate more in non-work activities such as retirement. The choice between full-time jobs (with higher pay and longer working hours) and flexible jobs (with lower pay but shorter working hours or higher autonomy) in later life is influenced by the preferences for leisure when an individual ages (Gustman and Steinmeier, 1986). Reize (2000) discussed a theoretical framework explaining the transitions from unemployment to self-employment. It treats the decision to choose self-employment rather than paid work as a problem of dynamic utility maximization. The alternative employment modes (and non-

work activities) have different attractiveness for individuals, depending on preference-determining factors such as individuals' financial conditions, human capital and risk aversion. If the present value of the stream of expected utilities is higher for self-employment compared to other alternatives, an individual will choose self-employment. This theoretical framework can also be applied to explanations of other kinds of state transitions such as from full-time employment to part-time employment.

## 3.4 Part-time employment

### 3.4.1 General overview

Part-time employment is the most popular kind of flexible work among older people (Loretto *et al.*, 2009). The International Labour Office (ILO) has defined part-time employment as a regular form of wage employment with working hours substantially shorter than those of normal jobs within an establishment (Thurman and Trah, 1990).

Reday-Mulvey (2005) studied the European LFS in 2002 and noted that full-time jobs prevail among younger workers but, surprisingly, part-time jobs prevail among older workers rather than retirement. The worldwide phenomenon of older people entering flexible work before entering full retirement is relatively recent phenomenon. For the U.S., Christensen (1990) noted that before the 1990s over 75% of people aged 55 to 64 showed willingness to work part-time after retirement. The U.S. Department of Labor (1999) shows that in 1999, 16% of employed males aged 60 to 64 and 50% of employed males aged 65 or over were part-time workers, whereas 33% of employed females aged 60 to 64 and 60% of employed females aged 65 or over were part-timers. In Europe, there was an increasing trend for part-time employment relative to full-time employment among older people except for Greece since the 1970s (ILO, 1997).

In the U.K. between 1992 and 2008, the increase in part-time workers aged 60 to 64 was larger than that for full-time workers (Khan, 2009). Table 3.2 shows the changes in UK part-time employment rates by age group and gender in the 2000s. The proportions of part-timers in the younger age groups have been increasing in the 2000s while the opposite is true for older workers. However, the proportions of older people working as part-time were still the largest within the period, the greatest proportion being those over the state pensionable age (SPA) and from 50 to the SPA. This shows that part-time employment is much more popular among older people. It is not surprising to find that the proportions of females working part-time have been larger than for males among all age groups. The differences between the proportions of part-timers over the SPA and in other age groups were much larger for males than females. This implies that males become much more willing to work part-time after they reach the SPA.

**Table 3.2: UK part-time employment rates by age group and gender in the 2000s**

| Group | Part-time employment rates (%) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 q1 |
| **Total** | | | | | | | | | | | | |
| **16 or over** | 19.68 | 19.70 | 19.86 | 19.85 | 19.56 | 19.46 | 19.50 | 19.22 | 19.45 | 19.92 | 20.09 | 20.06 |
| **16 to 24** | 11.88 | 12.51 | 12.90 | 12.54 | 13.23 | 13.52 | 14.32 | 14.24 | 16.06 | 17.30 | 17.60 | 17.58 |
| **25 to 39** | 18.19 | 18.10 | 18.19 | 18.39 | 17.63 | 17.44 | 17.16 | 16.67 | 16.76 | 17.42 | 17.68 | 18.11 |
| **40 to 49** | 19.81 | 19.87 | 19.88 | 19.89 | 19.51 | 19.38 | 19.44 | 19.44 | 19.42 | 19.87 | 19.30 | 19.36 |
| **50 to SPA** | 20.51 | 20.54 | 20.31 | 19.83 | 19.82 | 19.11 | 19.00 | 19.01 | 18.91 | 19.05 | 19.04 | 18.93 |
| **Over SPA** | 54.72 | 53.18 | 53.23 | 52.22 | 51.21 | 51.73 | 51.50 | 51.20 | 49.20 | 47.05 | 46.20 | 43.65 |
| **Male** | | | | | | | | | | | | |
| **16 or over** | 4.24 | 4.51 | 4.88 | 5.04 | 5.16 | 5.28 | 5.46 | 5.42 | 5.77 | 6.28 | 6.54 | 6.83 |
| **16 to 24** | 5.85 | 6.54 | 7.70 | 7.09 | 5.51 | 7.88 | 8.63 | 8.77 | 10.45 | 12.50 | 11.71 | 11.21 |
| **25 to 39** | 2.29 | 2.48 | 2.55 | 2.80 | 3.10 | 3.20 | 3.10 | 3.27 | 3.68 | 4.04 | 4.30 | 4.76 |
| **40 to 49** | 2.10 | 2.34 | 2.27 | 2.39 | 2.25 | 2.55 | 2.61 | 2.62 | 2.98 | 3.52 | 3.44 | 3.68 |
| **50 to SPA** | 5.92 | 6.22 | 6.54 | 6.80 | 6.94 | 6.41 | 6.83 | 7.36 | 7.15 | 7.17 | 6.96 | 7.68 |
| **Over SPA** | 37.09 | 34.86 | 36.73 | 36.02 | 34.49 | 36.81 | 35.72 | 34.01 | 31.40 | 29.93 | 31.53 | 30.88 |
| **Female** | | | | | | | | | | | | |
| **16 or over** | 37.31 | 36.99 | 36.92 | 36.55 | 35.77 | 35.23 | 35.06 | 34.48 | 34.48 | 34.86 | 34.78 | 34.25 |
| **16 to 24** | 18.94 | 19.43 | 19.11 | 19.01 | 20.13 | 20.06 | 20.92 | 20.50 | 22.81 | 23.10 | 24.29 | 24.65 |
| **25 to 39** | 35.49 | 35.09 | 34.97 | 35.11 | 33.42 | 32.73 | 32.15 | 30.82 | 30.37 | 31.25 | 31.56 | 31.63 |
| **40 to 49** | 39.15 | 38.85 | 38.70 | 38.16 | 37.36 | 36.82 | 36.87 | 37.24 | 36.54 | 36.66 | 35.45 | 35.58 |
| **50 to SPA** | 41.53 | 41.03 | 40.42 | 38.81 | 38.30 | 37.23 | 36.57 | 35.99 | 36.15 | 36.45 | 36.14 | 34.69 |
| **Over SPA** | 63.62 | 62.71 | 62.34 | 60.87 | 59.82 | 59.35 | 58.62 | 57.26 | 55.63 | 53.80 | 53.77 | 50.06 |

Note: Part-time employment rate: the proportion of part-timers in the labour force aged 16 or over
Source: My own calculation using data from the UK LFS

### 3.4.2 Studies on part-time employment

Studies on part-time employment have considered many countries (Pagan, 2009, 2012; Kjeldstad and Nymoen, 2012). There are many studies investigating the situation of the U.S. Miller (1997) used the 1976 and 1986 US PSID to study the part-time employment of married females. Ordered probit models on the probabilities of non-participation, part-time employment or full-time employment were estimated to examine the changes between 1986 and 1976. Miller's results show that there was a structural change in the preferences of married females between these years. In 1976 more educated and experienced married females tended to shift from non-participation to full-time or part-time employment. In 1986 they tended to work full-time regardless of whether they were previously unemployed or part-time.

Falzone (2000) focused on the part-time employment of married females. He used the US PSID in 1992 to estimate multinominal logit models on the probabilities of being employed full-time, employed part-time or economically inactive. His results supported the view that part-time employment is an efficient employment choice for married females. The number and ages of children and the spouse's income increase the probabilities of working part-time instead of full-time for married females. Nevertheless, the number of years in education has an opposite effect. This supports the findings of Miller (1997) that education increases the likelihood for married females to work full-time rather than part-time. Falzone further divided the sample into younger (18 to 24), mature (25 to 44) and older age groups (45 or over) to study the effect of age on married women to choose their employment modes. He found that older married females accounted for the largest proportion of inactive people or part-time workers. Younger married females preferred to work full-time.

Studies on the part-time employment of older people increased in the 1990s. Many of them focused on partial retirement rather than part-time employment *per se*. They treated part-time employment as a partial retirement decision. Ruhm (1990) is among the few early studies on the theme. They used all the six waves of the Social Security Administration Retirement History Longitudinal Survey (RHLS) from 1969 to 1979 to estimate several binomial logit models on various dependent variables such as being partially retired or not[29]. His results suggested that more education, higher pay and having pension coverage tend to increase the probability of older Americans to remaining in their full-time employment. Moreover, older people tend to seek bridge employment in industries different from their previous career employment.

A study on the U.S. by Kim and DeVaney (2005) analysed the factors affecting older people's choice of economic status (full-time work, partial retirement or full retirement). They used the Health and Retirement Study (HRS) in 1992 and in 2000 to estimate multinomial logit models on the probabilities of being employed full-time, partially retired or fully retired. Partial and full retirements are defined based on respondents' self-reported retirement status and changes in the number of working hours. Their results show that age and gender have similar effects on the probabilities of having partial or full retirement. Older people's decisions on full retirement were affected by health and wealth factors such as investment assets, pension coverage and health insurance. Education, self-employment status and chronic health conditions affect older people's decisions on partial retirement. The result that the more educated tend to have partial retirement (or part-time employment) is in contrast to the findings of Miller (1997) on married females. This implies that different demographic groups with the same level of education can have

[29] Ruhm (1990) also estimated OLS regressions on various dependent variables such as retirement age and Cox proportional hazards models on exit probabilities from the current economic state.

different preferences over their modes of employment.

Health is commonly believed to be an important factor affecting older people's employment decisions. Several studies analysed the effect of health on older people's choice of employment modes. Gannon and Roberts (2011) investigated the issue in the U.K. and Ireland. They used the Living in Ireland (LII) Survey from 1995 to 2001 and the BHPS from 1991 to 2004 to estimate multinomial probit models on the probabilities of being employed full-time, employed part-time or fully retired. They found that older people with health problems are unsurprisingly more likely to retire in both countries. Those with health problems are more likely to work part-time rather than full-time in the U.K. However, health problems have no effect on the probabilities of working part-time in Ireland.

Apart from health problems, disability status is also an important factor affecting older people's choice of employment mode. Nevertheless, as noted by Pagan (2012), studies which analysed the relationship between part-time work and disability are scarce. Most of them focus on the situation of the U.S. (Schur, 2002, Hotchkiss, 2004). Pagan (2009) is among the few non-US studies that analysed the effect of being disabled on the probabilities of working part-time among older people in Europe. He used the Europe Survey of Health, Ageing and Retirement (SHARE) in 2004 to estimate binomial probit models on the probabilities of working part-time. His results show that older people with disabilities are more likely to work part-time compared with their non-disabled counterparts. Many older people with disabilities work part-time to achieve a balance between their health and work life.

Pagan (2012) differs from other studies by comparing SHARE data in 2007 to that in 2004 and carrying out a dynamic analysis on workers' transitions into and out of part-

time employment. Pagan compared transitions among employment statuses for disabled and non-disabled older people. He also estimated binomial probit models to study the determinants of the probabilities of part-time older workers in 2004 remaining in part-time work in 2007. His results show that older people with long-term disabilities are more likely to stay in their part-time jobs compared to their non-disabled counterparts. Part-time employment is an important means for disabled older people to earn money for sustaining their future retired life.

### 3.4.3 Voluntary and involuntary part-time employment

Part-time employment is attractive to older people for a number of reasons: enabling them to work with reduced stress, acting as a bridge from career employment to full retirement, offering social integration offered by the working environment and providing extra income. Based on the theoretical framework discussed in Section 3.3, if the present value of the stream of expected utilities is higher in part-time employment compared to other alternatives, an individual will choose to work part-time. Nonetheless, it is assumed that his or her choice is voluntary, which means choosing part-time employment is an efficient labour market option (Falzone, 2000). Part-time employment can be an involuntary choice for older people if they face constraints due to market failure such as information asymmetry or age discrimination. This would indicate a marginalization of older people in the labour market.

Tilly (1991) noted that before the 1970s the growth in U.S. part-time employment was driven by the growth in voluntary part-time employment due to the increasing desire of females and younger people to work part-time. However, this growth in voluntary part-time employment started to level off and involuntary part-time employment started to increase. For older people, there has been a substantial increase in the share of voluntary

part-time workers in the early 1970s (Deutermann and Brown, 1978). The trend continued in the 2000s (Loretto and Vickerstaff, 2011). Nardone (1995) examined the US CPS in 1994 and found that many older people who work part-time are voluntary workers. He also found that they are not disproportionately represented in the involuntary group.

Morris and Mallier (2003) noted that for Europe in 1997, 45% of older males and 66% of older females reported that they choose to work part-time voluntarily. However, Reynolds (2003) suggested that some older part-time workers would prefer more working hours. This may imply that they do not choose their part-time jobs voluntarily and they may prefer full-time work. Morris and Mallier (2003) noted that one-third of older males and one-fifth of older females in Europe stated that they work part-time involuntarily due to a lack of suitable full-time opportunities. These figures are significant and highlight the need to investigate the voluntary and involuntary nature of part-time employment among older people.

Despite the importance of the voluntary and involuntary nature of part-time employment, few studies on this issue exist for any demographic groups. Hotchkiss (2004) studied the voluntary and involuntary nature of part-time employment among disabled people. He used the US CPS from 1984 to 2000 to estimate binomial probit models on the probabilities of working part-time voluntarily (versus working involuntarily). His results show that the increase in part-time employment among disabled people is mainly voluntary. Part-time employment has become an attractive choice of employment mode to disabled people since 1992.

Kjeldstad and Nymoen (2012) studied the issue from the gender perspective. They used the 2005 Norwegian LFS to estimate binomial logit models to study the job characteristics of different kinds of part-time employment. Three types of part-time

employment, namely voluntary short, voluntary long and involuntary work, are classified. Their results show that voluntary long part-time work is the most prevalent and is a female-dominated type of part-time employment. This reflects employers' consideration on women's preference on working hours. Voluntary short part-time employment is less gendered and is provided mainly in low-skilled service industries for flexibility reasons. The probability of working part-time involuntarily is affected by secondary labour market factors such as the type of contract and non-Western citizenship. These factors have greater effects on females than males.

## 3.5 Self-employment

### 3.5.1 General overview

Self-employment is another type of flexible employment commonly chosen by older people. As noted by Loutfi (1991, p.1), self-employed workers are typically defined as "working proprietors of unincorporated businesses, own-account workers, members of producers' co-operatives and unpaid family workers". The difference in the mode of remuneration distinguishes self-employed workers from employees. Self-employed workers not only receive returns to their labour but also receive returns to their capital and entrepreneurship.

Many studies noted that self-employment rates increase with age (Bregger, 1996; Morris and Mallier, 2003; Karoly and Zissimopoulos, 2004; Taylor, 2011). As noted by Zissimopoulos and Karoly (2007), workers aged 45 or over accounted for 54% of the US self-employed (in unincorporated business only) in 2002. Some have been self-employed for most of their career, or become self-employed at a later stage of their career. In 2009, self-employment rates of older people were higher than those of younger people (Hipple,

2010). Moreover, self-employment is more popular among males than among females. The U.S. Department of Labor (1999) noted that before the 2000s, 13% of employed males aged 55 to 64 and 25% of employed males aged 65 or over were self-employed, compared to 8% of those aged 25 to 54. For employed females, 9% of those aged 55 to 64 and 14% of those aged 65 or over were self-employed, compared to 6% of those aged 25 to 54.

In the U.K., the self-employment rates of older people have been increasing since the early 1980s (Laczko and Phillipson, 1991). As noted by Khan (2009), 18% of people aged 50 or over were self-employed in 2008. This figure was higher than that of people aged 25 to 49 (12%). In the U.S., older males were more likely to be self-employed than older females (25% and 11% respectively). Khan further noted that the gender difference in self-employment was larger in the group aged over the SPA (65 for males and 60 for females). 40% of males aged 65 or over and 13% of females aged 60 to 64 were self-employed in 2008.

Table 3.3 shows the changes in UK self-employment rates by age group and gender in the 2000s. These trends are similar to those found in other studies. The proportion of self-employed among all age groups has been increasing in the 2000s. The over-SPA group had the largest proportion of self-employed, followed by those in the 50-to-SPA group. All figures were smaller than those of the part-time employment rates in Table 3.2, implying that part-time employment is more widespread than self-employment in the U.K. It is not surprising to find that the proportions of male self-employed are larger than those of female self-employed. Tables 3.2 and 3.3 provide supporting evidence for the common belief that males prefer to be self-employed, whereas females prefer to work part-time.

**Table 3.3: UK self-employment rates by age group and gender in the 2000s**

| Group | Self- Employment rates (%) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 q1 |
| **Total** | | | | | | | | | | | | |
| **16 or over** | 12.09 | 12.08 | 12.86 | 13.03 | 12.87 | 13.10 | 13.26 | 13.00 | 12.92 | 13.34 | 13.61 | 13.97 |
| **16 to 24** | 3.05 | 3.29 | 3.84 | 4.38 | 4.14 | 4.24 | 4.20 | 4.05 | 4.00 | 4.38 | 4.48 | 4.40 |
| **25 to 39** | 9.67 | 9.62 | 10.34 | 10.41 | 10.08 | 10.51 | 10.70 | 10.62 | 10.25 | 10.03 | 10.22 | 10.08 |
| **40 to 49** | 13.14 | 13.20 | 13.83 | 13.81 | 13.83 | 13.76 | 13.73 | 14.03 | 14.15 | 14.19 | 14.04 | 14.87 |
| **50 to SPA** | 16.94 | 16.60 | 17.32 | 17.30 | 17.06 | 17.16 | 17.53 | 17.29 | 16.84 | 17.78 | 17.29 | 18.09 |
| **Over SPA** | 26.31 | 26.80 | 27.06 | 27.38 | 26.76 | 26.63 | 26.05 | 20.37 | 21.14 | 23.85 | 28.55 | 28.38 |
| **Male** | | | | | | | | | | | | |
| **16 or over** | 16.43 | 16.43 | 17.43 | 17.86 | 17.54 | 17.72 | 17.93 | 17.61 | 17.30 | 17.66 | 18.06 | 18.45 |
| **16 to 24** | 4.52 | 4.81 | 5.46 | 6.61 | 6.31 | 6.37 | 6.22 | 5.65 | 5.67 | 6.04 | 5.81 | 5.98 |
| **25 to 39** | 12.85 | 12.98 | 13.98 | 14.14 | 13.70 | 14.03 | 14.33 | 14.34 | 13.70 | 13.05 | 13.35 | 13.30 |
| **40 to 49** | 17.91 | 17.87 | 18.71 | 19.10 | 18.92 | 18.71 | 18.78 | 19.05 | 18.64 | 18.66 | 18.52 | 19.46 |
| **50 to SPA** | 22.57 | 22.06 | 22.81 | 22.90 | 22.59 | 22.67 | 22.84 | 22.72 | 22.22 | 23.38 | 23.00 | 23.87 |
| **Over SPA** | 47.69 | 47.06 | 46.63 | 47.93 | 46.85 | 45.51 | 45.86 | 37.64 | 38.95 | 41.07 | 46.41 | 43.92 |
| **Female** | | | | | | | | | | | | |
| **16 or over** | 7.12 | 7.14 | 7.66 | 7.58 | 7.60 | 7.96 | 8.09 | 7.91 | 8.11 | 8.61 | 8.79 | 9.16 |
| **16 to 24** | 1.32 | 1.52 | 1.91 | 1.72 | 1.52 | 1.78 | 1.86 | 2.22 | 1.99 | 2.38 | 2.96 | 2.64 |
| **25 to 39** | 6.21 | 5.96 | 6.44 | 6.41 | 6.15 | 6.72 | 6.84 | 6.69 | 6.67 | 6.91 | 6.97 | 6.83 |
| **40 to 49** | 7.93 | 8.15 | 8.62 | 8.28 | 8.58 | 8.64 | 8.50 | 8.72 | 9.47 | 9.60 | 9.48 | 10.13 |
| **50 to SPA** | 8.83 | 8.77 | 9.31 | 9.13 | 9.14 | 9.31 | 9.87 | 9.37 | 8.97 | 9.59 | 9.19 | 9.97 |
| **Over SPA** | 15.52 | 16.25 | 16.25 | 16.41 | 16.42 | 16.99 | 16.41 | 14.29 | 14.71 | 17.06 | 19.33 | 20.58 |

Note: Self-employment rate: the proportion of self-employers in the labour force aged 16 or over
Source: My own calculation using data from the UK LFS

### 3.5.2 Studies on self-employment

Although self-employment is increasingly prevalent among older people, it is still a relatively understudied area (Reize, 2000). Previous research on self-employment has studied various factors affecting individuals to choose self-employment compared to wage work or unemployment (Evans and Leighton, 1989; Bruce *et al.*, 2000; Zissimopoulos and Karoly, 2007). Much of the previous research on analysing the effect of individuals' demographic characteristics found that self-employed workers are more likely to be male, married, older and more educated (Aronson, 1991).

For example, Blanchflower (2000) investigated the role and influence of self-employment across the Organisation for Economic Cooperation and Development (OECD) countries. He used data from various sources such as the International Social

Survey Programme in 1989 to carry out a macro-econometric analysis on self-employment rates and micro-econometric analysis on employment status and job satisfaction. His results show that the self-employment rates and unemployment rates are negatively correlated for most OECD countries. The probabilities of being self-employed are higher for people who are males, older and the least educated. Nevertheless, the most highly educated people also have high probabilities of being self-employed. These self-employed workers have higher job satisfaction than employees.

However, the results from early studies tend to differ from the common findings in more recent studies. Evans and Leighton (1989) is an example. They studied the determinants of being self-employed among white males in the U.S. They used the National Longitudinal Survey of Young Men (NLS) from 1966 to 1981 and the CPS from 1968 to 1987 to estimate binomial probit models on the probabilities of moving from paid work to self-employment. One of their findings is that the probabilities of entering self-employment are unaffected by age or work experience for the first 20 years of employment. This is not consistent with findings of other research. However, the common belief, that males with more assets are more likely to be self-employed is supported.

As noted by Zissimopoulos and Karoly (2007), one strand of research has examined the potential positive benefits of being self-employed. Taylor (1996) used the 1991 BHPS to study the effect of various factors such as job aspects on the probabilities of being self-employed. Their results of binomial probit models show that the higher autonomy and expected income offered by self-employment are important to attract people to be self-employed. However, the lack of job security deters risk-averse people from taking self-employment. Factors such as marital status and parents' economic status are examples of important determinants of being self-employed.

Much of the literature on self-employment focuses on the workforce as a whole. Only a few studies investigated the issue among older people (Zissimopoulos and Karoly, 2007; 2009). Fuchs (1982) is an early study on the switch of waged workers to self-employment and the switch from working to non-working among older white males in the U.S. He used the Retirement History Study (RHS) in 1969, 1971 and 1973 to estimate binomial logit models on the probabilities of continuing to work and on the probabilities of switching from wage work to self-employment. His results show that self-employed older males are more likely to continue to work than their waged counterparts. There are other significant factors affecting older males' willingness to stay in work such as good health, white-collar occupation and shorter hours of work. Older males who are self-employed in the later stage of their career are mainly those who have experienced self-employed in the past, or are in occupations with characteristics similar to self-employment such as managers or salesmen.

Parker and Rougier (2007) focused on the retirement decisions of older self-employed U.K. workers. They used the Retirement Survey in 1988 and in 1994 to estimate multinomial logit models of dynamic employment and retirement choices. They found that higher earnings decrease the probability of retirement among older self-employed workers. There is no evidence that gender, health or any family characteristics affect the retirement decisions of older self-employed workers. Moreover, their results of dynamic analysis show that relatively few wage workers and virtually no retirees chose self-employment in their later life. As pointed out by Parker and Rougier (2007) themselves, their study suffered from the weakness of a very small sample size (197 individuals).

Several studies have used the HRS in the U.S. to investigate the determinants of self-

employment among older people. Bruce *et al.* (2000) used the HRS in 1992, 1994 and 1996 to estimate multinomial logit models on the transition probabilities between self-employment, regular full-time employment and unemployment. They found that health insurance provision is not a significant factor in affecting older people's probabilities to be self-employed. Also, more wealth contributes to higher probabilities of transiting to self-employment.

Zissimopoulos and Karoly (2007) studied the transitions of older people into self-employment in their middle and later life. They used the HRS from 1992 to 2000 to estimate multinomial logit models on the probabilities of transitions among self-employment, retirement or unemployment. Their results show that health is a push factor for older people into self-employment, whereas wealth is a pull factor. There are other results consistent with those in prior research such as the effect of pension coverage on decreasing the probabilities of being self-employed.

Zissimopoulos and Karoly (2009) differ from the previous study by also considering the transitions of older non-workers. They used one more wave of the HRS in 2002 to estimate binomial probit models on the probabilities of transitions from non-employment to self-employment or regular full-time employment, and on the probabilities of transitions from regular full-time employment to self-employment. They found that prior job characteristics and wealth are significant factors in determining the transitions of both older workers and non-workers to self-employment.

## 3.6 Temporary employment

### 3.6.1 General overview

In addition to part-time employment and self-employment, temporary employment

is another option for older people. Houseman and Osawa (1995) summarized the definitions of temporary workers from various labour surveys in Japan. They found that temporary workers are generally defined as workers employed on a temporary contract which lasts for more than a month but less than a year. This general definition is similar to those adopted by studies such as Booth *et al.* (2002). De Grip *et al.* (1997) noted that the average proportion of temporary workers in Europe increased by 5.4% from 1983 to 1991. The growth of temporary employment continued in the early 1990s albeit at a slower pace (1.1%).

Table 3.4 shows the changes in the UK temporary employment rates by age group and gender in the 2000s. These changes show a U-shape trend in the 2000s. The over-SPA group had the largest proportion of temporary workers. The proportions of temporary employment rates in other age groups were similar to each other. The proportions of males working temporarily were smaller than female ones except in the 16-to-24 and over-SPA groups. In general, there are larger proportions of females working temporarily than those of males in younger age groups. The pattern is reversed when people have reached the SPA. One possible reason for this is that older males have to work temporarily to sustain their family expenses.

**Table 3.4: UK temporary employment rates by age group and gender in the 2000s**

| Group | Temporary employment rates (%) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 q1 |
| **Total** | | | | | | | | | | | | |
| **16 or over** | 5.65 | 5.40 | 5.15 | 4.99 | 4.70 | 4.73 | 4.71 | 4.34 | 4.63 | 5.09 | 5.09 | 5.06 |
| **16 to 24** | 9.54 | 8.81 | 8.59 | 8.73 | 8.14 | 8.58 | 8.90 | 7.96 | 7.85 | 10.40 | 9.80 | 9.54 |
| **25 to 39** | 5.18 | 5.01 | 4.82 | 4.80 | 4.35 | 4.55 | 4.55 | 4.33 | 4.80 | 5.19 | 5.05 | 5.10 |
| **40 to 49** | 4.72 | 4.50 | 4.05 | 3.72 | 3.68 | 3.65 | 3.48 | 3.15 | 3.44 | 3.71 | 3.82 | 3.87 |
| **50 to SPA** | 4.90 | 4.61 | 4.42 | 4.34 | 4.33 | 3.88 | 3.86 | 3.60 | 3.70 | 3.97 | 4.06 | 3.96 |
| **Over SPA** | 11.94 | 12.43 | 12.51 | 10.66 | 9.07 | 9.54 | 9.35 | 8.55 | 9.66 | 8.86 | 9.50 | 9.53 |
| **Male** | | | | | | | | | | | | |
| **16 or over** | 4.85 | 4.61 | 4.46 | 4.48 | 4.24 | 4.14 | 4.19 | 3.79 | 4.26 | 4.73 | 4.76 | 4.54 |
| **16 to 24** | 9.70 | 8.72 | 8.48 | 8.90 | 7.64 | 8.33 | 9.09 | 8.14 | 8.54 | 11.08 | 10.39 | 9.52 |
| **25 to 39** | 4.17 | 3.91 | 3.78 | 3.84 | 3.77 | 3.89 | 3.77 | 3.58 | 4.22 | 4.59 | 4.62 | 4.50 |
| **40 to 49** | 3.39 | 3.12 | 2.79 | 2.85 | 2.69 | 2.54 | 2.47 | 2.33 | 2.67 | 2.87 | 3.12 | 3.05 |
| **50 to SPA** | 4.62 | 4.59 | 4.53 | 4.62 | 4.47 | 3.86 | 3.86 | 3.43 | 3.74 | 4.02 | 3.93 | 3.84 |
| **Over SPA** | 16.62 | 19.06 | 18.44 | 13.36 | 13.16 | 12.65 | 14.14 | 12.25 | 15.23 | 13.09 | 13.00 | 12.24 |
| **Female** | | | | | | | | | | | | |
| **16 or over** | 6.46 | 6.20 | 5.85 | 5.50 | 5.16 | 5.30 | 5.22 | 4.88 | 4.99 | 5.43 | 5.41 | 5.56 |
| **16 to 24** | 9.36 | 8.91 | 8.72 | 8.54 | 8.68 | 8.84 | 8.70 | 7.79 | 7.13 | 9.67 | 9.21 | 9.55 |
| **25 to 39** | 6.19 | 6.12 | 5.83 | 5.74 | 4.92 | 5.19 | 5.31 | 5.07 | 5.35 | 5.75 | 5.46 | 5.67 |
| **40 to 49** | 6.00 | 5.82 | 5.24 | 4.51 | 4.59 | 4.67 | 4.42 | 3.91 | 4.14 | 4.48 | 4.45 | 4.62 |
| **50 to SPA** | 5.24 | 4.63 | 4.29 | 4.00 | 4.15 | 3.91 | 3.85 | 3.82 | 3.66 | 3.91 | 4.21 | 4.10 |
| **Over SPA** | 10.47 | 10.25 | 10.43 | 9.76 | 7.73 | 8.50 | 7.84 | 7.63 | 8.28 | 7.72 | 8.31 | 8.60 |

Note: Temporary employment rate: the proportion of temporary employees (either full-time or part-time workers) in the labour force aged 16 or over
Source: My own calculation using data from the UK LFS

### 3.6.2 Studies on temporary employment

Studies on temporary employment, especially among older people, are very few compared to those on part-time employment and self-employment. A possible reason is that, though on the increase, the proportion of temporary workers is still much smaller than in the other two types of flexible employment (De Grip *et al.*, 1997; Booth *et al.*, 2002). Most studies on temporary employment are at the firm level (Davis-Blake and Uzzi, 1993). There are also studies investigating the relationship between temporary employment and permanent employment such as transitions from temporary employment to permanent employment (Berton *et al.*, 2011) and wage differentials (Ghinetti, n.d.). As pointed out by Loretto *et al.* (2009), some workers are forced into temporary work because they cannot find a permanent job. This implies that they are involuntary

temporary workers. Not many studies focus only on the determinants of temporary employment. Studies on more than one type of flexible employment, including temporary employment, are more common[30].

Amuedo-Dorantes (2000) investigated whether temporary employment in Spain is voluntary or involuntary. He used the Spanish LFS from the second quarter of 1995 to the second quarter of 1996 to estimate multinomial logit models on the probabilities of being inactive, unemployed or temporarily employed. Proportional hazard models on transitions from temporary work to permanent work were also estimated. His results show that most temporary workers in Spain are involuntary and they have limited access to permanent employment.

Booth *et al.* (2002) are among the few UK studies on temporary employment that investigated whether UK temporary jobs are unpromising with poor pay and prospects, or promising jobs helping to transit to permanent employment. They addressed three main research questions. First, who held temporary jobs in the U.K. during the 1990s? Second, were there any differences in job satisfaction and the levels of wage and training received between temporary workers and permanent workers? Third, how long would it take temporary workers to get a permanent job? They used the BHPS from 1991 to 1997 to estimate various econometric models such as ordered probit models on job satisfaction and proportional hazard models on transitions from various kinds of temporary workers to permanent workers. Their results show that temporary employment is in general undesirable compared to permanent employment. This means many temporary workers are involuntary. They receive less training, have lower levels of job satisfaction and earn

[30] Related studies are discussed in next section.

less compared to permanent workers.

## 3.7 Studies on more than one type of flexible employment

As mentioned above, there are studies on more than one type of flexible employment. Some of them do not make a clear distinction on each type of flexible employment. Loretto *et al.* (2009) noted that full-time workers are usually permanent workers, whereas part-time workers are usually temporary workers. Kim and DeVaney (2005) and Pagan (2012) included a dummy of being self-employed in their regressions for analysing part-time employment of older people.

On the contrary, studies such as Morris and Mallier (2003) and Wenger and Reynold (2009) treated various kinds of flexible employment as distinct from each other and made comparisons on their relative popularity among workers. Johnson and Zimmermann (1993) noted that self-employment is preferred to part-time employment by people who value its greater degree of autonomy. Morris and Mallier (2003) pointed out that older females often prefer part-time employment, whereas older males prefer self-employment. Taylor (2011) found for the U.K. that in 2009 a larger proportion of males worked as self-employed workers, whereas a larger proportion of females worked part-time.

De Grip *et al.* (1997) is one of just a few macro level studies on the importance of part-time employment and temporary employment in Europe. They were interested in the occupations in which the types of flexible workers are employed. They used the LFS for 11 EU member states in 1983 and in 1991 to estimate separate binomial logit models on part-time employment rates or temporary employment rates. They found that the differences in the proportions of temporary employment among the EU countries are much smaller than those in part-time employment. The production sector has the widest

inter-country differences in the share of temporary employment. Furthermore, the popularity of the two types of flexible employment is not the same across various EU countries.

Farber (1999) is an example of micro study which focused on the association between job loss and alternative work arrangements including temporary employment or part-time employment in the U.S. They matched the Displaced Worker Supplements (DWS) of the CPS in February 1994 and 1996 to the Contingent and Alternative Employment Arrangements Supplements (CAEAS) to estimate binomial probit models on the probabilities of various types of employment. Their results show that job losers working temporarily are more likely to work full-time, whereas non-losers working temporarily are more likely to work part-time voluntarily. Moreover, temporary employment and involuntary part-time employment seem to be a bridge between job loss and subsequent regular full-time employment.

There are studies on various types of flexible employment among older people. Lissenburgh and Smeaton (2003) studied all three types of flexible employment discussed in previous sections. They used the UK LFS from 1997 to 2000 to estimate binomial logit models on the probabilities of exiting from permanent full-time jobs among older people. Multinomial logit models on the probabilities of transitions from economic inactivity to part-time employment, self-employment or temporary employment were also estimated. Their results show that factors affecting the probabilities of older people doing flexible work vary based on gender and the type of flexible employment under concern.

Lissenburgh and Smeaton (2003) found that self-employment offers the most comparable job quality to permanent full-time employment among the three types of flexible employment. Self-employed older workers reported high levels of job

satisfaction. Nonetheless, only professionals or owners of rare businesses have higher income than permanent full-time workers do. Temporary employment is ranked next in terms of job quality. Temporary workers are more likely to receive training. However, earning potential varies according to the type of work. Managers or professionals with fixed-term contracts are more likely to earn more than permanent full-time workers. Part-time employment has the poorest job quality among the three types of flexible employment. It is inferior to permanent full-time employment.

Wenger and Reynold (2009) studied the effect of health and health insurance coverage on the probabilities of the three types of flexible employment and regular full-time employment among US older married people. They used the CPS in February and March of 1997, 1999, 2001 and 2005 to estimate multinomial logit models on the probabilities of six kinds of flexible or regular full-time employment. They found that older married people with fair or poor health are less likely to be regular full-time workers. Poor health causes older people to seek flexible employment rather than regular full-time employment. However, they are more likely to be regular full-time workers when their spouses' health is poor.

## 3.8 Approaches to studying flexible employment

The studies discussed above used various kinds of probability models to investigate the determinants of flexible employment. For example, ordered logit/probit models are widely used by many studies (Miller, 1997; Blanchflower, 2000; Booth *et al.*, 2002). In these studies, it is implicitly assumed that the various employment modes can be ordered. For example, Miller (1997) estimated ordered probit models on the probabilities of non-participation, part-time employment and full-time employment among married females. He assumed that knowing the preferred single choice of individuals among the unordered

employment alternatives is sufficient to grant the use of ordered probit model.

Nevertheless, in our view he neglected the voluntary and involuntary nature of the employment modes chosen by individuals. This is difficult to show based on the information on individuals' choices among employment modes alone. If one does not have sufficient information on determining the voluntary and involuntary nature of individuals' economic status (such as the reasons for individuals' choice), ordered logit/probit models may not be a suitable estimation approach to study the issue.

In addition to ordered logit/probit models, binomial logit/probit models and multinomial logit/probit models are common estimation methods used. For instance, Taylor (1996) estimated binomial probit models to study the effect of various factors such as UK job aspects on the probabilities of being self-employed. Falzone (2000) estimated multinomial logit models to study part-time employment of married females in the U.S. Binomial logit/probit models are often used in studies comparing the probabilities of voluntary and involuntary flexible employment, provided that information for classifying the two (such as the reasons for individuals' choice) is available (Hotchkiss, 2004; Kjeldstad and Nymoen, 2012). For studies on more than one type of flexible employment, the use of multinomial logit/probit models is more common (Lissenburgh and Smeaton, 2003; Wenger and Reynolds, 2009). As noted by DeVaney and Kim (2005), multinomial logit (and probit) models assume that the choice outcomes are independent to each other and no clear hierarchy exists among them. Thus multinomial logit/probit models are more suitable than ordered logit/probit models in studying various kinds of flexible employment.

## 3.9 Final remarks

To summarize, despite the increasing popularity of various kinds of flexible employment among older people worldwide, there are few studies on this specific theme. Most studies on the employment prospects of older people, as discussed in Chapter 1, focus on regular full-time employment. Little attention has been paid to the flexible employment of older people (Lissenburgh and Smeaton, 2003; Kim and DeVaney, 2005; Wenger and Reynold, 2009). There is little evidence on factors influencing older people's choices on various modes of employment. There are also few studies on the factors affecting the shift between different employment modes among older workers (Lissenburgh and Smeaton, 2003).

Wenger and Reynold (2009) suggested two reasons for the lack of related studies. Firstly, many labour studies on older people, such as Blundell *et al.* (2002) and Hairault *et al.* (2010), focus on retirement, rather than on employment. Secondly, many studies on partial retirement or bridge employment[31], such as Ruhm (1990) and Adams and Rau (2004), only focus on whether older people can remain in the workforce. Work is considered as something which older people can do or not, rather than choose to do in different ways. As noted by Loretto *et al.* (2009), relatively little is known about existing patterns of flexible employment among older people. Little is also known about older people's motivation to work flexibly. A deep investigation on these issues is therefore needed.

Among studies on different kinds of flexible employment, most focus on younger people or the whole workforce (Zissimopoulos and Karoly, 2007; 2009). There are studies

[31] Bridge employment is commonly defined as employment pursued between the period of career employment and full retirement.

which focus on a particular group, e.g. on married workers (Wenger and Reynold, 2009), on married females (Miller, 1997; Falzone, 2000) or on people with disabilities (Schur, 2002; Hotchkiss, 2004). Studies, which consider older people, only focus on males (Fuchs, 1982). Not many studies have investigated the flexible employment of older people by gender. Thus a study on this theme is needed because the work patterns for older males and older females may differ significantly. A comparison between the flexible employment prospects of younger people and older people should also be made. Moreover, many studies focus on one type of flexible employment only such as Zissimopoulos and Karoly (2009) and Pagan (2012). Studying the determinants of older people's choices on various kinds of employment mode is worthwhile because these may affect policy considerations on helping older people to achieve their favourite employment mode.

In addition to the above issues, the voluntary and involuntary nature of flexible employment deserves special attention (Hakim, 1987; Falzone, 2000; Morris and Mallier, 2003). The focus so far has been placed on part-time and, sometimes, temporary employment). As discussed in Section 3.2, there are various potential benefits for older people in working part-time, such as working with reduced stress. Nonetheless, part-time employment can be an involuntary choice for older people if they cannot find their preferred employment mode such as full-time work. This may show the marginalization of older people in the labour market.

There is a similar concern on the self-employment of older people. Kruppe *et al.* (1998) suspected that being self-employed could be a consequence of the lack of other employment opportunities. Nevertheless, in our view, studies on the voluntary and involuntary nature of self-employment are uncommon for two reasons. Firstly, in contrast

to part-time and temporary employment, being self-employed requires people's commitment to entry such as capital investment. Older people who hope to find a regular full-time job but cannot do so may not "force" themselves to choose self-employment. Most of them hope to earn enough to sustain their retirement and may not be willing to risk start-up capital investment. Secondly, there are not many datasets eliciting information on voluntary and involuntary self-employment. The above issues can be addressed using binomial or multinomial logit/probit estimation. The next chapter discusses our empirical framework for addressing these issues and our estimation results.

# CHAPTER 4

# OLDER VERSUS YOUNGER PEOPLE'S PREFERENCES OVER AND OUTCOMES OF FLEXIBLE EMPLOYMENT MODES: AN EMPIRICAL ANALYSIS

## 4.1 Introduction

This chapter discusses the data, the empirical framework and the analysis results on preferences over, and outcomes of, flexible employment modes for older versus younger people. As suggested in the previous chapter, most studies on the employment prospects of older people focus on regular full-time employment. Little attention has been paid to the flexible employment modes available to older people (Lissenburgh and Smeaton, 2003; Kim and DeVaney, 2005; Wenger and Reynold, 2009). This study aims to provide new insights on this theme with three research objectives.

Firstly, we study the preferences of older versus younger unemployed job-seekers over various employment modes. We restrict our analyses to unemployed job-seekers instead of all job-seekers as we wish to focus on the preference priority of workers over various employment modes when they do not have any work at hand. Most studies on flexible employment discussed in the previous chapter focus on the factors that affect the actual outcomes, i.e. which type of employment individuals actually move into. Little research has been done on unemployed job-seekers' preferences. People with certain characteristics may have higher probabilities of entering particular employment modes even if their preferred mode was different. It is therefore important to study this issue because it affects policy makers' decisions on how to help older people seek their favoured mode of employment.

Secondly, as suggested in Chapter 2, older people have lower employment probabilities than younger people. However, the situation may be different for different employment modes. My study provides three new insights on this question.

A) We consider more than one type of flexible employment. Many studies such as Zissimopoulos and Karoly (2009) and Pagan (2012) only focus on one type of flexible employment. We focus on part-time employment and self-employment and treat working temporarily as a control variable. This is due to the complexity of classifying part-time employment and temporary employment separately[32].

B) We use a long time-span of the UK LFS from 2001q2 to 2012q1 and conduct updated analyses.

C) We study the neglected issue of gender, as suggested in the previous chapter. Few studies have investigated issues of gender when considering the flexible employment of older people.

Thirdly, my study investigates the voluntary and involuntary nature of part-time employment. As discussed in the previous chapter, older people may choose to work part-time for various reasons. Nonetheless, part-time employment can be an involuntary choice if they cannot find their preferred employment mode such as full-time work. As noted by Falzone (2000), there are policy implications if involuntary part-timers are concentrated in a particular group of workers. It is therefore important to study whether older part-timers tend to work voluntarily or involuntarily.

The three research dimensions identified above lead us to use binomial logit models

[32] A more detailed account is provided in Section 4.2.

and multinomial logit models to investigate five specific research questions. Firstly, what are the significant factors affecting older people's preferences over each type of employment? Secondly, what are the significant factors affecting older people's entry into a particular mode of employment? Thirdly, what are the significant factors leading older people to work part-time involuntarily? Fourthly, are the answers to the above questions different from those of younger people? Fifthly, do the results above differ between males and females?

In contrast to Chapter 2 that looks at three economies, we only study the U.K. The UK LFS has much richer information for the analysis of unemployed job-seekers and part-timers, compared to similar datasets for the U.S. and Hong Kong. Also, the U.K. can act as a benchmark between heavily regulated economies like Europe and less regulated economies like the U.S. (Ajayi-Obe and Parker, 2005). The remainder of this chapter is organized as follows. Section 4.2 provides a discussion on the background and treatment of the data. Section 4.3 discusses the summary statistics for the sub-samples. Sections 4.4 to 4.6 present the estimation framework and discuss the empirical results for the three analyses. Section 4.7 concludes the discussion.

## 4.2 Variables and data treatment on the UK LFS

In this study, UK LFS data from 2001q2 to 2012q1 are used as prior to this there were no ethnicity measures. The data are accessed from the UK Data Archive website[33]. As in the previous empirical chapter, we pool the LFS at each quarter to construct a time-series of independently pooled cross-sectional data. This can increase the sample size so as to strengthen the robustness of the estimation results (Wooldridge, 2006). Many studies

[33] The data source of the UK LFS is acknowledged in the Reference.

in labour economics, such as Gomulka and Stern (1990) and Chen and Hamori (2010), use independently pooled cross-sectional data.

The choice of LFS variables is based on the literature (Evans and Leighton, 1989; Butcher and Hutchinson, 1996; Miller, 1997; Lissenburgh and Smeaton, 2003; Zissimopoulos and Karoly, 2009; Pagan, 2012) and the availability of relevant data. Table 4.1 shows the categories of variables included in each regression analysis. The included variables cover respondents' demographic, household, human capital and job characteristics. All variables related to demographic and household characteristics are included in all the regression equations. Information related to job characteristics is only available for regressions on workers in the third analysis, which studies the voluntary and involuntary nature of part-time work.

**Table 4.1: Categories of independent variables included in each regression analysis**

| Regressions: | 1 | 2 | 3 |
|---|---|---|---|
| **Demographic characteristics** | | | |
| Gender | ✓ | ✓ | ✓ |
| Marital status | ✓ | ✓ | ✓ |
| Nationality | ✓ | ✓ | ✓ |
| Ethnicity | ✓ | ✓ | ✓ |
| Health status | ✓ | ✓ | ✓ |
| Age | ✓ | ✓ | ✓ |
| **Household characteristics** | | | |
| Number of dependent children aged 4 or less | ✓ | ✓ | ✓ |
| Number of dependent children aged between 5 and 9 | ✓ | ✓ | ✓ |
| Number of dependent children aged between 10 and 15 | ✓ | ✓ | ✓ |
| Region of residence | ✓ | ✓ | ✓ |
| **Human capital characteristics** | | | |
| Education | ✓ | ✓ | ✓ |
| Unemployment duration | ✓ | | |
| **Job characteristics** | | | |
| Sector (private or public) | | | ✓ |
| Industry | | | ✓ |
| Industry (last job) | ✓ | | |
| Usual working hour | | | ✓ |
| Temporary work or not | | | ✓ |
| Tenure | | | ✓ |
| Being home workers or not | | | ✓ |
| Whether having second job | | | ✓ |
| **Others** | | | |
| Benefit claimant status | ✓ | ✓ | ✓ |
| Year dummies | ✓ | ✓ | ✓ |

The variables for unemployment duration and for industry of the last job are only included in the first analysis. This is because the first analysis studies the unemployed job-seekers' preferences and these information are available for unemployed job-seekers only. As noted by Wooldridge (2006), the population distribution may change over time in pooled cross-sectional data. Thus a series of year dummies is included to reflect the possible changes in year-specific effects.

**Table 4.2: Description for the dependent variables in each analysis**

| Variables | Description |
|---|---|
| ***JobPreference*** | Dependent variable for the first set of regression analyses; dummy for **searching which type of employment** with four categories:<br>0: no preference*<br>1: want full-time work<br>2: want part-time work<br>3: want to be self-employed |
| ***EconActivity*** | Dependent variable for the second set of regression analyses; dummy for **economic activity** with four categories:<br>0: unemployed*<br>1: work full-time<br>2: work part-time<br>3: self-employed |
| ***InvoluntaryPT*** | Dependent variable for the third set of regression analyses; dummy for **working part-time involuntarily** (=1,0) |

* Denotes control variables

Table 4.2 provides the description for the dependent variables in each analysis. *JobPreference* and *EconActivity* are the multinomial dependent variables in the first and second analysis. Many studies choose the category for full-time work as the reference group in their regressions (Falzone, 2000; Kim and DeVaney, 2005; Wenger and Reynolds, 2009; Kjeldstad and Nymoen, 2012). We use unemployed job-seekers with no preference and unemployed workers as the reference groups of *JobPreference* and *EconActivity* respectively. This is for ease of comparison among the employment modes.

There are a number of alternative definitions for each flexible employment mode in the literature. Part-time employment is often defined by the number of working hours. Most studies define part-timers as people working less than 35 hours a week, either during the survey week or as usual (Blau, 1994; Falzone, 2000; Nardone, 2005). There are studies that define part-timers as people working less than 32 hours (Pagan, 2009) or less than 30 hours (Gannon and Roberts, 2011). The self-employed are defined differently from part-timers. They are not defined by working hours but often by their report as self-employed in the survey (Carrasco, 1999; Lissenburgh and Smeaton, 2003; Ajayi-Obe and

Parker, 2005). Although the self-employed can be either part-time or full-time workers, what sets the self-employed apart is the autonomy in their work so as to allow them to choose their number of working hours. For this reason the distinction between full-time and part-time employment is seldom made among the self-employed.

Temporary workers are defined by whether their contracts are seasonal/casual/short-term (Booth *et al.*, 2002). Classifying temporary workers is complicated by the fact that both full-time and part-time workers can be temporary. Lissenburgh and Smeaton (2003) used a priority rule to classify part-time employees, the self-employed and temporary employees. According to their priority rule, the self-employed are defined by self-reported status. Part-timers are also defined by self-reported status regardless of whether they hold temporary or fixed contracts. Other full-timers who hold temporary contracts are classified as temporary workers.

However, the proportion of temporary workers classified by the above priority rule can be much smaller compared to those of other flexible workers. Therefore we focus on part-time employment and self-employment only and treat working temporarily as a control. This means that we allow part-timers and full-time workers to be either temporary or permanent employees. Temporary workers are also defined by self-reported status. Our study defines part-timers and the self-employed by respondents' self-reported status. Unemployed people are defined as ILO unemployed who are without work, currently available for work and seeking work (International Labour Office, 2012).

*InvoluntaryPT* is the binomial dependent variable in the third analysis. There are various definitions adopted in the literature to classify voluntary and involuntary part-timers. Most definitions are based on the concept of under-employment. Hotchkiss (2004) defined voluntary part-timers as those who work for less than 35 hours a week and do not

want to work full-time. Kjeldstad and Nymoen (2012) considered part-timers who want longer working hours as involuntary part-timers. We define involuntary part-timers as those who looked for different or additional paid work, or who would like to work longer hours at their current rate of pay[34] (UK Data Archive Study Group, 2011).

**Table 4.3: Description for continuous independent variables in each analysis**

| Variables | Description |
|---|---|
| ***#KidsAged_0to4*** | Number of dependent children in family aged 4 or less |
| ***#KidsAged_5to9*** | Number of dependent children in family aged from 5 to 9 |
| ***#KidsAged_10to15*** | Number of dependent children in family aged from 10 to 15 |
| ***WorkHour*** | Total usual hours worked in main job |
| ***Tenure*** | Number of years in current job |

[34] The UK LFS variables used for this definition are *difjob* and *undemp*.

**Table 4.4: Description for binary (0,1) independent variables in each analysis**

| Variables | Description |
|---|---|
| ***Male*** | Male gender |
| ***MS_Married**** | Marital status for being married |
| ***MS_Single*** | Marital status for being single |
| ***MS_Separ_Divor*** | Marital status for being separated or divorced |
| ***MS_Widowed*** | Marital status for being widowed |
| ***Foreign*** | Nationality for being foreigner |
| ***Ethn_White**** | Ethnicity for being White |
| ***Ethn_Black*** | Ethnicity for being Black |
| ***Ethn_Asian*** | Ethnicity for being Asian |
| ***Ethn_Mixed*** | Ethnicity for being mixed |
| ***Ethn_Other*** | Ethnicity for being in other ethnic group |
| ***Health_problems*** | Health status for having health problems limiting kinds of work |
| ***Age_16to19**** | Age group for being aged from 16 to 19 years old |
| ***Age_20to24*** | Age group for being aged from 20 to 24 years old |
| ***Age_25to29*** | Age group for being aged from 25 to 29 years old |
| ***Age_30to34*** | Age group for being aged from 30 to 34 years old |
| ***Age_35to39*** | Age group for being aged from 35 to 39 years old |
| ***Age_40to44*** | Age group for being aged from 40 to 44 years old |
| ***Age_45to49*** | Age group for being aged from 45 to 49 years old |
| ***Age_50to54**** | Age group for being aged from 50 to 54 years old |
| ***Age_55to59*** | Age group for being aged from 55 to 59 years old |
| ***Age_60to64*** | Age group for being aged from 60 to 64 years old |
| ***Age_over64*** | Age group for being aged over 64 |
| ***R_England**** | Region of residence for living in England |
| ***R_Wales*** | Region of residence for living in the Wales |
| ***R_Scotland*** | Region of residence for living in Scotland |
| ***R_NorthIreland*** | Region of residence for living in North Ireland |
| ***Qual_Degree*** | Qualification for having a university degree or above |
| ***Qual_Postsec*** | Qualification for having a college or associate degree |
| ***Qual_Secondary*** | Qualification for having a secondary school qualification |
| ***Qual_Primary**** | Qualification for having a primary school qualification or below |
| ***DurUnemp_Less1**** | Unemployment duration, less than 1 year |
| ***DurUnemp_1to3*** | Unemployment duration, from 1 year to less than 3 year |
| ***DurUnemp_3to5*** | Unemployment duration, from 3 years to less than 5 year |
| ***DurUnemp_5plus*** | Unemployment duration, 5 years or more |
| ***Private*** | Sector for working in the private sector |
| ***Ind_Agri_Fish*** | Industry for working agriculture and fishing |
| ***Ind_Energy_Water*** | Industry for working energy and water |
| ***Ind_Manuf**** | Industry for working manufacturing |
| ***Ind_Constr*** | Industry for working construction |
| ***Ind_DisHote_Rest*** | Industry for working distribution, hotels and restaurants |
| ***Ind_TranspComm*** | Industry for working transport and communication |
| ***Ind_BankFinIns*** | Industry for working banking, finance and insurance, etc |
| ***Ind_PubEduHealth*** | Industry for working in public administration, education and health |
| ***Ind_Others*** | Industry for working other services |
| ***LInd_...*** | Industry of last job (same classification as *Ind_...* variables) |
| ***Temporary*** | Whether the current job is temporary |
| ***Homeworker*** | Homeworker or not |
| ***SecJob*** | Has a second job |
| ***Benefit*** | Claiming any State Benefits/Tax credits |
| **(Year dummies)** | Survey year (the earliest year is the control group) |

(* Denotes control variables)

Tables 4.3 and 4.4 provide the descriptions for the independent variables in the three analyses. Different sets of age dummies are included in the separate analyses for younger people and older people with *Age_16to19* and *Age_50to54* as the control groups respectively. There is no consensus on the cut-off between younger and older people in the literature. There are studies defining the cut-off as 55 (Hutchens, 1986), as 35 (Duncan and Loretto, 2004) or as 45 (Osberg, 1993; Johnson and Neumark, 1997). The most widely-used cut-off age is 50 (Peracchi and Welch, 1994; Hirsch et al., 2000; Chan and Stevens, 2001; NOP Social and Political, 2001; Adams, 2004; Chou and Chow, 2005). Therefore as in our previous empirical chapter, we choose age of 50 as the cut-off age between younger and older people. We include the variable *Temporary* in the third analysis to capture any differences due to temporary employment.

We exclude any data irrelevant for the analysis. Firstly, people who are below the minimum employment age are excluded as all the analyses deal with those at or above the minimum working age[35]. The behaviour of people above the State Pension Age (SPA) deserves policy attention and hence we include them in the regression. Secondly, data with inconsistencies and incomplete answers are excluded. Thirdly, top-coded data are excluded for consistent and unbiased estimation. Lastly, we exclude unpaid family workers and participants in government employment and training programmes. This is because the proportions of people in these two groups over the whole sample are very small (less than 1%) and the results for this sub-group are therefore unreliable. After dropping irrelevant cases, the final samples for the three analyses consist of 111,275 individuals, 2,341,527 individuals and 460,664 individuals respectively.

In the first analysis, only unemployed job-seekers are included for studying their job

[35] The minimum working age in the U.K. is 16.

preferences. As stated in Section 4.1, we restrict our analyses to unemployed job-seekers instead of all job-seekers when we wish to focus on the preference priority of workers over various employment modes when they do not have any work at hand. Information on job preferences (the employment mode which respondents are looking for) is only available for those who reply that they are looking for jobs. In the second analysis, only economically-active people (either employed or unemployed) are included for studying the factors affecting the entry of people into various employment modes. In the third analysis, only part-timers are included for studying the voluntary and involuntary nature of their employment.

## 4.3 Summary sample statistics

Tables 4.5 to 4.10 in the Appendix show the summary statistics for three samples of respondents: unemployed job-seekers, the economically-active and the subsample of the economically-active who work part-time. The values for the categorical variables represent the proportion of people with that characteristic in the corresponding samples. Some statistics are similar for all the three samples. Therefore we combine the discussion on those important statistics for brevity.

Most unemployed job-seekers, as shown by Tables 4.5 and 4.6, want to look for full-time jobs followed by part-time jobs and self-employment regardless of age and gender. Over 70% of males and over 50% of females want to look for full-time jobs. The proportions of older people wanting to seek full-time jobs are smaller than those of younger people, whereas the proportions of older people wanting to seek part-time jobs or self-employment are larger than those of younger people. This pattern is the same for both genders. Although most females want to work full-time, the values for the proportions of females wanting to work part-time are much larger than those of males by

over 30%. This shows that females are generally more willing to work part-time than males.

The values for the unemployed in Tables 4.7 and 4.8 are the unemployment rates of various samples from 2001 to 2012. The unemployment rates of younger people are higher than those of older people. The unemployment rates of all males, regardless of age, are higher than those of females. Most people work full-time regardless of age and gender. The proportions of younger full-timers are larger than those of older full-timers, whereas the proportions of older flexible workers (part-timers and self-employed) are larger than those of younger flexible workers. This pattern is the same for both genders. We can see that younger people are more likely to prefer full-time work and work full-time. Older people are more likely to prefer flexible employment and work flexibly. The proportions of female part-timers are larger than those of male part-timers, whereas the proportions of the male self-employed are higher than those of female self-employed regardless of age. This further supports the common belief that males have a higher preference for self-employment and females for part-time work.

Table 4.9 shows that 78% of all part-timers do so voluntarily. The proportion of older voluntary part-timers is larger than that of younger voluntary part-timers. In Table 4.10 the proportions of the two kinds of part-timers are similar for younger males, whereas over 70% of younger part-time females are so voluntarily. The proportions of older voluntary part-timers are over 80% for both genders. This shows that most female part-timers want to work part-time. Younger males tend to work part-time involuntarily. In contrast, most older male part-timers are satisfied with their part-time work.

Most unemployed job seekers are within the age range 20 to 24, whereas most of the economically-active are within the age range 35 to 44 irrespective of gender. The largest

proportion of male part-timers are over 64, whereas the largest proportion of female part-timers are 35 to 44. It is notable that people aged 50 or over account for significant proportions of all unemployed job-seekers, the economically-active and part-timers (around 20% to 30%). There are larger proportions of male unemployed job-seekers or economically-active than those of their female counterparts. The proportions of male unemployed job-seekers and economically-active in the older sample are larger than that in the younger sample. Nevertheless, younger males account for only 10% of all part-timers. This figure doubles for older males. Although males become more willing to take part-time jobs when they get older, part-time work is still much more popular for females.

## 4.4 Multinomial logits: job preferences of unemployed job-seekers

### 4.4.1 Estimation framework

In this first analysis, we estimate multinomial logit models for unemployed job-seekers' preferences over various employment modes[36]. An unemployed job seeker $i$ faces $j$ job preference choices, where $j$=0 is no preference, $j$=1 is preference for full-time work, $j$=2 is preference for part-time work and $j$=3 is preference for self-employment. A multinomial logit model is run to estimate the probability that an unemployed job seeker has for one of the four distinct choices of job preferences. Let $Y$ be the choice made (*JobPreference* in this case). A four-choice multinomial logit model is estimated as follows:

[36] All the estimation procedures are carried out using Stata. We use logit models instead of probit models because it is more popular in this field of research and it therefore makes it easier to compare our results to those of others (Amuedo-Dorantes, 2000; Lissenburgh and Smeaton, 2003; Kim and DeVaney, 2005; Parker and Rougier, 2007; Wenger and Reynold, 2009). Also, estimation program of multinomial logit models in Stata (mlogit) runs faster than that of multinomial probit models (mprobit). The framework discussed hereafter is based on Falzone (2000) with some modifications.

(11) $P\,(Y = j \mid X) = e^{\beta_j X_i} / \sum_{j=0}^{3} e^{\beta_j X_i}$

where $\beta_j$ is a vector of parameters and $X_i$ is a set of independent explanatory variables related to each job seeker $i$. Normalization of Equation (11) requires one group to be the reference group and against which the probability is compared. We use the group with no preference over employment mode $j$=0 as the reference. The probability of unemployed job-seekers having no job preference is given by setting $\beta_0$=0 as follows:

(12) $P\,(Y = 0 \mid X) = 1 \Big/ \left[1 + \sum_{j=1}^{3} e^{(\beta_j - \beta_0) X_i}\right]$

Since the dependent variable has four categories, we can estimate the log odds of preference over full-time work, preference over part-time work and preference over self-employment to the baseline category (no preference). Three non-redundant logit equations can be estimated as follows:

(13) $\log\left[P\begin{pmatrix}\text{preference for}\\ \text{full}-\text{time work}\end{pmatrix} / \; P(\text{no preference})\right] = \beta_1 X_i$

(14) $\log\left[P\begin{pmatrix}\text{preference for}\\ \text{part}-\text{time work}\end{pmatrix} / \; P(\text{no preference})\right] = \beta_2 X_i$

(15) $\log\left[P\begin{pmatrix}\text{preference for}\\ \text{self}-\text{employment}\end{pmatrix} / \; P(\text{no preference})\right] = \beta_3 X_i$

Including just a gender dummy as one of the independent variables is insufficient for studying gender differences because this implicitly assumes the effects of all other variables are the same for males and females (Berndt, 1990). We therefore estimate six sets of multinomial logit regressions on younger or older people for the male, female and pooled samples separately. All the estimation results are expressed in terms of marginal

effects for ease of inference[37]. This implies that an estimated parameter can be directly interpreted as the change in probability of the preference choice contributed by a unit change in the independent variable.

### 4.4.2 Marginal effects on the job preferences of unemployed job-seekers

Table 4.11 shows the marginal effects from the multinomial logits for the job preferences of unemployed job-seekers. The results of interest in these regressions are with respect to individuals' gender, health, education, unemployment duration, benefit claimant status and age. Most estimated parameters are statistically significant at the 1% level. Males are in general more likely to prefer full-time jobs or self-employment and less likely to prefer part-time jobs. It is not surprising to find that people with health problems, regardless of age, are less likely to prefer full-time jobs and more likely to prefer the two modes of flexible employment. Wenger and Reynold (2009) noted that flexible employment can help less healthy people to maintain a work-health balance.

The reference group for the education dummies is people with primary school qualifications. Younger unemployed job-seekers with secondary education or above are less likely to prefer full-time jobs and more likely to prefer self-employment. As noted by Carrasco (1999), more educated people are often better informed when it comes to spotting self-employment opportunities. Younger unemployed job-seekers with post-secondary education or above are less likely to prefer part-time jobs. Comparing the two choices of flexible employment, more educated people prefer self-employment. In addition, the higher the education a job seeker has, the lower the preference for part-time work and the higher the preference for self-employment. This pattern is the same for both

[37] As in Chapter 2, we calculate the marginal effects by using the command "mfx" in Stata.

younger and older unemployed job-seekers. A possible reason is that autonomy in work is more important for more educated people.

Younger unemployed job-seekers who are unemployed for more than 1 year are more likely to prefer full-time jobs and less likely to prefer flexible employment. However, older job-seekers unemployed for more than 1 year are less likely to prefer any kind of employment. They tend to prefer full-time work if they are unemployed for five years or more. Preference for full-time work increases with unemployment duration, whereas preference for part-time work decreases with it. This is because the longer the job seeker's unemployment duration is, the more likely he or she is to be in financial difficulty and therefore to need stable employment with higher earnings. Both older and younger unemployed job-seekers with longer unemployment durations are less likely to prefer self-employment. This may be because they become more reluctant to choose self-employment if they have been unemployed for a long time.

Unemployed job-seekers who claim state benefits or tax credits are more likely to prefer full-time jobs and less likely to prefer self-employment (regardless of age). This is because most benefit claimants do not have the funds to start their own business. As noted by Carrasco (1999), state benefits are the main source of income for unemployed people. When the benefits are exhausted, the intensity of job search rises and the chance for unemployed people to find work increases. Full-time employment often leads to a more stable income. Younger unemployed job-seekers on benefits are more likely to prefer part-time employment, whereas their older counterparts are less likely to do so.

Estimates on the age dummies are the most important results in this study because they capture age effects when the other characteristics are controlled for. Unemployed job-seekers aged 20 to 49 are less likely to prefer full-time jobs and more likely to prefer

flexible employment (compared to the 16-19 control group). The disinterest of unemployed job-seekers for full-time jobs increases with age. In addition, for those aged 50 or over, the preference for part-time and self-employment (i.e. flexible employment) increases with age. These results show that, regardless of age, unemployed job-seekers have an increased preference for flexible employment modes as they become older. Also, for any age group, unemployed job-seekers have a preference for flexible employment over full-time work. Nevertheless, these results may not answer the question of whether flexible employment is a 'real' preference or just a consequence of being discouraged by the inability to find full time employment. For a clearer picture, we also need to assess the results of the analyses on employment outcomes and on involuntary part-time employment.

Male and female unemployed job-seekers with similar characteristics may have very different job preferences. We can gain a better understanding on such differences by running separate regressions on the male and female samples. Tables 4.12 and 4.13 repeat separate exercise for males and females. The results for older female unemployed job-seekers are insignificant due to the small sample size. Some results for the male and the female samples, such as those on *Health_problems* and number-of-children variables, have similar patterns as those for the full sample.

Focusing on the estimated age parameters, the results for the male and the female sub-samples are similar to those for the full sample. The one exception is for the age effects on the probability that younger males prefer part-time work. More specifically, younger male job seekers' preference for part-time work decreases with age. Older males over 54 are more likely to prefer the two flexible employment modes and, between these two, they are much more likely to prefer part-time employment than self-employment.

This implies that self-employment is always preferred by male unemployed job-seekers. Younger males prefer self-employment to the other two employment modes. As for older male job seekers, part-time employment is preferred the most, followed by self-employment. Female unemployed job-seekers are always more likely to prefer flexible employment and less likely to prefer full-time work compared to their youngest counterparts. These patterns of age-related preference for flexible employment and disinterest in full-time work are most pronounced as unemployed job seekers pass their respective SPAs (65 for males and 60 for females).

### 4.4.3 Brief summary

The most important factor affecting the preferences of both younger and older unemployed job-seekers over full-time work or part-time work is gender. The age bracket is another important factor affecting unemployed job-seekers' preferences for full-time work. The same pattern also holds for older unemployed job-seekers' preferences over part-time work. Qualifications and benefit claimant status also play important roles in affecting older unemployed job-seekers' preferences over full-time work. The effects among the factors affecting job-seekers' preferences over self-employment are similar. The effect of having a health problem is, surprisingly, not as important as the aforementioned factors.

There are also gender differences in the significant variables affecting unemployed job-seekers' preferences. Age is the most important factor affecting younger male job seekers' preferences over full-time work. Being a widow plays an important role in affecting younger male job seekers' preferences over full-time and part-time work. Age, qualifications, industry of the last job and benefit claimant status are important factors affecting older male job seekers' preferences over full-time work. Age also plays an

important role in affecting older male job seekers' preferences over part-time work after the age of 64. In contrast, age and the number of children are the most important factors affecting both younger females' and older females' preferences over full-time and part-time work. There are no gender differences in the important factors affecting job-seekers' preferences over self-employment.

## 4.5 Multinomial logits: employment outcomes for the economically-active

### 4.5.1 Estimation framework

In the second analysis, we estimate multinomial logit models for the employment outcomes of the economically-active. The estimation framework is similar to that in the first analysis. An economically-active individual $i$ engages in one of $j$ economic activities, where $j$=0 is unemployed, $j$=1 is working full-time, $j$=2 is working part-time and $j$=3 is self-employed. A multinomial logit model is estimated for the probability that an individual engages in one of the four distinct economic activities. Let $Y$ be the economic activity engaged in (*EconActivity* in this case). We choose the unemployed group $j$=0 as the reference to normalize Equation (11). As in Equation (12), the probability of an individual being unemployed is given by setting $\beta$=0.

Since the dependent variable *EconActivity* has four categories, we can estimate the log odds of working full-time, working part-time and being self-employed to the baseline category (unemployed). The three non-redundant logit equations are estimated as follows:

(16) $\log[P(\text{working full} - \text{time})/\ P(\text{unemployed})\ ] = \beta_1 X_i$

(17) $\log[P(\text{working part} - \text{time})/\ P(\text{unemployed})\ ] = \beta_2 X_i$

(18) $\log[P(\text{self} - \text{employed})/\ P(\text{unemployed})\ ] = \beta_3 X_i$

As in the first analysis, we estimate six sets of multinomial logit regressions on younger or older people for the male, female and pooled samples.

### 4.5.2 Marginal effects on the employment outcomes of economically-active

Table 4.14 shows the marginal effects from multinomial logits for different employment outcomes of the economically-active. Unemployed workers are the reference group. The regression results of interest are with respect to individuals' gender, health, education, benefit claimant status and age. All males are more likely to work full-time or be self-employed and less likely to work part-time than females. This supports the findings of Taylor (2011) that females are more likely to work part-time and males are more likely to be self-employed. Males are much more likely to work full-time than be self-employed at all ages.

It is not surprising to find that less healthy younger people are less likely to work full-time and more likely to work part-time or be self-employed. Wenger and Reynold (2009) noted that flexible employment can help less healthy people maintain a work-health balance. Less healthy older people are less likely to work full-time or be self-employed and more likely to work part-time. This may be because less healthy older people are less able to run their own business than their younger counterparts.

Younger people with secondary education or above are more likely to work full-time, though they are more likely to prefer self-employment as mentioned in Section 4.4.2. Some results for the education dummies on older people are notably different from those on younger people. Older people with secondary education or above are more likely to work full-time except for those with a degree. Older degree-holders are less likely to work full-time. A possible reason is that older degree-holders have earned enough during their

adulthood and so they are in less need of full-time earnings. They may therefore want to enjoy more work flexibility. This can explain why older people are more likely to be self-employed. Older people with post-secondary or secondary-school level are also more likely to be self-employed.

Younger benefit claimants are less likely to work full-time and more likely to work part-time. It is possible that younger benefit claimants have difficulties in finding full-time jobs and so they end up being part-timers. It is not surprising that they are less likely to be self-employed, possibly due to financial reasons. Older benefit claimants are also less likely to work full-time, but they are more likely to engage in the two modes of flexible employment.

For the younger sub-sample, people aged 20 to 49 are more likely to be self-employed and less likely to work full-time or part-time than people aged 16 to 19. There is an increase in the probability of being self-employed and a decrease in the probability of working full-time as younger people age. The age-profile for part-time employment looks largely flat and slightly concave. As the younger group ages, they are more likely to have accumulated savings to start their own business. For the older sub-sample, people aged over 54 are less likely to work full-time and more likely to work part-time or be self-employed than those in the control group 50 to 54. Older people are more likely to engage in part-time employment than self-employment.

Tables 4.15 and 4.16 repeat the exercise for males and females separately. The most important results to note are for the age profiles. Within the younger male sub-sample, as respondents age they are less likely to work full-time or part-time and more likely to be self-employed. In the older male sub-sample, as respondents age, they are more likely to engage in the two flexible employment modes. Moreover, they are much more likely to

be self-employed than part-time. The results for females are similar to those for males. Females aged 30 to 49 are less likely to work full-time and part-time, and more likely to be self-employed compared to the reference 16-19 age group. Females aged over 54 are less likely to work full-time and more likely to engage in flexible employment compared to the 50-54 reference group. All these patterns become more pronounced when males and females pass their respective SPAs.

### 4.5.3 Brief summary

Many of our results support the findings in previous studies. For example, both younger and older males are more likely to work full-time or be self-employed and less likely to work part-time compared to their female counterparts. In addition, all males are much more likely to work full-time than to be self-employed. The most important factors affecting the entry of younger people into full-time work or part-time work are gender and benefit claimant status. Age also plays an important role in affecting younger people's entry into full-time work. Gender and age are important factors affecting older people's entry into full-time employment, part-time employment or self-employment. The effect of age is much more significant after the age of 64. Benefit claimant status is significant in affecting older people's entry into full-time work.

After running separate regressions on the male and female sub-samples, we find that age and benefit claimant status are the most important factors affecting all males' entry into full-time work. Age also has a significant role in affecting older males' entry into the three types of employment modes and younger males' entry into self-employment. Age, the number of children, qualifications and benefit claimant status are important factors affecting younger females' entry into full-time or part-time work. Marital status, age and benefit claimant status are the important factors in the case of older females. Age plays

an important role in affecting females' entry into self-employment, especially for younger females.

## 4.6 Binomial logits: working part-time involuntarily

### 4.6.1 Estimation framework

In the third analysis, we estimate binomial logit models on the probabilities of part-timers working voluntarily or involuntarily. Consider the probability of working part-time involuntarily conditional on a set of independent variables $X_i$ and model parameters $\beta$ as follows:

$$(19)\quad P(Y = 1 \mid X) = \frac{\exp(\beta, X_i)}{1+\exp(\beta, X_i)}$$

$P$ is estimated by logit modelling with the log-likelihood function $l$ as follows (StataCorp., 2005):

$$(20)\quad l\,(\beta) = \sum_{i=1}^{N} \left\{ Y_i \ln F\,[X_i\beta] + (1 - Y_i)\ln(1 - F\,[X_i\beta]) \right\}$$

where $F$ is the logistic cumulative density function, $Y$ is the dummy for working part-time involuntarily (*InvoluntaryPT*) and $N$ is the total number of cases. We estimate six sets of binomial logit regressions on younger or older people for the male, female and pooled samples.

### 4.6.2 Marginal effects on working part-time (in)voluntarily

Table 4.17 shows the marginal effects from binomial logits for working part-time involuntarily on the sub-sample of part-time workers. As noted in Section 4.2, we define

involuntary part-timers as those who look for different or additional paid work, or who would like to work longer hours at their current rate of pay (UK Data Archive Study Group, 2011). The results of interest in these regressions are with respect to individuals' gender, health, education, various job characteristics, benefit claimant status, survey year and age.

Male part-timers are more likely to work involuntarily than female part-timers. The results of the previous two analyses show that, compared to females, males are less likely to prefer part-time work and less likely to actually work part-time. The results in this section show that males who do work part-time may not be happy with their part-time status. They may be unable to find their preferred employment mode (full-time work) and are 'forced' to work part-time. The probability of younger-male part-timers working involuntarily is higher than that of their older counterparts by about 13%.

There are gender differences in the effect of health problems on the preferences for part-time work. For this sub-sample of part-timers, less healthy males are less likely to be part-timers involuntarily, whereas their female counterparts are more likely to be part-timers involuntarily. Part-time work is a suitable choice considered by less healthy males to balance work and health. As shown in the previous two analyses, less healthy females are more likely to prefer part-time work or self-employment but they are more likely to work part-time. Less healthy females may be 'forced' into part-time work because they cannot find their preferred employment mode (self-employment).

Part-timers with secondary school qualifications or above are increasingly likely to work voluntarily (except for some older-female part-timers). The higher the education status of a part-timer is, the lower his/her probability of working part-time involuntarily. As noted in the previous section, more educated people want to enjoy more work

flexibility. Thus they should be happier in working part-time.

Variables related to job characteristics are included to study their effect on involuntary part-time work. All part-timers who work in the private sector or at home are less likely to do so involuntarily. Also, the longer the working hours or tenure of part-timers, the less likely they are to do so involuntarily. It is notable that temporary part-timers are more likely to work part-time involuntarily than permanent part-timers. This implies that they may be unable to find their preferred permanent jobs and are 'forced' into temporary part-time work. Younger part-timers with secondary jobs are less likely to work part-time involuntarily, whereas older part-timers with secondary jobs are more likely to do so involuntarily. It is possible that older part-timers with a secondary job work part-time involuntarily and so take on a secondary job to supplement their income. This can also explain the higher probability of being a benefit claimant among those working part-time involuntarily (except for younger females). Part-time work may not be their preferred employment mode.

Most estimates of the year dummies show increasingly positive signs compared to the initial base year 2001. This shows that with the passage of time part-timers have been increasingly likely to be working part-time involuntarily compared to those in the early 2000s. People aged 20 to 49 are less likely to work part-time involuntarily compared to those aged 16 to 19. All those over 54 are less likely to work part-time involuntarily compared to those aged 50 to 54. Therefore, regardless of gender, people are more willing to work part-time as they age.

### 4.6.3 Brief summary

The results of the binomial logits shed light on the factors affecting part-timers'

attitude towards being part-timers. For younger workers, gender is the most important factor affecting preferences for part-time work, with females having a greater preference for it. For older workers, age is the most important factor affecting part-time work preferences and gender is much less important. After running separate regressions on males and females, age is still the most important factor affecting both older-male and older-female part-timers' attitude towards part-time work. Part-timers aged over 54 are less likely to do so involuntarily, compared to the 50-to-54 reference group. Part-time employment is therefore more likely to be a voluntary choice for older workers.

## 4.7 Conclusion

Flexible employment is a popular employment mode among older people. As suggested by Morris and Mallier (2003), flexible employment can extend working lives by acting as a bridge between full-time employment and retirement. However, many studies on the employment of older people have focused on regular full-time employment. We extend the work of Lissenburgh and Smeaton (2003) by investigating the job preferences of older people (versus younger people) in addition to employment outcomes. The results from multinomial logit and binomial logit regressions shed light on the efficiency of labour markets in matching older workers' job preferences with their labour market outcomes. We can also learn why older people work part-time (in)voluntarily. All these have implications for government policies dealing with an ageing workforce. We note the significant results found in the various regressions and provide some policy recommendations.

We can combine the results of the first two analyses to learn the relationships between people's job preferences and employment outcomes. Unemployed job-seekers with a particular attribute may have a greater preference for a particular employment

mode, but the economically-active with the same attribute may have a higher probability of entering a different employment mode. Full-time employment is the most popular employment mode among males, followed by self-employment and then part-time employment. Although older males over 54 are much more likely to prefer part-time employment than self-employment (compared to older males from 50 to 54), their probability of entering part-time employment is similar to that of entering self-employment.

Younger females are more likely to prefer part-time work but less likely to undertake it. As these younger females age they exhibit an increased preference for self-employment. In contrast, the sub-sample of older females is more likely to prefer and enter flexible employment. This implies that older females can meet their employment preferences compared to their younger counterparts and find part-time work preferable to self-employment. Regarding the voluntary and involuntary nature of part-time employment, both males and females are more willing to work part-time as they age. Part-time employment is therefore more likely to be a voluntary choice regardless of gender and age.

As noted by Loretto *et al.* (2009), the UK government has taken various measures to encourage older people into work. These include the set-up of an Extending Working Life Group within the Department for Work and Pensions and the increase of females' SPA from 60 to 65 by 2020. Our results show that older people are more likely to prefer and enter flexible employment. Also, part-time employment seems to be a voluntary choice for them. The UK government can therefore take a larger step by promoting flexible employment among older people.

We suggest two policy recommendations aimed at promoting flexible employment

among the ageing workforce. Firstly, the government can provide targeted help towards older male unemployed and those unemployed for less than 5 years. As older workers age, they are much more likely to *prefer* part-time employment to self-employment but their probability of entering part-time employment is similar to that of entering self-employment. The probability of males over 65 entering part-time work is even smaller than that that of being self-employed. This implies that older males may have difficulties in finding part-time work. There are two possible reasons for this. Firstly, older males may have worked full-time when they were young and so they are not familiar in finding part-time employment. Secondly, employers are not willing to employ older males, especially those over 65, either as part-timers or full-timers. Furthermore, older job-seekers unemployed for less than 5 years are more likely to have no job preferences. This implies that they may have difficulties in seeking either full-time or flexible work. On the demand side, the Government can implement measures such as the provision of financial subsidies to encourage firms to employ older people as part-timers. On the supply side, the Extending Working Life Group can help older people (especially males) to find part-time work by providing easier access to information on part-time vacancies.

Secondly, the Government should implement measures to encourage flexible employment among older benefit claimants. The results of the first analysis suggest that older benefit claimants are more likely to prefer full-time work and less likely to prefer part-time work. This may be due to the limitations of pension rules associated with part-time work. Many pension rules around Europe forbid companies from allowing part-time employees to draw a part of pension to supplement their earnings (Butrica *et al.*, 2006). This may discourage older benefit claimants from taking part-time work. For promoting part-time employment among older people, the Government should adjust the pension scheme to cover part-timers (and other flexible workers). If older benefit claimants are

allowed to receive benefits and work flexibly at the same time, they may be more willing to choose part-time work. In any case, self-employment is a popular choice among older males. However, older benefit claimants are less likely to prefer self-employment. A possible reason is that they do not have enough start-up funds for self-employment. The Government could initiate business start-up schemes such as the provision of funds or loans to encourage older benefit claimants into self-employment.

There is one implication for further research. Although we can model the effect of various factors on employment outcomes, detailed information on when individuals leave the original state and transits into another state is ignored. If we wish to know the effects of various factors on employment duration and even unemployment duration, we need to conduct analyses on panel data. Further research addressing this issue is carried out in Chapter 6 using the BHPS data.

# CHAPTER 5

# UNEMPLOYMENT AND EMPLOYMENT DURATIONS: A LITERATURE REVIEW

## 5.1 Introduction

The previous chapters provided detailed analyses on the job preferences and employment outcomes of older people, but these have been static analyses looking at employment modes at any one moment in time. In this chapter we review past research that has addressed similar questions from a dynamic perspective in terms of how long these employment modes last. In the next chapter we will carry out our own dynamic duration analyses on employment modes.

As discussed in the previous chapters, since the 1990s we have observed an increased proportion of older people in work. The OECD (1998) noted that in 1996 unemployment rates of people aged 45 to 64 were lower than the overall rates in most OECD economies. However, older people's mobility from unemployment to re-employment was often lower than that of younger people (Laczko and Phillipson, 1991; OECD, 1998). Tatsiramos (2010) suggested two possible reasons for this. First, older people may find re-employment difficult due to poor employment prospects. Second, there may be disincentives to being re-employed due to a combination of extended unemployment benefit periods and early retirement schemes. As older people are becoming increasingly important in the workforce, the duration of their unemployment spells before re-employment or retirement deserves policy attention.

In addition to the issue of unemployment duration, policy makers need to pay attention to how long older people stay in various types of employment spells. Some older

people may either choose to work full-time before retirement and postpone the bulk of their leisure until after retirement, or choose to engage in flexible employment thus extending their working lives and enjoying more leisure earlier on. It is important to know whether older people in a particular employment mode are more likely to stay in the labour market, so that the Government can provide appropriate assistance to help them into early retirement or to support work as bridge employment before retirement.

Chapter 3 reviews studies on flexible employment of all workers but particularly older ones. This chapter provides a deeper literature survey on duration studies by various types of economic activity. Section 5.2 provides a general overview of the various approaches for analyses on this theme. Section 5.3 discusses the background and various types of survival analyses. Sections 5.4 and 5.5 discuss past empirical studies based on the initial labour market states under consideration. Section 5.6 discusses studies specific to older people. A final section concludes.

## 5.2 General overview of approaches used in duration studies

Most of the studies discussed in next sections used panel datasets for their analyses because panels have information on individuals' work history, such as unemployment duration, previous and current job characteristics etc. Some used regression techniques for cross-sectional data to study the issue of unemployment and employment durations. For example, Muhleisen and Zimmermann (1994) analysed the effect of unemployment histories on job mobility by estimating binomial probit models for German data. Bruce and Schuetze (2004) estimated LPM on the effect of self-employment duration on the probabilities of subsequent part-time employment and unemployment for the U.S. Hyytinen and Rouvinen (2008) estimated logit models to investigate the influence of short self-employment duration on Europeans' earnings after re-entering paid employment.

There are also panel studies which account for unobserved heterogeneity across individuals in the estimation of binary dependent variable models. For instance, Corcoran and Hill (1985) used a fixed-effect logit model to examine whether unemployment in one period leads to subsequent unemployment for US men. Glocker and Steiner (2007) estimated fixed effects LPM to study the effect of previous unemployment on the entry into self-employment in Germany.

Despite the popularity of the above techniques, Jenkins (2005) discussed various problems of applying the OLS regression approach in duration studies. The most pertinent of these is that OLS regressions generate biased estimates on censored or truncated survival data and many panel datasets often have censoring or truncation problems. The problem of censoring exists when the duration of the initial status is incomplete at the left/right side (left/right censoring) of the observation period. In contrast, the problem of truncation exists when cases are systematically excluded from the sample because their survival times are shorter (left truncation) or longer (right truncation) than a specified amount of time. OLS regressions can only be carried out by excluding all the censored or truncated data, or by treating all the censoring or truncation as "complete" but then the estimated slopes of the OLS regressions are biased. The second major problem is that OLS regressions cannot handle time-varying covariates. We can only choose one value of a time-varying covariate at a period to be included in the regressions. If we choose a value at the time before any transition occurs or when the spell starts, much information, such as individuals' transition time, are lost.

Cleves *et al.* (2010) suggested another problem when using OLS regression techniques in duration studies. One of the common assumptions of OLS regressions is a normal distribution of the residuals. However, assuming normality of time to an event in

duration analyses is not reasonable. The instantaneous probability of an event occurring should not be assumed to be constant over time. Thus they believed that the normality assumption is the actual problem of applying OLS regressions in duration analyses. Jenkins (2005) also discussed the problems of applying binomial (or multinomial) dependent variable models such as logit and probit models in duration studies. He identified two main problems. First, in binomial (or multinomial) dependent variable models though one can model transitions by treating the continuous survival times before transitions as various bands, more detailed information on when an individual leaves the spell are lost. Second, grouping the survival times and values of time-varying covariates creates measurement error. Because of the problems discussed above, common techniques such as OLS regressions and binomial dependent variable models are not suitable for studying unemployment and employment durations. As noted by Jenkins (2005), we need approaches which can account for the sequential and time-varying nature of the survival data, and also handle the censoring problem. Survival analysis is the most suitable approach.

## 5.3 Survival analyses

Danacica and Babucea (*n.d.*) noted that the use of survival analysis, which involves the modelling of duration data, first came from medical research. Survival analyses are widely used in socio-economic studies to explore issues such as unemployment, inflation, bank loans and life expectancy of consumer goods. There are various kinds of survival analyses, namely non-parametric, semi-parametric and parametric analyses.

### 5.3.1 Non-parametric analyses

Non-parametric analyses allow the investigation of the hazard function which is

the instantaneous probabilities of leaving a state conditional on surviving to time $t$ (Georgellis *et al.*, 2007). The hazard function is formulated as follows (Cleves *et al.*, 2010, p.7):

$$(21)\quad h(t) = \lim_{\Delta t \to o} \frac{P(t+\Delta t > T \geq t \mid T \geq t)}{\Delta t} = \frac{f(t)}{S(t)}$$

where $S(t) = 1 - F(t) = P(T > t)$ and $f(t) = \frac{d\,F(t)}{d\,t} = \frac{d}{d\,t}[1 - S(t)] = -S'(t)$. $T$ denotes the survival time or duration in a state, $F(t)$ is the cumulative distribution function of $T$, $S(t)$ is the survivor function which is the probability of surviving beyond time $t$, or simply the reverse cumulative distribution function and $f(t)$ is the density function. Jenkins (2005) noted that these analyses are "non-parametric" in the sense that they make no prior assumptions on the shapes of the hazard functions. The Kaplan-Meier estimator, proposed by Kaplan and Meier (1958), is a popular non-parametric method[38]. Many studies discussed in previous sections have applied this method for preliminary evaluation on the hazard functions of the economic state (Katz and Meyer, 1990; Arrow, 1996; Hunt, 1999; Martinez-Granado, 2002; Haardt, 2006; Georgellis *et al.*, 2007).

### 5.3.2 Parametric analyses

Cleves *et al.* (2010) noted that, compared to non-parametric analyses, parametric analyses (and semi-parametric analyses discussed in Section 5.3.3) are "parametric" in the sense that they make an assumption on how the vectors of covariates $x_i$ determine the probability of an event. Frees (2004) noted that binomial or multinomial dependent variable techniques model the probability of transition from one state into another. In

[38] There are other kinds of non-parametric methods such as the life table estimator. However, we only discuss the Kaplan-Meier estimator because of its popular use in duration studies.

contrast, parametric (and semi-parametric) proportional hazards regressions model the natural logarithm of the hazard rate function as follows (Cleves *et al.*, 2010, p.129):

$$(22)\quad h\,(t\,|x_i) = h_0\,(t)\;\; e^{x_i\,\beta_j}$$

where $h_0\,(t)$ is the baseline hazard function which corresponds to the probability of state transition when all values of the regressors are equal to zero, $x_i$ is the vector of regressors and $\beta_j$ is the vector of regression coefficients. Cleves *et al.* (2010) explained that the task in parametric model is picking a functional form for $h_0\,(t)$. The exponential component is for parameterizing the shift caused by spells having different values of covariates. All parametric models have a corresponding hazard functions such as assuming constant baseline hazard over time ($h_0\,(t) = e^a$) in exponential models, where *a* is an extra parameter to be estimated. Weibull and Gompertz models are also popular parametric proportional hazards models for modelling data with monotone hazard rates that change exponentially over time. The choice of parametric models depend on researchers' assumption on the functional form of $h_0\,(t)$.

### 5.3.3 Semi-parametric analyses

The Cox (1972) proportional hazards model is a popular semi-parametric method used in studies on unemployment and employment durations. There are three main advantages of using the Cox model (Jenkins, 2005; Georgellis *et al.*, 2007; Cleves *et al.*, 2010). Firstly, parametric models make assumptions on the distribution of the baseline hazard function. Incorrect assumptions will produce misleading estimates of the $\beta_j$ parameters. However, the Cox proportional hazards model does not need to specify the functional form of the baseline hazard function. Thus it is much more popular than

parametric models in studies of unemployment or employment duration[39].

Secondly, the Cox models can handle censoring of survival times because of their use of the partial likelihood function. They compute the hazard estimates only at times of failure using the risk pools available at each of the failure times, so as to calculate the likelihood function. The partial likelihood function considers probabilities of failed cases. It explicitly neglects probabilities of censored cases and uses the information on survival times before censorship instead. All those cases censored after failure time *t* is part of the risk pool used to compute the likelihood function at time *t*. The maximization of the partial likelihood loses efficiency but the estimates are robust, consistent and asymptotically normal (Lancaster, 1990; Smith and Smith, 2004).

Thirdly, because of the nature of partial likelihood function discussed above, the Cox models can incorporate time-varying covariates into the analyses (Jenkins, 2005). For these reasons, the Cox proportional hazards model is preferable to the OLS and binomial (or multinomial) dependent variable models in studies of unemployment and employment durations. It is also preferable to parametric models when researchers are not sure about the shape of the baseline hazard function. Based on the number of exit states under consideration, the Cox models, and other proportional hazards models, can be classified as single risk or competing risks models. We compare these two kinds of hazards models in Section 5.3.5.

[39] The expense of having an unspecified baseline hazard function is that the resulting estimates are not as efficient as those in a correctly specified parametric model (Fox, 2002).

### 5.3.4 Accounting for unobserved heterogeneity

The models described in the previous sub-sections assume that all differences between observations are captured by observed explanatory variables *X*. Unobserved differences between observations can be introduced into survival analyses and they are usually referred to as "frailty" in biostatistics (Jenkins, 2005). Consider the hazard rate function as follows:

$$(23)\quad h\,(t,\ x_i \mid v) = v \cdot h\,(t,\ x_i)$$

The difference between this hazard rate function and the one discussed in Section 5.3.2 is the introduction of unobserved heterogeneity by including a multiplicative factor $v$. It is assumed that this random variable takes on positive values, has normalized unit mean, has finite variance and is distributed independently of $X$ and $t$. Equation (23) is referred to as a "mixture" model or "mixed proportional hazard model" (Jenkins, 2005). Individuals with values above the mean of $v$ will leave faster, and vice versa. Jenkins (2005) explained that the estimation of the mixed model depends on choosing a functional form for the distribution of $v$ such as the Gamma distribution or the Inverse Gaussian distribution.

As suggested by some early literature such as Lancaster (1985), Ham and Rea (1987) and Meyer (1990), there are three possible consequences of not accounting for unobserved heterogeneity in survival analyses. Firstly, unobservable characteristics such as motivation, ability and social relationship may influence the duration of finding jobs or staying in the present work position and bias the effect of the regressors (D'Addio *et al.*, 2005; Jenkins, 2005). Secondly, there may be measurement errors in the observed

survival times or covariates (Lancaster, 1990). Thirdly, unobserved heterogeneity may affect inferences about the shape of the baseline hazard function (Jenkins, 2005)

Nevertheless, there is also literature discussing that accounting for unobserved heterogeneity may not be necessary for two reasons. First, Lancaster (1985), Ham and Rea (1987) and Meyer (1990) pointed out that if the baseline hazard function is allowed to be nonparametric, not accounting for unobserved heterogeneity may not bias the estimates. Second, Narendranathan and Stewart (1993) suggested that introducing a misspecified regression term to capture unobserved heterogeneity may cause distortion to the estimation, and so has little improvement to the estimation.

### 5.3.5 Single risk versus competing risks hazards models

Single risk models are survival models which consider one exit state from any type of spell. They restrict the baseline hazards and the estimates for covariates for all potential exit states to be the same. Studies described in Sections 5.3 to 5.5 such as Taylor (1999) and Booth *et al.* (2002) are examples of single risk models. However, D'Addio and Rosholm (2005) noted that individuals typically exit from unemployment into different states. Thus the estimates of single risk hazards models may have aggregation bias on exit states. Single risk models are suitable for comparing the exit from different initial states into the same exit state.

In contrast, competing risks models estimate survival times jointly with more than one exit state. Cleves *et al.* (2010) stated that competing risks models consider the cause-specific hazard function which is the instantaneous probability of leaving a state from a specified cause, provided that no risk from any cause has yet happened. Suppose that there are five causes of failure and let $j$ be the variable denoting the cause of failure. The

cause-specific hazard function for cause $j$=1 at time $t$ is formulated as follows (Cleves *et al.* 2010, p. 366):

$$(24)\quad h_1(t) = \lim_{\Delta t \to 0} \frac{P(t+\Delta t > T \geq t, j=1 \mid T \geq t)}{\Delta t}$$

where $T$ denotes the time to first failure from any cause. The overall hazard rate is

$h(t)=\sum_{j=1}^{5} h_j(t)$. The probability of risk from $j$=1 is $h_1(t)/h(t)$. The estimation of a cause-specific hazard function is similar to that of a hazard function. Examples of studies from Sections 5.4 to 5.6, which applied competing risks models, are Theeuwes *et al.* (1990), Boheim and Taylor (2000), Reize (2000), D'Addio and Rosholm (2005), Kupets (2006). Georgellis *et al.* (2007) and Millan *et al.* (2012) are among the few studies applying both single risk and competing risks models. Compared to single risk models, competing risks models avoid committing state-aggregation bias and can provide more detailed results on the different effects of regressors on the hazard rates by various exit states.

## 5.4 Studies on the duration of unemployment

The effect of elapsed spell duration is often one of the main concerns in many duration studies. Studies on duration dependence[40] have been popular since the 1980s. Many of these focus on exit from unemployment and are based on job search theory[41] proposed by early studies such as McCall (1970) and Mortensen (1977). As noted by Yoon (1981), search theory assumes that an unemployed individual has knowledge of the

[40] The term "duration dependence", as defined by Pedersen and Westergard-Nielsen (1993), refers to the effect of the time spent in a particular labour market state on the probability of transitions into other states.
[41] Many studies on other kinds of duration dependence, such as those discussed in Sections 5.5 and 5.6, are also based on job search theory with different considerations of the initial and the final states.

job offer distribution and the fixed search cost of each offer per period. He or she draws a job offer and decides whether it is better than any likely future offers. If the expected marginal benefit gained from searching for the future offer exceeds the marginal search cost, the individual remains unemployed. The duration of unemployment stops when the individual gets an acceptable job offer.

Pedersen and Westergard-Nielsen (1993) noted that negative duration dependence was the common finding in many studies on unemployment spell duration[42]. This means that the escape rate from unemployment decreases with the duration of unemployment spells. We discuss studies on unemployment duration in three parts. The first part focuses on the transition from unemployment into employment (or inactivity). The second part focuses on the transition from unemployment into various types of employment. The third part focuses on both unemployment and employment durations.

### 5.4.1 From unemployment to employment (or inactivity)

Dynarski and Sheffrin (1990) is an early study analysing the relationship between unemployment duration and cyclical movements in unemployment in the U.S. They used the PSID from 1980 to 1982 to analyse unemployment durations by using Cox proportional hazards models. Their results showed that individual unemployment duration increases with the aggregate unemployment rate. Also, under good economic conditions, probabilities of re-employment increase among all workers, especially among those with the longest unemployment duration.

[42] There are also employment-duration studies which have reached similar results. Arrow (1996) used the GSOEP from 1984 to 1985 and estimated the Cox proportional hazards model to study the effect of health related variables on employment duration. His results showed that female workers are at a higher risk of being unemployed than male workers if they have long illness or chronic illness. Also, workers who had experienced unemployment in the past are more likely to be at risk of renewed unemployment than their counterparts without past unemployment experience.

Muhleisen and Zimmermann (1994) analysed the effect of unemployment histories on job mobility using the German Socio-Economic Panel (GSOEP) from 1984 to 1989. They estimated binomial probit models on the transitions into employment and included a dummy on previous unemployment duration in their analysis. A simulation estimation technique was used to control for unobserved heterogeneity. They found no evidence that foreign workers induce unemployment of locals in Germany. Foreigners and more educated workers escape from unemployment faster than their local or less educated counterparts. Age seems to have no significant influence on job mobility. Also, they found that past unemployment causes future unemployment, which supports similar findings in many other studies.

Kupets (2006) is among the few studies examining the determinants of unemployment duration in developing economies. He used the Ukrainian Longitudinal Monitoring Survey (ULMS) from 1998 to 2002 to study the determinants of unemployment duration. His results on the two competing risks hazards model showed that there is positive duration dependence of the hazards from unemployment to employment. Duration dependence becomes negative after the fourteenth month of unemployment. This non-monotonic pattern is different from the results for many developed economies where negative unemployment duration dependence exists.

There are also studies exploring the effect of a particular factor on unemployment duration. Katz and Meyer (1990) studied how the level and duration of unemployment insurance (UI) benefits affect the unemployment duration in the U.S. First, they examined the unemployment spells of UI recipients and non-recipients using the PSID from 1980 to 1981. Their plots for the unemployment duration hazard functions[43] show that

[43] Katz and Meyer (1990) parameterise these as Kaplan-Meyer hazard functions.

unemployment duration distributions differ between UI recipients and non-recipients. There are sharp increases in the exit rate of UI recipients from unemployment when their benefits are nearly exhausted. Second, they estimated hazards models of the effect of the level and duration of UI benefits on unemployment duration using the Continuous Wage and Benefit History (CWBH) UI administrative records from 1978 to 1983. Their results showed that a one-week increase in the benefit duration increases the mean unemployment duration of UI recipients by 0.16 to 0.20 weeks.

Stewart (2001) studied the effect of health status on unemployment duration of Canadians. He used the 1995 Canadian Out of Employment Panel (COEP) to estimate the Prentice-Gloeckler-Meyer (PGM) proportional hazards model on unemployment duration. His results show that previous factors of job termination due to illness and reported health limitation have a negative influence on the hazard rate. Individuals reporting either illness or health limitations have lower probabilities of finding a job, whereas individuals with both characteristics have much longer unemployment spells.

Haurin and Sridhar (2003) focused on the impact of local unemployment rates on individuals' reservation wages and unemployment duration in the U.S. They used the PSID from 1984 to 1987 to estimate OLS models and selection-corrected two stage least squares (2SLS) models. They found that local unemployment rates have no significant effect on reservation wages or unemployment duration. There is no evidence that individuals have lower reservation wages in areas with higher unemployment rates. Thus policies aimed at reducing unemployment should focus on increasing labour demand.

### 5.4.2 From unemployment to various employment modes

There are also unemployment-duration studies focusing on transitions into one or

more types of employment. Self-employment is often the most common type of employment under consideration. For example, Alba-Ramirez (1994) used Spain's Working and Living Conditions Survey (ECVT) in the fourth quarter of 1985 and the U.S.'s DWS in 1984, 1986 and 1988 to study the effect of unemployment duration on the entry into self-employment. He estimated two binomial probit models, one for the entry into self-employment from wage work and the other one for entry into self-employment from unemployment. Among the independent variables he included demographic and previous job characteristics of individuals. His results show that unemployment duration increases the probabilities of being self-employed in both countries. Part-time workers and workers not covered by any social security plans are more likely to be self-employed. In Spain, those self-employed who have no employees earn less than their paid counterparts.

Reize (2000) examined the effect of unemployment duration on the transitions into self-employment. He used the first 14 waves of the GSOEP from 1983 to 1996 to estimate discrete time hazards models controlling for unobserved heterogeneity. His results show that there is no effect of unemployment duration on the transition into self-employment. Furthermore, unemployed individuals entering self-employment are generally more educated and face a lower risk of being unemployed again than those entering paid employment.

However, Glocker and Steiner (2007) reached different conclusions to those of Reize (2000). They used a pseudo-panel dataset, self-constructed from the German Microcensus from 1996 to 2002, to study the effect of previous unemployment on the entry into self-employment. Their fixed effects linear probability estimates showed that previous unemployment significantly increases the probability of being self-employed regardless

of gender. However, this effect is not significant for older people. The entry rates into self-employment among males are much higher than those of females. This supports the findings of earlier studies, such as Evans and Leighton (1989) and Blanchflower (2000) already discussed in Chapter 3.

Boheim and Taylor (2000) analysed the effect of individual and labour market factors on the probabilities of unemployment spells ending with the transitions into four economic activities, namely: full-time employment, part-time employment, self-employment and economic inactivity. They used the BHPS from 1991 to 1997 to estimate discrete time hazards models. Their descriptive statistics suggested that unemployment spells of females are shorter than those of males due to females' tendency to transit into part-time employment or economic inactivity. Moreover, their results on duration analyses suggested that policies aimed at reducing unemployment duration and encouraging full-time employment should be targeted towards individuals aged 25 or over. Females with children have lower transition rates from unemployment into full-time work than males and childless females.

### 5.4.3 Studies on both unemployment and employment durations

There have been several studies on both unemployment and employment durations since the 1990s. These studies' findings are similar to those focusing on either unemployment or employment durations but they provide a more thorough investigation on individuals' work histories. Theeuwes *et al.* (1990) analysed the transitions among three economic activities (employment, unemployment and economic inactivity) in the Netherlands using a self-constructed pseudo-panel dataset based on the Dutch 1985 National Survey. Their estimates of a three-state hazards model showed that significant duration dependence is only found in a few cases. They found age, education and work

experience to be the important factors affecting the transitions among economic activities for both genders. Family and child-related variables have important effects on the transitions among the economic activities of females but not of males. These results are similar to many findings in the employment literature such as Miller (1997) and Zissimopoulos and Karoly (2007).

In contrast to other duration-dependence studies, Hunt (1999) considered not only employment and unemployment spell durations but also non-employment durations. He used the GSOEP from 1990 to 1996 to estimate Cox proportional hazards models on the transitions out of employment, unemployment and non-employment. He found that the results on unemployment and non-employment spell durations are similar. Females and those over 50 have longer non-employment durations, whereas individuals that are more educated have shorter non-employment durations. The presence of children seems not to be an important factor in explaining the various transitions. Furthermore, higher individuals' wages in 1990 decrease non-employment and employment spell durations. However, the addition of covariates such as individuals' wages in 1990 explains most of the gender difference in employment duration but explains little in the case of non-employment duration.

## 5.5 Studies on the durations for various types of employment

In addition to studies on either unemployment or employment duration, there are also studies focusing on the durations of various types of employment. Most of these explore self-employment durations. As noted by Georgellis *et al.* (2007), there exist relatively few studies on the survival of, and exit from, self-employment compared to studies on entry into self-employment. Many studies on self-employment durations consider either a unique exit state (leaving self-employment) or multiple exit states such

as entering paid employment or unemployment.

Carrasco (1999) used the Spanish Continuous Family Expenditure Survey (ECPF) from 1985 to 1991 to examine the factors influencing the entry decision into self-employment and the probabilities of remaining self-employed. She estimated binomial logit models on the probabilities of transition from paid-employment into self-employment, multinomial logit models on the probabilities of transitions from unemployment into self-employment or paid employment and discrete hazard models on self-employment duration. Her results showed that unemployed workers are more likely to be self-employed than working for pay. Nonetheless, they face more difficulties in sustaining their business than ex-employees. Moreover, the probability of exiting from self-employment decreases with longer self-employment duration. Individuals with more assets, more education and middle-aged workers are more likely to move into self-employment.

Taylor (1999) studied self-employment durations in the U.K. using the BHPS from 1991 to 1995. His estimates of the Cox proportional hazards model showed that 40% of the self-employed who started their business since 1991 do not survive beyond the first year of business. A significant proportion of individuals terminate their business because they move into another form of employment instead of facing bankruptcy. The "fittest" individuals in terms of self-employment survival are those who are working before starting the business, that is, those who quit their previous paid work and those who have some start-up capital for their business.

Bruce and Schuetze (2004) used the PSID from 1979 to 1990 to investigate the influence of short self-employment duration on subsequent labour market outcomes and wages in the U.S. Their estimation framework was in two parts. In the first part, they

estimated OLS regressions on log wages and found no evidence that short self-employment duration increases wages relative to continued paid employment. They found that an additional year of self-employment experience decreases male earnings in subsequent paid employment by 3% to 11%. In the second part, they estimated LPM on the effect of self-employment duration on the probabilities of subsequent part-time employment and unemployment. They found that a short spell of self-employment raises the probabilities of part-time employment by 10% to 30% and that of unemployment by 3% to 10%.

Georgellis *et al.* (2007) studied UK self-employment durations by focusing on the effect of self-reported job satisfaction and non-pecuniary aspects of self-employment. They estimated single risk models on the probabilities of exiting from self-employment and competing risks models on the probabilities of exiting to various states using the BHPS from 1991 to 1998. Their results suggest that job satisfaction is important in explaining self-employment duration. Three out of the five measures of job satisfaction seem to be most treasured by the self-employed: satisfaction from pay, sense of job security and work initiative.

Hyytinen and Rouvinen (2008), similarly to Bruce and Schuetze (2004), investigated the influence of short self-employment duration on individuals' earnings after re-entering paid employment. They used the European Community Household Panel (ECHP) covering 15 European economies from 1994 to 2001 and carried out three separate analyses. In the first part, they conducted an unconditional difference-in-difference analysis on earnings from self-employment and subsequent earnings after re-entering paid work. Their results show that there is a large wage differential between those who experienced self-employment and those with continuous paid-employment. In the second

part, they estimated OLS regressions on log wages. Their results suggest that the self-employed to employee wage differential is actually larger than that found in the first part of their analysis. In the third part, logit models on labour market outcomes were estimated. They found that self-employment is an involuntary choice among unemployed individuals, especially for more educated ones. This can explain the large *ex post* wage difference. Their results indicate that Europeans move into self-employment involuntarily.

Millan *et al.* (2012) provide a recent study on the determinants of self-employment duration in Europe. The first part of their study considers the effect of individual-level factors on self-employment duration, whereas the second part considers the effect of macro-level factors such as regional covariates. Similarly to Hyytinen and Rouvinen (2008), they used the ECHP from 1994 to 2001 to estimate discrete choice models. First, they estimated single risk proportional hazards models on self-employment duration. Second, they estimated competing risks models on the transitions from self-employment into paid employment, unemployment, or economic inactivity. Their results show that education and previous paid-employment experience increase self-employment durations. The entry into self-employment from unemployment has a strong negative impact on self-employment durations. Nonetheless, the macro-level factor of aggregate expenditure on start-up incentives also increases self-employment durations, especially for individuals who are unemployed before starting their business.

There are also studies on temporary-employment duration, e.g. Booth *et al.* (2002), discussed in Chapter 3. Another example is D'Addio and Rosholm (2005) which assessed the effect of temporary-employment duration on the transitions into permanent employment and non-employment. They used the ECHP from 1994 to 1999 to estimate competing risks hazards models on transitions from temporary employment into

permanent employment and non-employment. Both specifications with and without the control of unobserved heterogeneity are applied. They find that there is a higher probability of getting a permanent job for females with longer temporary-employment durations. Males who have been working temporarily for more than three years are more likely to enter non-employment. Moreover, previous labour market status has a strong influence on job stability. Temporary jobs are often associated with low earnings, especially for incomers from non-employment.

Finally, there are also studies which have explored unemployment durations and various types of employment durations. Martinez-Granado (2002) explored the effect of individual and time-varying economic factors on transitions among three economic activities: unemployment, paid employment and self-employment. He used the BHPS from 1991 to 1993 to estimate competing risks Weibull proportional hazards models on movements from any of the three states into the others. He found that both unemployed and employed individuals tend to enter self-employment when unemployment rates are high. The reasons for unemployed and employed individuals to do so are different. Under adverse economic conditions, unemployed individuals perceive that they are less likely to find waged employment and therefore seek self-employment. However, the long-term unemployed have lower probabilities of moving into self-employment due to a loss of human capital or insufficient information to start a business. Some employees may perceive that they may have poor career prospects and so quit their jobs in order to start their own business.

## 5.6 Duration-dependence studies on older people

There are a few duration-dependence studies focusing on either unemployment or employment durations for older people before retirement. Meghir and Whitehouse (1997)

explored the unemployment and employment durations of UK males over 40 and the determinants of their retirement age. They used the UK Retirement Survey from 1988 to 1989 to estimate a multiple spell transition model of moving in and out of work. Their non-parametric analysis suggested that males in occupational pension schemes have longer employment duration than non-OP participants. Nevertheless, their exit rates from work increase after the age of 50. Furthermore, their results for multiple spell transition models showed that increases in wages delay job exits, whereas increased social security benefits delay re-employment. This implies that financial factors are important in determining one's retirement age.

Miniaci (1998) used the 1995 Italy's Survey on Income and Wealth of Households (SIWH) to analyse retirement behaviour. First, he estimated multinomial logit models to study the effect of various socio-economic factors on the retirement age and transitions out of employment by gender. He found that years of pension contributions have a positive effect on the probabilities of both males' and females' retirement. The effect of pension-contribution years on males is positive at first but later becomes negative on the probability of transiting into another non-retirement state. In contrast, the effect is always negative for females. Second, he estimated Cox proportional hazards model with two exit states, which are retirement and others. His results showed that younger cohorts tend to retire earlier, whereas more educated and the self-employed tend to retire later. Moreover, females tend to exit from the labour force beyond the standard retirement age.

Chan and Stevens (2001) used three HRS waves in 1992, 1994 and 1996 to study the effect of job loss on the employment probabilities of older US workers. They estimated discrete time hazards models on the probabilities of returning to work and exiting this new employment. Their results show a substantial and long-lasting effect of

job loss on the future employment probabilities of older displaced workers. The employment rate of displaced workers after four years of job loss remains 20% lower than that of non-displaced workers. After two years of a job loss, a worker losing his or her job at age 50 has a 70-75% chance of being re-employed. The return rates are lower among workers aged 60. Even if a displaced older worker can get a new job, their employment duration is short and they have a higher chance of leaving the job compared to their non-displaced counterparts.

An *et al.* (2004) studied the joint retirement decisions of Danish spouses. They used 1980-1990 population data collected by the Statistics Denmark and estimated a multivariate mixed proportional hazards model (MMPH) on the joint distribution of spouses' duration until retirement. They found that low income and poor health have a positive effect on the probability of individuals' retirement prior to spouse's retirement. Moreover, no matter whether one retires early or late, his or her spouse tends to retire at a similar time. A spouse's retirement decision has a larger effect on one's retirement decision than any other factor such as income or health. They conclude that retirement is a household decision rather than an individual decision.

Haardt (2006) extended the work of Meghir and Whitehouse (1997) by including females and OP members in their analysis, employing more independent variables and using a more up-to-date dataset (BHPS from 1991 to 2005). The results of their discrete time hazards models have several implications. Marital status is not important in explaining older people's transitions between economic states. Work experience in one's younger years decreases the risk of exit from employment and increases re-employment probabilities. Females face a lower transition risk out of, and back into, employment when regional unemployment rates are high. Health problems are important in explaining older

people's transition states. The effects of OP membership are different between males and females. Having children decreases the exit risk from employment among older females. Finally, benefit entitlement has an important effect on the re-employment hazard rate.

Tatsiramos (2010) used ECHP data from 1994 to 2001 to study the effect of previous job displacement on the transitions into re-employment and retirement for non-employed older workers[44]. His results on competing risks proportional hazards models suggest that in economies with generous unemployment insurance provision, such as Germany and Spain, older displaced workers have lower re-employment rates and higher retirement rates compared to their non-displaced counterparts. However, older displaced workers in Italy and the U.K. are less likely to exit from non-employment into retirement. These displaced workers return to employment much faster than their non-displaced counterparts due to scarce provision of unemployment or retirement benefits.

## 5.7 Final remarks

To summarise, most duration-dependence studies discussed in this chapter used panel datasets because of their availability of information on individuals' work history, such as unemployment duration, previous and current job characteristics. Some of these studies used OLS or binomial/multinomial regression techniques to study the issue of unemployment and employment durations (Muhleisen and Zimmermann, 1994; Bruce and Schuetze, 2004; Hyytinen and Rouvinen, 2008). Nevertheless, they may suffer from estimation bias on censored or truncated survival data and cannot handle time-varying covariates (Jenkins, 2005). Grouping the survival times and values for time-varying

[44] Tatsiramos (2010) defined non-employed older workers as individuals aged 45 to 64 who are either unemployed or economically inactive (not looking for jobs and not retired).

covariates creates measurement error and loses much detailed information.

Many duration studies have implemented survival analyses techniques that can account for the sequential and time-varying nature of the panel data and can handle the censoring problem (Theeuwes *et al.*, 1990; Boheim and Taylor, 2000; Booth *et al.*, 2002; Kupets, 2006; Millan *et al.*, 2012). Cox proportional hazards models are popular because they do not need to specify the functional form of the baseline hazard function. This can avoid estimation bias from incorrectly assuming the distribution of the baseline hazard function. Researchers can also choose to capture unobserved heterogeneity in their survival analyses or not. Based on the number of exit states under consideration, the Cox models, and other proportional hazards models, can be classified as either single risk or competing risks models. Single risk models are only suitable for comparing the hazard rates of exiting from different initial states into the same exit state, whereas competing risks models can avoid state aggregation bias of exit states.

There are various duration studies based on the initial state before transition or the subsequent state(s) after exit. They are not limited to the theme of unemployment or employment durations. Some of these focus on the duration of various types of employment, especially self-employment duration (Carrasco, 1999; Bruce and Schuetze, 2004; Hyytinen and Rouvinen, 2008; Millan *et al.*, 2012). Studies on both unemployment and employment durations are similar to those focusing on either unemployment or employment duration, but they provide a more thorough investigation on the work history of individuals. There are also studies which investigate more than one type of economic activity (Theeuwes *et al.*, 1990; Hunt, 1999; Martinez-Granado, 2002).

Unemployment and employment duration for older people is still understudied and has been addressed by a limited number of papers: Chan and Steven (2001), Haardt (2006)

and Tatsiramos (2010). Many of these focus on unemployment or employment duration before retirement. However, they all focus on employment without distinguishing various employment modes. There are few studies on older people focusing on unemployment duration before transiting into various types of employment or inactivity, or the durations of various types of employment. As suggested in the previous chapters, flexible employment is increasingly popular among older people. Under the trend of an ageing society, how to help older workers to stay in their chosen employment mode for longer deserves policy makers' attention. A study on older people's unemployment and employment durations is needed. In the next chapter, we bring together the various ideas discussed above and estimate several competing risks Cox models on unemployment and employment durations.

# CHAPTER 6

# SURVIVAL ANALYSES ON UNEMPLOYMENT AND EMPLOYMENT DURATION IN THE UNITED KINGDOM

## 6.1 Introduction

This chapter provides empirical analyses on the duration of unemployment and employment spells for people over 16 in the U.K. As in Chapter 4, we choose to investigate the U.K. because it acts as a benchmark between heavily regulated economies in Europe and less regulated economies like the U.S. We pay special attention to the unemployment and employment durations for older people aged 45 or over and compare their situation to that of younger people aged 16 to 44. As mentioned in the previous chapter, unemployment and employment durations for older people are still understudied. There are only a few duration-dependence studies for older people (Chan and Stevens, 2001; Haardt, 2006; Tatsiramos, 2010). We aim to provide new insights on the unemployment and employment duration for older people with three specific research objectives.

Firstly, in addition to unemployment durations, we study the duration of various employment modes, namely full-time employment, part-time employment and self-employment. We have discussed in the previous chapter that many studies, such as Meghir and Whitehouse (1997) and Haardt (2006), focus on the status of being employed without distinguishing various employment modes. Though there are studies which do focus on one type of employment mode, such as Taylor (1999) on self-employment, not many studies compare the duration among various employment modes. It is important to fill this gap because it affects policy makers' decisions on providing appropriate

assistance to older workers in different employment modes, enabling them to work longer if they want.

Secondly, our study aims to investigate the various exit states out of various economic modes. This is to avoid committing state-aggregation bias and to provide more detailed results on how the duration of various economic modes varies by exit states. As suggested in the previous chapter, Boheim and Taylor (2000) and Georgellis *et al.* (2007) are among the few studies which considered various exit states. However, they only studied the transition out of one economic state[45]. A duration study on older people's transition from unemployment or employment spells into various states is therefore needed.

Thirdly, we aim to investigate the effect of spell starting age if it is after the age of statutory retirement. As discussed in Section 1.5, the possibility of encouraging delayed retirement has been raised in the U.K. so as to lessen the demand on public financial security. It is important to understand whether there are any changes on the duration of current state or state transitions when one passes his or her statutory retirement age, so as to learn the relevance of increasing the retirement age on encouraging delayed retirement. We use BHPS data from 1991 to 2008 to estimate competing risks Cox proportional hazards models[46] on four types of spell: unemployment (UE), full-time employment (FTE), part-time employment (PTE) and self-employment (SE). Cox proportional hazard models do not need a functional form to be specified for the baseline hazard function. This avoids estimation bias from making incorrect assumptions on its distribution. Because of the limited number of spells, we run the regressions on all people aged 16 to

[45] Boheim and Taylor (2000) focused on unemployment, whereas Georgellis *et al.* (2007) focused on self-employment.

[46] We use the term 'Cox regression' or 'Cox models' for brevity in the rest of this chapter.

64 or over. We shed light on the situation faced by older people by paying attention to the effects of age dummies and making comparisons with younger people. In addition, we estimate two Cox models on all spells of males and females and include an age dummy if starting a spell after statutory retirement age instead of a series of age dummies. This is to analyse the effect of retirement age on current economic state duration.

This study aims to answer the following five research questions. Firstly, what are the significant factors affecting the cause-specific hazards of exiting from spells of unemployment, full-time employment, part-time employment or self-employment into various exit states? Secondly, are there any differences in the effect of a particular factor on the cause-specific hazards of exiting from a particular spell into various states? Thirdly, what are the directions of the effects of age on the cause-specific hazards of exiting from each type of spell into various states? Fourthly, what are the differences (if any) of the effect of retirement age on exiting into various economic states? Lastly, do the results above differ between males and females? The remainder of this chapter is organized as follows. Section 6.2 provides a discussion on the background and treatment of the data. Section 6.3 discusses the summary statistics for the data samples. Section 6.4 presents the estimation framework of the Cox models. Sections 6.5 to 6.7 discuss the estimation results of the Cox models on various types of spells. Section 6.8 discusses the estimation results on all spells to analyse the effect of retirement age. Section 6.9 concludes the discussion.

## 6.2 Data

### 6.2.1 The British Household Panel Survey (BHPS)

The BHPS is an annual household survey designed to collect socio-demographic data on the UK population. The BHPS differs from the LFS insofar as it surveys the same

individuals over several years. The BHPS was conducted by the ESRC UK Longitudinal Studies Centre (ULSC) and the Institute for Social and Economic Research (ISER) at the University of Essex. It ran on an annual basis from 1991 (Wave 1) until 2008 (Wave 18) and was superseded by the United Kingdom Household Longitudinal Study (UKHLS) in 2009. The BHPS Wave 19 is part of the UKHLS Wave 2 (McFall, 2012). According to Taylor *et al.* (2010), the wave 1 panel recruited 10,300 individuals in 5,500 households drawn from 250 areas in Great Britain. An additional sample of 1,500 households from Scotland and Wales was added to the main sample in 1999. Another additional sample of 2,000 households from Northern Ireland was added in 2001.

The BHPS fieldwork started on the first of September each year. All residents aged over 15 and present at Wave 1 of the survey were designated as panel members. They were re-interviewed each successive year. Members splitting off from original households to form new households were followed and all adult members of these new households were also interviewed. New household members were also eligible for interview. Respondents were asked about events occurring at the time of interview and occurring in the previous year, termed the 'reference year'. The BHPS used various data collection methods such as face-to-face interview, telephone interview and self-completion surveys.

The BHPS is widely used for panel data analyses (Campbell, 1999; Booth *et al.*, 2002; Arulampalam, Booth and Bryan, 2004; Blundell *et al*., 2004; Stewart, 2004; Ajayi-Obe and Parker, 2005). It covers a nationally representative sample and collects extensive information on respondents' work-life histories. We use data from Wave 1 to 18 (1991 to 2008) to construct our own spell-data file for survival analyses on individuals' work-life histories. As explained by McFall (2012), starting with Wave 19, the BHPS fieldwork moved from a September-to-December period to a January-to-March period for the

UKHLS. This means that there exists a 16-to-30-month gap between Waves 18 and 19 rather than the standard 12-month gap. There may be large recall errors in the information provided by respondents due to the large gap. The recalled start and end dates of any spells within these time gaps may be too unreliable. Therefore we choose to only use the BHPS data files from Waves 1 to 18 even though the BHPS data can be matched with the UKHLS data. The data are accessed from the UK Data Archive website[47]. A BHPS work-life history file constructed by Halpin (1997) is available in the UK Data Archive. However, we choose to construct our own spell dataset for three reasons. First, Mare (2006) discovered that there are various problems with the spells in Halpin's files such as: negative durations, overlapping spells and gaps between spells. Second, Halpin's files only cover waves from 1991 to 2006. Third, the variables available in Halpin's files may not be suitable for our analyses. We briefly explain how we construct our spell-data file in the Appendix.

### 6.2.2 Variables and data treatment

To identify spell types, we create the economic-activity variable *EconActivity* with five states: unemployment (UE), full-time employment (FTE), part-time employment (PTE), self-employment (SE) and economic inactivity (Inact). The economic status of employees, self-employed and unemployed is self-reported by BHPS respondents. We define part-time workers as employees working for less than 35 hours per week or self-reported as part-time by the respondents[48]. Economic inactivity is defined as including retirement and other non-employment activities.

[47] The data source for the BHPS is acknowledged in the References.

[48] We can define full-time and part-time employment by ourselves using information on working hours in the *wINDRESP* records. In contrast, there is no information on working hours in the *wJOBHIST* records. Also, there is no distinction between full-time and part-time employment for records in *aJOBHIST*. We follow the practice of Mare (2006) in assuming all employment spells in *aJOBHIST* are full-time.

We treat main employment as the only job done by the respondents for two reasons. First, Millan *et al.* (2012) noted that including individuals with a second job in the regressions might bias the regression estimates. Second, information on second job is absent in the *wJOBHIST* records. Moreover, there are studies treating a job change without changing the employment mode as starting a new employment spell (Theeuwes *et al.*, 1990; Georgellis *et al.*, 2007; Millan *et al.*, 2012). As we are interested in how long an individual can stay in each economic status, we ignore any job changes with no change in the employment mode[49]. Table 6.1 summarises the categories of variables included in each Cox model. Variables related to demographic, household and human capital characteristics can be found in all the Cox regressions. As mentioned by Johnson (2002), 96.1% of the BHPS respondents in Wave 1 are White. Other ethnicities are not well represented in the survey. Therefore, in contrast to the previous two studies, we do not include ethnicity variables in the Cox regressions. Apart for industry, some information on job characteristics such as firm size may not be available in the *wJOBHIST* and *wINDRESP* records. Therefore, we include industry dummies as the only variable for job characteristics in the Cox regressions on employment spells. The annual unemployment rate from Eurostat is matched to the BHPS data for estimating the effect of labour market conditions on the durations of various economic states[50]. We include variables on elapsed spell duration to study the effect of duration dependence.

[49] We do split the spells at failure times for including the only one 'time-varying' regressor (elapsed spell duration). This is explained further in the next sub-section.

[50] We match the unemployment rates in the year of interview prior to the end of the spells to the BHPS data but not that prior to the start of the spells as in Boheim and Taylor (2000). This is because we consider unemployment rates to be completely exogenous.

**Table 6.1: Categories of independent variables included in each regression analysis**

| Cox regressions on spells of: | UE | FTE | PTE | SE | All |
|---|---|---|---|---|---|
| **Demographic characteristics** | | | | | |
| Gender | ✓ | ✓ | ✓ | ✓ | ✓ |
| Marital status | ✓ | ✓ | ✓ | ✓ | ✓ |
| Health status | ✓ | ✓ | ✓ | ✓ | ✓ |
| Age | ✓ | ✓ | ✓ | ✓ | |
| Retirement age | | | | | ✓ |
| **Household characteristics** | | | | | |
| Number of dependent children aged 4 or less | ✓ | ✓ | ✓ | ✓ | ✓ |
| Number of dependent children aged between 5 and 11 | ✓ | ✓ | ✓ | ✓ | ✓ |
| Number of dependent children aged between 12 and 15 | ✓ | ✓ | ✓ | ✓ | ✓ |
| Total unearned income | ✓ | ✓ | ✓ | ✓ | ✓ |
| Region of residence | ✓ | ✓ | ✓ | ✓ | ✓ |
| **Human capital characteristics** | | | | | |
| Education | ✓ | ✓ | ✓ | ✓ | ✓ |
| Previous experience of working full-time | ✓ | ✓ | ✓ | ✓ | ✓ |
| Previous experience of working part-time | ✓ | ✓ | ✓ | ✓ | ✓ |
| Previous experience of working as self-employed | ✓ | ✓ | ✓ | ✓ | ✓ |
| **Job characteristics** | | | | | |
| Industry | | ✓ | ✓ | ✓ | |
| **Others** | | | | | |
| Benefit: unemployment or income support | ✓ | | ✓ | ✓ | |
| Annual unemployment rate | ✓ | ✓ | ✓ | ✓ | ✓ |
| Elapsed duration of spells | ✓ | ✓ | ✓ | ✓ | ✓ |
| State of spells | | | | | ✓ |

**Table 6.2: Definitions for the independent variables**

| | |
|---|---|
| **Time-fixed independent variables at the start of spells** | |
| *Male* | Male gender |
| *MS_Married** | Marital-status for being married |
| *MS_Single* | Marital-status for being single |
| *MS_SepDivWid* | Marital-status for being separated, divorced or widowed |
| *Health_problems* | Health-status for having health problems limiting kinds of work |
| *#KidsAged_0to4* | Number of dependent children in family aged 4 or less |
| *#KidsAged _5to11* | Number of dependent children in family aged 5 to 11 |
| *#KidsAged_12to15* | Number of dependent children in family aged 12 to 15 |
| *UnearnedY_per1000* | Total unearned income = (total family income minus total personal income)/1000 |
| *Benefit_UE_Ysupp* | Receiving unemployment benefit/Jobseeker's Allowance and income support |
| *R_England_S** | Region-of-residence for living in the southern part of England |
| *R_England_M* | Region-of-residence for living in East Anglia, E. and W. Midlands |
| *R_England_N* | Region-of-residence for living in the northern part of England |
| *R_nonEng* | Region-of-residence for living in the Wales, Scotland or N. Ireland |
| *Qual_Degree* | Qualification for having a university degree or above |
| *Qual_Sec_Postsec* | Qualification for having a sec school qual, a college or assoc degree |
| *Qual_Primary** | Qualification for having a primary school qualification or below |
| *Ind_Sec** | Secondary industry (including manufacturing and construction) |
| *Ind_Tert* | Tertiary industry (including distribution, hotels and restaurants, transport and communication, banking, finance and insurance, etc) |
| *Ind_PubEduHealth* | Industry for working public sector, edu, health |
| *Ind_Others* | Other Industries (including agri and fishing, energy and water, etc) |
| *PrevExp_FTE_yrs* | Previous FTE experience before the start of spell (in years) |
| *PrevExp_PTE_yrs* | Previous PTE experience before the start of spell (in years) |
| *PrevExp_SE_yrs* | Previous SE experience before the start of spell (in years) |
| *ln_UE_rate* | Natural logarithm on annual unemployment rate (*Annual_UE_rate*) in previous year of the start of spell |
| *Age_16to24** | Age group for being aged from 16 to 24 years old |
| *Age_25to34* | Age group for being aged from 25 to 34 years old |
| *Age_35to44* | Age group for being aged from 35 to 44 years old |
| *Age_45to54* | Age group for being aged from 45 to 54 years old |
| *Age_over54* | Age group for being aged over 54 years old |
| *Age_over59* | Age group for being aged over 59 years old |
| *Age_over64* | Age group for being aged over 64 years old |
| *Inact** | Spell of economic inactivity |
| *UE* | Unemployment spell |
| *FTE* | Full-time employment spell |
| *PTE* | Part-time employment spell |
| *SE* | Self-employment |
| **Time-varying independent variables** | |
| *Elaps_Dur_yrs* | Elapsed duration of spells at failure times (in years) |
| *Elaps_Dur_yrs_Sq* | Square term of *Elaps_Dur_yrs* |

* Denotes control variables

Table 6.2 provides the definitions for the independent variables. Most variables are defined as 'time-fixed' at the start of the spells for two reasons. First, the values of some variables, such as gender, are unchanged over time. Second, there is potential endogeneity of certain variables, such as marital status, with the hazard rates of leaving a spell. In addition, there are not enough spells to estimate robust parameters for certain types of state transition. We try to minimize the problem by grouping the categories of some variables together. For example, we combine the categories for being separated, divorced or widowed together (*MS_SepDivWid*). The values of *UnearnedY/1000* are adjusted for price changes, with 2012 as the base year[51].

The three variables on previous experience and elapsed spell duration are expressed in years[52]. These variables (*PrevExp_FTE_yrs*, *PrevExp_PTE_yrs* and *PrevExp_SE_yrs*) measure the number of years working in each type of employment before the start of each spell. The variables on elapsed spell duration are the only 'time-varying' independent variables in our analyses. We include the square term of elapsed spell duration to capture any non-monotonic patterns of duration dependence as suggested by Meghir and Whitehouse (1997) and Kupets (2006). *Age_over59* and *Age_over64* are different from other age dummies in capturing the effect of retirement age on females' and males' state duration respectively. For including the 'time-varying' information, we split the spells at the failure times[53], which is close to splitting the spells into person-months. The numbers of person-months for each spell type are noted at the bottom of Tables 6.7 to 6.20.

[51] Composite price index data from the Office for National Statistics is used for the price adjustment.
[52] We tried expressing these variables in months and including them in the Cox regressions, but the magnitude of the parameters is too small for interpretation.
[53] We do so by using the 'stsplit' command in Stata.

## 6.3 Summary sample statistics

Tables 6.3 to 6.6 in the Appendix show the summary statistics for the four types of spell. The statistics are measured before splitting the spells into person-months. Full-time employment accounts for the largest number of spells (7,988), followed by unemployment (6,053), part-time employment (4,191) and self-employment (889). As mentioned in sub-section 6.2.2, the characteristics are measured at each interview date prior to the start of the spell. Values for the categorical variables represent the proportion of spells with that characteristic in the corresponding samples.

Slightly more than half of the UE spells (about 60%) are experienced by males. This pattern is the same as that of FTE spells. However, around 77% of PTE spells are experienced by females, whereas 63% of SE spells are experienced by males. This supports the findings of Taylor (2011) that females are more likely to work part-time and males are more likely to be self-employed. The mean ages at the start of UE, FTE or PTE spells are around 30 years old regardless of gender. The mean starting age of SE spells is older (around 35 years old). The 16-to-24 and the over-54 age groups account for the largest and smallest proportions of UE, FTE or PTE spells respectively. There are larger proportions of middle-aged people (25 to 34) starting SE spells compared to younger people.

In the lower part of each table, we present the proportions and mean durations (in months) of each spell type by exit states. Most UE spells end with full-time employment (around 40%). These spells have the shortest mean duration (around 9 months) compared to UE spells ending with other exit states. UE spells transiting into self-employment account for the smallest proportions among all UE spells irrespective of gender. This implies that self-employment is possibly the last option when unemployed people cannot

get full-time or part-time work. UE spells ending with economic inactivity have the longest mean duration. The proportion of male UE spells ending with FTE is much larger than that of female UE spells, while the proportion of male UE spells ending with PTE is much smaller than that of female UE spells.

Most FTE spells end with unemployment regardless of gender (around 28%), and have the shortest mean duration (around 18 months). The proportion of female FTE spells ending with unemployment is smaller than that of male FTE spells. There are larger proportions of female FTE spells ending with part-time employment or economic inactivity compared to male FTE spells. This implies that when females leave their full-time work, they tend to choose part-time employment or leave the labour market.

The patterns in the proportions and mean durations of PTE and SE spells are different from those of FTE spells. Most PTE spells end with economic inactivity (24%), followed by full-time employment (19%) and unemployment (16%). In contrast, most SE spells end with full-time employment (22%), followed by unemployment (16%) and economic inactivity (14%). PTE spells or SE spells ending with unemployment have the shortest mean duration compared to spells ending with other exit states. Most male PTE or SE spells end with full-time employment or unemployment, whereas most female PTE or SE spells end with economic inactivity.

## 6.4 Estimation framework of Cox proportional hazards models

In Chapter 5 we discussed the background and theoretical framework for the Cox proportional hazards models. This section explains how we run the Cox regressions. We estimate competing risks models instead of single risk models to avoid state aggregation bias. The survival times of each type of spell are estimated separately by exit states. Four

types of spells, namely unemployment (UE), full-time employment (FTE), part-time employment (PTE) and self-employment (SE), are considered. The competing risks Cox regression techniques model the cause-specific hazard function as follows:

(25) $h_c(t\,|x) = h_{0c}(t)\ e^{x\beta_c}$

where *c* is the cause of risk (transiting into any four states among unemployment, full-time employment, part-time employment, self-employment or inactivity depending on what the initial state is[54]). $h_{0c}(t)$ is the baseline hazard function which is the probability of state transition when all values of the regressors are equal to zero. The Cox models do not specify $h_{0c}(t)$ for parameter estimation. $x$ is the vector of 'time-fixed' and 'time-varying' regressors. $\beta_c$ is the vector of regression coefficients. The overall hazard rate of any type of spell is the sum of all the cause-specific hazard rates, i.e. $h(t) = \sum h_c(t)$. The probability of risk from cause c, which is the exit state in our case, is $h_c(t) / h(t)$. When we consider a particular exit state, we model the cause-specific hazard function by treating other exit states as censored. Under the assumption of independent hazards, we can estimate the effects of the regressors on the hazards of leaving the spells conditional on the exit states.

Estimation of the parameters $\beta_c$ is based on maximum partial likelihood approach. The framework discussed hereafter is based on Cooke and Morales-Napoles (2006). Suppose the times of failures are $t_1,\ldots, t_n$ and $t_i < t_j$ for $i < j$. The corresponding partial likelihood function is:

[54] Suppose the state of spell is unemployment, the causes of risk under consideration are full-time employment, part-time employment, self-employment and inactivity.

$$(26)\ \mathrm{L}(\beta_c) = \prod_{i=1}^{N}\left(e^{\beta_c x_i}/\sum_{j\geq i}^{n} e^{\beta_c x_j}\right)$$

As discussed in Section 5.3.4, unobserved heterogeneity may affect inferences about the shape of the baseline hazard function. Nevertheless, we follow some later works such as Boheim and Taylor (2000) and Kupets (2006) to estimate Cox models without accounting for unobserved heterogeneity for the two reasons discussed in Section 5.3.4. First, not accounting for unobserved heterogeneity may not bias the estimates if the baseline hazard function is allowed to be nonparametric (Lancaster, 1985; Ham and Rea, 1987; Meyer, 1990). Second, introducing a misspecified regression term to capture unobserved heterogeneity may cause distortion to the estimation, and so has little improvement to the estimation (Narendranathan and Stewart, 1993). The results of the log-rank tests reject the hypothesis of equality in survivor functions between male and female spells. We therefore estimate twelve sets of competing risks Cox regressions on spells of unemployment, full-time employment, part-time employment and self-employment for the pooled, male and female spells separately[55]. In addition, we estimate two Cox regressions on all spells of males and females separately and include an age dummy if starting a spell after the retirement age instead of a series of age dummies. This is to analyse the effect of retirement age on economic state duration. The Cox regressions are run on all spells instead of various types of spells so as to increase the sample size and ensure higher statistical significance of the age-dummy estimates.

In the next three sections we discuss our Cox regression results on durations of unemployment, full-time employment, part-time employment and self-employment

[55] All the estimation procedures are carried out using Stata. Once we declare the data to be survival data using the "stset" Stata command, the information on time spans of the spells is stored in memory. The command for running Cox regressions ("stcox") uses this stored information for estimation and so there is no need to specify a dependent variable.

durations. The reference groups are spells with characteristics of being married and having primary school qualifications, aged 16 to 24, being in the secondary industry (for the three employment spells only) and in the southern part of the U.K. Although we have grouped some variable categories, there are not enough exits from certain types of employment spells into other states, such as from SE spells into PTE, for determining robust estimates. This problem worsens when we run the Cox regressions by gender. However, we still keep separate results on males and females because notable differences in the hazard rates between genders are noteworthy. Most estimates on key variables, such as age dummies, are statistically significant in the full sample. We focus on reporting just the results that are of key interest. All the estimation results are expressed in terms of hazard ratios (HR) as follows:

$$(27)\ \mathrm{HR} = e^{\sum \widehat{\beta_c} (X_a - X_b)}$$

where *a* and *b* represents any two groups of spells. Hazard ratio with a value greater than one means higher exit probabilities or shorter duration in the initial state, with a unit change in the continuous regressor or compared to the treatment group of the binary regressor. Our main focus is the estimated results on age.

## 6.5 Estimation results on unemployment (UE) spells

### 6.5.1 General results

Table 6.7 shows the hazard ratios from competing risks Cox models on exiting from UE spells into full-time employment, part-time employment, self-employment or economic inactivity for the full sample. The estimated results on male and female spells are shown in Tables 6.8 and 6.9 respectively. Our results support some findings in previous studies and provide a deeper understanding.

Hunt (1999) found that males face higher hazards of exiting from UE spells into employment than females. In contrast, we find that males face higher hazards of exiting from UE spells into FTE or SE, but they face lower hazards of exiting from UE spells into PTE or Inact than females. There are large differences in the hazard rates of leaving from UE spells to PTE or SE between males and females. This supports the common belief that males are more likely to be self-employed, whereas females are more likely to work part-time.

Stewart (2001) found that individuals with a health limitation face lower hazards of leaving UE spells but he did not distinguish the exit states. In contrast, we find that individuals with health problems face lower hazards of exiting from UE spells into FTE and higher hazards of exiting into PTE, SE or Inact. Individuals with health limitations choose either giving up job hunting or working flexibly as alternative to full-time work.

As noted by Boheim and Taylor (2000), family responsibility is important in affecting individuals' working hours. Having more dependent children at the start of spells decreases the hazards of exiting from UE into FTE but increases the hazards of exiting into PTE. This pattern is much more manifest among females than among males. This shows that females are more willing to work part-time in order to gain more time in childcare. Having more dependent children (except children aged 5 to 11) increases the hazards of exiting from UE spells into Inact among females. This is opposite to the results on males. The more children a male has, the longer time he spends on job hunting before he chooses non-labour market activities.

It is surprising to find that more educated individuals (with degree or above) face lower hazards of exiting from UE spells into FTE or PTE (except males from UE into PTE). They have longer unemployment durations before exiting into FTE or PTE than

less educated individuals. Dynarski and Sheffrin (1990) suggested that this may be because of the different nature of unemployment among individuals with different levels of education. More educated individuals are more likely to face permanent layoffs from regular full-time jobs. Less educated individuals may be unemployed because of temporary layoffs from flexible work. It is also interesting to find that more educated females face much higher hazards of exiting from UE into Inact compared to females with primary education or below.

Irrespective of gender, having one more year of previous FTE, PTE or SE experience increase the hazards of exiting from UE spells into FTE, PTE or SE respectively (with some statistically insignificant exceptions). However, more previous FTE, PTE or SE experience provides no help in ending unemployment with other types of employment. This implies that previous FTE, PTE or SE experience is relevant for unemployed individuals to re-enter the corresponding mode of employment only. Previous SE experience is in particular very important for both unemployed males and females to be self-employed again, as shown by the 20% to 30% increase in hazards with an additional year of previous SE experience.

Higher unemployment rates at the start of spells increase and decrease the males' hazards of exiting from UE spells into FTE or PTE respectively. It is possible that the higher the unemployment rates a male faces at the start of UE spells, the sooner he will encounter an improvement in economic conditions and hence the sooner he will get a full-time job. Thus he will not choose to engage in part-time work. For females, higher unemployment rates at the start of UE spells increase their hazards of exiting from UE spells into FTE or PTE. Moreover, higher unemployment rates increase the hazards of exiting from UE spells into SE regardless of gender, as found by Martinez-Granado (2002)

too. Those unemployed who may have financial difficulties may give up job hunting early and choose self-employment.

As noted in the previous chapter, duration dependence is one of the main concerns in duration studies. Many previous studies found that duration dependence of unemployment is negative. In contrast, we find that the effect of elapsed spell duration shows a non-monotonic pattern. Regardless of gender, unemployed individuals face lower hazards of leaving UE spells to FTE or PTE in their early stage of unemployment. However, they face higher hazards of making such transitions in the later stage, though the effect is small (3% to 6%). There is negative duration dependence for unemployment spells at the early stage and duration dependence turns to be slightly positive later. This is possible when individuals in their early UE stage do not have enough market information for job hunting and learn more on job vacancies later. The effect of elapsed spell duration on females' hazards of exiting from UE spells into SE or Inact also shows a non-monotonic pattern. In contrast, duration dependences for males to transit from UE spells into SE or Inact are always negative. This shows that males do not choose self-employment or leave the labour market easily no matter how long they are unemployed.

### 6.5.2 The effect of age

Estimated parameters on the age dummies show interesting patterns. Age at the start of a spell affects the hazard of exiting from unemployment into other states. Individuals starting unemployment spells over 24 face lower hazards of exiting from UE spells into FTE or PTE compared to those starting from 16 to 24. The older an individual is when starting an unemployment spell, the longer he or she remains unemployed before getting full-time or part-time jobs. However, the trend of decreasing hazards from leaving unemployment spells to part-time employment reverses after the spell starting age of 54.

The effects of spell starting age on females' transition of UE into FTE are stable over the age of 35. Females starting UE spells over 54 face higher hazards of exiting into PTE state compared to the youngest female group.

Individuals starting UE spells at any age over 24 face very high hazards of exiting from UE spells into SE regardless of gender. This shows the importance of experience and financial assets on starting a new business, which can be accumulated when one grows older. All individuals starting UE spells at any ages over 24 face lower hazards of exiting into Inact regardless of gender. This is possibly because the youngest age group includes students who are more likely to leave the labour market and engage in non-labour market activities such as schooling. The estimates show a gradually decreasing trend along the age dummies and but then reverse for *Age_over54*. This supports the prediction by the life-cycle labour supply model that the time spent on labour market activities shows an inverted-U shape over one's lifetime, though the estimate of *Age_over54* is lower than that of *Age_25to34*. One possible explanation is that there is higher degree of pessimism in finding jobs among those aged 25 to 34 than those aged over 54 and they are more likely to leave the labour market for other activities such as pursuing higher education.

## 6.6 Estimation results on full-time employment (FTE) spells

### 6.6.1 General results

Many previous employment-duration studies, such as Hunt (1999), did not differentiate various types of employment and exit states. We provide deeper understanding on employment duration by considering various types of employment spells and various exit states. Table 6.10 shows the hazard ratios from competing risks Cox models on exiting from FTE spells into unemployment, part-time employment, self-

employment and economic inactivity for the full sample, whereas Tables 6.11 and 6.12 show the estimated results on males and females respectively.

Males face higher hazards of exiting from FTE spells into UE or SE than females. We have noted in the previous section that males face higher hazards of exiting from UE spells into FTE. This implies that males change state between unemployment and full-time employment more easily than females. It is not surprising to see that males face lower hazards of exiting from FTE spells into PTE or Inact than females. There are large differences in the hazard rates from leaving FTE spells to PTE or SE between males and females. Irrespective of whether they start out as unemployed or employed full-time, males are more likely to become self-employed and females are more likely to work part-time.

It is not surprising to find that more educated individuals, irrespective of gender, face lower hazards of leaving from FTE spells to UE or PTE (except males from FTE to PTE, though these are insignificant). They face higher hazards of exiting from FTE spells into SE. Both males and females with one more year of previous FTE or PTE experience face higher hazards of exiting from FTE spells into PTE. Previous SE experience is particularly important for both employed males and females to leave full-time employment and become self-employed again, as shown by the 20% to 40% increase in hazards with an additional year of previous SE experience.

Both males and females working in the tertiary industries, the public sector, education and health or other industries face lower hazards of leaving from FTE spells to UE compared to those in secondary industries. This implies that full-time jobs in the former three sectors are more stable. In addition, full-time employed males and females in the former two sectors face higher hazards of exiting into PTE or Inact and lower

hazards of exiting into SE. Higher unemployment rates at the start of spells increase males' hazards of exiting from FTE spells into UE or SE but decrease their hazards of exiting into PTE. Full-time employed females face higher hazards of exiting into UE, PTE or SE when unemployment rates are high. Bad economic conditions hit individuals holding full-time jobs and thus many of them lose their full-time jobs or choose to work flexibly. However, males are not more likely to change to work part-time even under bad economic conditions.

The effect of elapsed spell duration on hazard rates of leaving FTE spells to various states also show a monotonic pattern similar to that of UE spells. Both full-time employed males and females face lower hazards of leaving FTE spells to UE, PTE or Inact in their early stage of unemployment, and then face higher hazards of making such transitions in later stage of their spells (though the effect is small). It is interesting to find that both males and females face higher hazards of exiting into SE in their early stage of full-time employment and later face lower hazards of making such transitions. As noted by Martinez-Granado (2002), elapsed spell duration has a decreasing positive effect on the exit rates from employment into self-employment (though not significant).

### 6.6.2 The effect of age

How age at the start of spell affects the hazards of exiting from FTE into various states deserves attention. Both males and females starting FTE spells when aged over 24 face lower hazards of exiting from FTE spells into UE compared. The older an individual starts a FTE spell, the longer he or she remains employed. Both males and females starting FTE spells over 24 face lower hazards of leaving to PTE. However, there is an exception that males starting FTE spells over 54 face higher hazards of leaving to PTE (though insignificant compared to other estimates on age dummies). In addition, males starting

FTE spells from 25 to 54 face higher hazards of exiting into SE compared to the youngest group, whereas males starting FTE spells over 54 face lower hazards of doing so. Males starting full-time jobs at older ages are less likely to be self-employed compared to those starting full-time jobs younger. It is possible that these males have financial difficulties and so are unable to start a business. Both males and females with starting age over 24 face lower hazards of leaving FTE spells to Inact (except males over 54).

## 6.7 Estimation results on part-time employment (PTE) and self-employment (SE) spells

### 6.7.1 General results

As noted in the previous chapter, many studies on flexible employment focus on SE duration. We discuss the estimated results on both PTE and SE spells in this section. Tables 6.13 and 6.16 show the hazard ratios from competing risks Cox models on PTE and SE spells for the full sample respectively. The results of males and females are shown in Tables 6.14 and 6.15 for PTE spells and in Tables 6.17 and 6.18 for SE spells.

Georgellis *et al.* (2007) found that males in SE spells face higher hazards of becoming unemployed and lower hazards of leaving the labour market. In contrast, we find that both males in PTE or SE spells face much higher hazards of exiting into UE or FTE and much lower hazards of exiting into Inact compared to their female counterparts. This shows that when male flexible workers end their spells of flexible employment, they are more likely to stay in the labour market than females. However, males in PTE spells face much higher hazards of exiting into SE, whereas males in SE spells face lower hazards of exiting into PTE. Males in PTE spells face the highest hazard of transiting into SE, whereas males in SE spells face the highest hazard of transiting into FTE. This implies

that self-employment may be a bridge for males to transit from part-time employment into full-time employment.

It is surprising that males with health problems face higher hazards of exiting from PTE spells into any exit state except economic inactivity. Similar patterns can be found for self-employed males. They face higher hazards of exiting from SE spells into any exit state except PTE. In contrast, females with health problems seem to be more satisfied with their flexible employment state than their male counterparts. They face lower hazards of exiting from either PTE or SE spells into UE or FTE.

More unearned income from other family members decreases the hazards of exiting from PTE spells into any exit state (with some exceptions by gender). This shows that family financial situation can affect whether individuals can work part-time for long. Block and Sandner (2009) found that more household income increases the duration of self-employment. We find that self-employed males with more unearned income face lower hazards of exiting into unemployment. Nonetheless, this is opposite for self-employed females.

Some studies, such as Katz and Meyer (1990), Meghir and Whitehouse (1997) and Haardt (2006), found that benefit entitlement or increased social security benefits may delay re-employment. We find that both males and females receiving income support face much higher hazards of exiting from PTE or SE spells into UE. This implies that income support not only delays re-employment among the unemployed but also encourages flexible workers to leave their work for more financial support such as unemployment benefits.

More educated individuals are more likely to leave part-time employment and do something else. Males with secondary school qualifications or above face higher hazards of exiting from PTE spells into FTE or SE. However, for females, only those with degree or above face higher hazards of having such transitions. As noted by Taylor (1999), education may not be a good predictor for self-employment durations because qualifications may not be helpful for individuals in starting a business. However, we can still spot some patterns. Self-employed males with secondary school qualifications or above generally face lower hazards of exiting into FTE or PTE. This is the opposite pattern to that of females. More educated males tend to stay in SE spells, whereas their female counterparts tend to leave self-employment for other employment modes.

Previous PTE experience is highly relevant for the self-employed to re-enter part-time employment. Similarly, previous SE experience is highly relevant for part-timers to be self-employed again. Both males and females working in the tertiary industries face higher hazards of leaving from PTE spells to FTE or SE compared to those in secondary industries. Self-employed males in the tertiary industries, the sector of public, education and health or other industries face higher hazards of exiting into unemployment. The opposite is true for self-employed females. In addition, self-employed males in the tertiary industries face higher hazards of exiting into any states in the labour market. They face lower hazards of leaving the labour market.

Bad economic conditions not only hit full-time workers but also part-timers. Higher unemployment rates at the start of spells increase males' hazards of exiting from PTE spells into UE or FTE, whereas female part-timers face higher hazards of exiting into SE. However, both male and female part-timers face lower hazards of leaving the labour market when the economic conditions become worse. The effect of unemployment rates

on SE duration is different from that on PTE duration. Both self-employed males and females face lower hazards of exiting into any states (except males from SE into UE). This supports the recession-push hypothesis that individuals tend to stay in self-employment when the economic conditions worsen (Millan *et al.*, 2012). The effect of elapsed spell duration on hazard ratios of leaving PTE or SE spells to various states show a monotonic pattern similar to those of UE and FTE spells. However, self-employed females face higher hazards of exiting into part-time employment in their early stage of self-employment.

### 6.7.2 The effect of age

Age at the start of a spell affects PTE and SE duration differently. Both males and females over 24 face lower hazards of exiting from PTE spells into any states[56]. The older an individual is at the start of a PTE spell, the longer he or she remains employed. This shows that older individuals are more likely to stay in PTE spells longer than their younger counterparts. Self-employed males over 24 face lower hazards of exiting into any state. This is because individuals over 24 often have the networks to identify business opportunities and can sustain their business for longer (Millan *et al.*, 2012). Their hazards of exiting into PTE are particularly low. This implies that self-employed males, no matter which age they start their business at, do not easily leave their SE spell for part-time employment.

In contrast, self-employed females aged 25 to 34 face higher hazards of exiting into UE compared to their youngest counterparts. After the age of 34, the older a female is when starting an SE spell, the lower the hazard she faces of transiting into unemployment.

[56] An exception is the higher hazards of exiting into self-employment faced by female part-timers aged 25 to 44.

Females aged over 24 face much higher hazards of exiting from SE spells into Inact. The reason may be that they need to give birth and so leave the business. Older females aged over 54 only have 16% higher hazards of making such a transition.

## 6.8 Estimation results on the effect of statutory retirement age

Tables 6.19 and 6.20 show the hazard ratios from competing risks Cox models on exiting into unemployment, full-time employment, part-time employment, self-employment or economic inactivity for the male and female sample respectively. The reference groups are spells with characteristics of being married, in the southern part of the U.K., having primary school qualifications and inactivity spells. We take into account the different retirement age for males and females in the U.K. and include different age dummies (*Age_over64* and *Age_over59*) for capturing the effect of retirement age.

We pay special attention to the dummies of spell state and retirement age. As discussed in Section 6.2.2, as we ignore any job changes with no change in the employment mode, there are no transition of jobs with the same employment mode (such as from a full-time job to another full-time job). Parameters for transition of the same state cannot be estimated. Male PTE spells have higher hazards of exiting into self-employment, and vice versa for female PTE spells. In addition, male SE spells have lower hazards of exiting into unemployment, which is in opposite to that of female SE spells. These agree with the results in Section 6.6.1 that males are more likely to become and remain self-employed than females. Both male and female spells with starting age after the retirement age (65 for males and 60 for females) face higher hazards of exiting into part-time employment and lower hazards into any other states. This shows that part-time employment is a popular choice for bridge employment after reaching the retirement age.

## 6.9 Conclusion

Older people may become a major workforce in the near future and the duration of their unemployment and various employment modes deserve policy attention. This chapter extends previous works, such as Boheim and Taylor (2000) and Haardt (2006), by considering spells of various economic activities and their various exit states for working-age people in the U.K. We pay special attention to older people aged 45 or over and compare their situation to that of younger people aged 44 or less. Our regression results provide deeper understanding on some of the findings in Chapter 4. Here we note the significant factors found in the Cox models before summarizing the effect of age and providing some policy recommendations.

Gender is a significant factor, regardless of age, in affecting the duration of various types of economic activity. Whether in UE or FTE spells, both males and females face higher hazards of exiting into SE and PTE respectively. Males in both PTE and SE spells face much higher hazards of exiting into UE or FTE and much lower hazards of exiting into Inact compared to their female counterparts. Family responsibilities, such as child-caring, are a possible reason for these gender differences. Having more dependent children decreases the hazards of exiting from UE into FTE but increases the hazards of exiting from UE into PTE. This pattern is stronger among females.

In Chapter 4, we found that older males may have difficulty in finding part-time work. A possible reason for this is that older males have been working full-time when they were younger and so they are not familiar in finding part-time employment. In this chapter, we can see that regardless of the type of initial spell, previous FTE, PTE or SE experiences are relevant for re-entering the same employment mode but not other

employment modes. Previous SE experience, in particular, is very important for returning into self-employment.

Many studies have found that employment and unemployment duration dependences are negative. In contrast, we find that the effect of elapsed spell duration shows a non-monotonic pattern on the hazards of exiting from any type of spell, except SE spells. This implies that hazard rates decrease during the early stage of a spell and increase in the later stage. In Chapter 4, we find that both older and younger unemployed job-seekers with longer unemployment durations are less likely to prefer self-employment. Our results show that the longer a male is unemployed, the less likely he will start a business. Conversely, both males and females face higher hazards of exiting into SE at the early stage of full-time employment and later face lower hazards of making such transition.

We shed light on the situation facing older people by focusing on the estimated age effects. The older an individual is when he or she starts a UE spell, the longer he or she remains unemployed before resuming full-time or part-time work. However, the trend of decreasing hazards from leaving UE spells to PTE reverses at the starting age of 45. Part-time employment seems favourable for those unemployed who are over 45. In addition, the older an individual is when starting any type of employment spell, the longer he or she remains employed. This shows the higher stability for older individuals to remain employed compared to the youngest group. Self-employed males, no matter they start their business at what age, do not easily leave their SE spell for part-time employment. In contrast, self-employed females aged 25 to 34 face higher hazards of exiting into UE compared to their youngest counterparts. After the age of 34, the older a female is when starting a SE spell, the lower the hazard she faces in transiting into unemployment. Moreover, part-time employment is a popular choice for bridge employment after

reaching retirement age.

Our findings lead to two policy recommendations. Firstly, income support seems to discourage re-employment. In addition, flexible workers receiving income support may quit their jobs for more financial support such as unemployment benefits. This implies that they may work flexibly for financial reasons or an inability to find full-time jobs. These add unnecessary burdens on the government budgets. The Government should provide assistance to benefit recipients in full-time job hunting, or only accept income support applicants who satisfy minimum hours of work. The current Jobseeker's Allowance (JSA), which provides financial support to the unemployed or underemployed, has similar requirements to those we recommend. The New Deal 50 Plus serves a similar function for older people aged 50 or over. Recipients of these benefits have to provide regular evidence of seeking work or of working at a minimum level. Our results imply that the current requirements may not be fully effective in encouraging benefit recipients to find jobs or stay in work. Secondly, we find that the longer a male is unemployed, the less likely he will start a business. Thus any measures, which encourage unemployed individuals to become self-employed, should be provided at the early stage of their unemployment. This is especially important for older benefit claimants with little past experience of self-employment.

# GENERAL CONCLUSION

## Summary of results

Through a series of static and dynamic empirical analyses, the work in this thesis has compared the employment patterns of older people to those of younger people in selected economies. In Chapter 2 we differentiate the effects of explained and unexplained factors on age-employment gaps using the US CPS and UK LFS in the 2000s and Hong Kong Census and By-census data from 1991 to 2006. Application of the binomial logit models and non-linear Oaxaca-Blinder decompositions has low data requirements and provides a good starting point for the investigation on the employment patterns of ageing workforces. Our binomial logit models on employment probabilities show that higher levels of education do not give older males significantly higher employment probabilities. This may be due to deterioration of skills for highly educated older males, leading to a lower employment premium. In contrast, older females enjoy higher employment probabilities from higher education in the U.S. and the U.K. but not in Hong Kong. This implies that, for older females, skill deterioration is greater for older females in Hong Kong than but not for those in the U.S. and the U.K.

The typical age-employment profile is concave for the employment probabilities over one's life-time. The result for younger people in all the three economies matches the typical age-employment profiles. However, older females in Hong Kong still have the same age-employment profile as that of younger people. Both older males and females in the U.K. and older males in Hong Kong have an age-employment profile opposite to the typical one. It is therefore possible for older people to gain from their greater working experience when they look for jobs. Hong Kong has the largest employment gap between younger and older people among all the three economies. Our Oaxaca-Blinder

decompositions of the U.S. and Hong Kong show that the differences in observable characteristics (explained factors) can explain nearly the entire negative age-employment gap. In contrast, there are many more uncontrolled-for factors in our UK models, which further enlarge the negative age-employment gap for males and females.

Older people who search for flexible employment such as part-time jobs may have different employment patterns from full-time job seekers. Further empirical analyses on different employment modes of UK older people are reported in Chapter 4. We extend the work of Lissenburgh and Smeaton (2003) in three parts. Firstly, we study the preferences of older and younger unemployed job-seekers over various employment modes. Secondly, we update the analysis on the entry of older people into various employment modes. We consider more than one type of flexible employment, use a long time-span of the UK LFS from 2001q2 to 2012q1 and consider the neglected issue of gender. Thirdly, we investigate the factors that identify why part-time workers work part-time involuntarily.

Our multinomial logit models on job preferences and employment outcomes show that unemployed job seekers with a particular attribute may have a greater preference for a particular employment mode. However, the economically-active with the same attributes may have a higher probability of entering a different employment mode. Full-time employment is the most popular employment mode among males, followed by self-employment and then part-time employment. Although older males over 54 are much more likely to prefer part-time employment than self-employment compared to their counterparts from 50 to 54, their probability of entering part-time employment is similar to that of entering self-employment. In contrast, younger females are more likely to prefer part-time work but less likely to undertake it. As these younger females age they exhibit

an increased preference for self-employment. The sub-sample of older females is more likely to prefer and enter flexible employment and they prefer part-time employment to self-employment. Older females can meet their preferences with actual employment outcomes compared to their younger counterparts.

Our binomial logit models on working part-time involuntarily show that gender is the most important factor affecting preferences for part-time work among younger workers. Younger females, in particular, express a much greater preference for part-time work. For older workers, age is the most important factor affecting part-time work preferences and gender is much less important. After running separate regressions on males and females, we find that both are more willing to work part-time as they age. Part-time employment is therefore more likely to be a voluntary choice regardless of gender and age.

Although we can model the effect of various factors on job preferences and employment outcomes, more detailed information on when an individual leaves the original state and transits into another state is ignored. Chapter 6 extends previous work on employment and unemployment duration, such as Boheim and Taylor (2000) and Haardt (2006), by considering spells of various economic activities and their various exit states for working-age people in the U.K. We use the UK BHPS data from 1991 to 2008 to estimate competing risks Cox proportional hazards models on unemployment and various types of employment spells. Our empirical results show that gender is a significant factor, irrespective of age, in affecting duration of various types of economic activities. Both males and females face higher hazards of exiting into SE and PTE respectively, irrespective of whether they are originally in UE or FTE spells. Regardless of the type of initial spell, all previous employment experiences are relevant for

individuals re-entering the same type of employment, whether it be FTE, PTE or SE. Previous SE experience is particularly important for individuals returning to self-employment. Many previous studies found that unemployment or employment duration dependences are negative. In contrast, we find that the effect of elapsed spell duration shows a non-monotonic pattern on the hazards of exiting from any type of spells except for SE spells. In addition, the longer a male is unemployed, the less likely he will start a business. On the contrary, both males and females face higher hazards of exiting into SE at an early stage of their full-time employment but later face lower hazards of making such a transition.

We shed light on the situation facing older people by interpreting the estimates on age dummies. The older an individual is when he or she starts a UE spell, the longer he or she remains unemployed before getting full-time or part-time jobs. However, the general trend of decreasing hazards from leaving UE spells to PTE reverses at the spell starting age of 45. In addition, the older an individual is when starting any type of employment spell, the longer he or she remains employed. Self-employed males, no matter at what age they start their business, do not easily leave their SE spell for part-time employment. In contrast, self-employed females aged 25 to 34 face higher hazards of exiting into UE compared to their youngest counterparts. After the age of 34, the older a female is when she starts a SE spell, the lower the hazard she faces in transiting into unemployment. Regardless of the initial state, both male and female spells with starting age after the retirement age (65 for males and 60 for females) face higher hazards of exiting into part-time employment and lower hazards into any other states. This shows that part-time employment is a popular choice for bridge employment after reaching the retirement age.

## Policy implications

Many economies have enacted legislation to promote longer working lives among older people. For example, in the U.K., the Pensions Act (1995), the Pensions Act (2007) and the Employment Equality (Age) Regulations (2006) will raise the SPA to 68 by 2046 and will allow employees not to retire at 65 (Khan, 2009). The question of how to help older people seek or stay in their preferred employment mode deserves attention. From our empirical results we can generalize four policy suggestions.

Firstly, highly educated older people in the U.S., the U.K. and Hong Kong, especially males, may suffer from serious deterioration of skills and may find difficulty in obtaining employment. Older people can emphasize their long working experience rather than their education when applying for jobs. Governments can provide subsidies to employers who recruit and provide training for older people, or set up training programs for older people to update their skills.

Secondly, in the U.K., older unemployed males and those unemployed for less than 5 years need targeted help from the government. Older males may have worked full-time when they were young and so they are not familiar in finding part-time employment. Also, employers are not willing to employ older males, especially those over 65, either as part-timers or full-timers. In addition, older job-seekers unemployed for less than 5 years may have difficulty in seeking either full-time or flexible work. On the demand side, the Government can implement measures such as providing financial subsidies to encourage firms to employ older part-timers. On the supply side, the Extending Working Life Group can help older people, especially males, to find part-time work by providing easier access to information on part-time vacancies.

Thirdly, older benefit claimants tend to prefer full-time work to part-time work. This may be due to the limitations of pension rules associated with part-time work. Pension rules that forbid part-time employees from drawing part of a pension may discourage older benefit claimants from taking part-time work. Governments should adjust the pension scheme to cover part-timers (and other flexible workers) so as to promote part-time employment among older people.

Fourthly, older benefit claimants are less likely to prefer self-employment. A possible reason for this is that they may not have enough start-up funds for self-employment. Governments could initiate business start-up schemes including the provision of funds or loans to encourage older benefit claimants into self-employment. The longer a male is unemployed, the less likely he will start a business. Thus any measures, which encourage unemployed individuals to become self-employed, should be provided at the early stage of their unemployment. This is especially important for older benefit claimants having little past self-employment experience.

## Recommendations for further research

This thesis has four recommendations for further research. Firstly, it may prove fruitful to use the quarterly General Household Survey (GHS) in Hong Kong as it has a higher data frequency than the Hong Kong Population Census and By-census. This would provide a much larger sample size for the decomposition analysis on Hong Kong. We did not use the GHS because of its high price (UK£125 per quarter). Any future projects which have enough funding could use the GHS to estimate more robust decomposition results.

Secondly, the decomposition results provide good insights on the possible direction

of the effects of unknown factors. There are other unknown factors in the U.K. which further enlarge the employment gap for males and females. Further research on what these unobservable characteristics are could be done.

Thirdly, we estimate the Cox models on all people aged 16 to 64 but not separately for younger and older people. This is because of the limited number of spells derived from the BHPS. According to McFall (2012), the UKHLS provides a much larger sample size, with 100,000 individuals in 40,000 British households, which should allow robust separate estimates on spells for younger and older people. This could be carried out in future when the period covered by the UKHLS increases.

Fourthly, our duration analyses on the U.K. suggest that income support discourages re-employment. Also, flexible workers receiving income support may quit their jobs for more financial support such as unemployment benefits. These imply that the current measures in public benefits such as JSA or New Deal 50 Plus may not be effective in encouraging benefit recipients to find jobs or stay in work. Further policy analyses on the effect of those benefits on re-employment, especially of older people, can be carried out in the future using the UKHLS.

# APPENDICES

## Appendix for Chapter 2

**Table 2.3: Summary statistics of the sample in the U.S. (mean values)**

| | Pooled | | | Male | | | Female | | |
|---|---|---|---|---|---|---|---|---|---|
| | **Full sample** | **Younger sample** | **Older sample** | **Full sample** | **Younger sample** | **Older sample** | **Full sample** | **Younger sample** | **Older sample** |
| **Employed** | 0.6335 | 0.7177 | 0.4795 | 0.6929 | 0.7715 | 0.5442 | 0.5799 | 0.6681 | 0.4234 |
| **Older** | 0.3535 | | | 0.3460 | | | 0.3604 | | |
| **Mean Age** | 43.56 | 33.34 | 62.24 | 43.02 | 33.16 | 61.68 | 44.04 | 33.51 | 62.73 |
| **Male** | 0.4742 | 0.4798 | 0.4640 | | | | | | |
| **MS_Married** | 0.5637 | 0.5214 | 0.6410 | 0.5911 | 0.5115 | 0.7415 | 0.5390 | 0.5305 | 0.5541 |
| **MS_Single** | 0.2633 | 0.3721 | 0.0643 | 0.2895 | 0.4071 | 0.0672 | 0.2397 | 0.3399 | 0.061 |
| **MS_Separ_Divor** | 0.1180 | 0.1003 | 0.1504 | 0.0967 | 0.0785 | 0.1310 | 0.1373 | 0.1204 | 0.1672 |
| **MS_Widowed** | 0.0550 | 0.0061 | 0.1442 | 0.0227 | 0.0029 | 0.0603 | 0.0840 | 0.0092 | 0.2169 |
| **Foreign** | 0.1485 | 0.1610 | 0.1257 | 0.1519 | 0.1678 | 0.1219 | 0.1454 | 0.1547 | 0.1289 |
| **Ethn_White** | 0.8008 | 0.7997 | 0.8029 | 0.8130 | 0.8102 | 0.8183 | 0.7899 | 0.7901 | 0.7896 |
| **Ethn_Black** | 0.1143 | 0.1119 | 0.1187 | 0.1031 | 0.1018 | 0.1056 | 0.1244 | 0.1212 | 0.1301 |
| **Ethn_Asian** | 0.0469 | 0.0472 | 0.0465 | 0.0458 | 0.0464 | 0.0447 | 0.0480 | 0.0479 | 0.0481 |
| **Ethn_Mixed** | 0.0203 | 0.0219 | 0.0174 | 0.0206 | 0.0223 | 0.0174 | 0.0200 | 0.0215 | 0.0174 |
| **Ethn_Other** | 0.0176 | 0.0193 | 0.0144 | 0.0175 | 0.0193 | 0.0140 | 0.0177 | 0.0193 | 0.0148 |
| **Qual_Degree** | 0.2475 | 0.2425 | 0.2567 | 0.2514 | 0.2285 | 0.2949 | 0.2440 | 0.2555 | 0.2237 |
| **Qual_Postsec** | 0.2568 | 0.2680 | 0.2363 | 0.2398 | 0.2458 | 0.2285 | 0.2721 | 0.2885 | 0.2430 |
| **Qual_Secondary** | 0.4648 | 0.4661 | 0.4625 | 0.4765 | 0.4995 | 0.4330 | 0.4543 | 0.4353 | 0.4880 |
| **Qual_Primary** | 0.0308 | 0.0234 | 0.0445 | 0.0322 | 0.0262 | 0.0436 | 0.0296 | 0.0207 | 0.0453 |
| **Exp** | 24.27 | 14.09 | 42.87 | 23.73 | 14.03 | 42.07 | 24.75 | 14.15 | 43.56 |
| **UnearnedY_per1000** | 41.45 | 45.74 | 33.61 | 34.96 | 38.69 | 27.90 | 47.30 | 52.24 | 38.55 |
| **R_South** | 0.3098 | 0.3046 | 0.3192 | 0.3049 | 0.3004 | 0.3135 | 0.3142 | 0.3085 | 0.3241 |
| **R_West** | 0.2587 | 0.2640 | 0.2490 | 0.2633 | 0.2679 | 0.2546 | 0.2546 | 0.2604 | 0.2442 |
| **R_Midwest** | 0.2291 | 0.2329 | 0.2221 | 0.2311 | 0.2346 | 0.2243 | 0.2272 | 0.2313 | 0.2201 |
| **R_Northeast** | 0.2025 | 0.1985 | 0.2097 | 0.2007 | 0.1971 | 0.2075 | 0.2040 | 0.1998 | 0.2115 |
| **Observations (‘000)** | 1,208 | 781 | 427 | 573 | 375 | 198 | 635 | 406 | 229 |
| **Period covered: 2003 to 2010** | | | | | | | | | |

**Table 2.4: Summary statistics of the sample in the U.K. (mean values)**

| | Pooled | | | Male | | | Female | | |
|---|---|---|---|---|---|---|---|---|---|
| | Full sample | Younger sample | Older sample | Full sample | Younger sample | Older sample | Full sample | Younger sample | Older sample |
| **Employed** | 0.7547 | 0.8011 | 0.6606 | 0.8067 | 0.8691 | 0.6917 | 0.7046 | 0.7397 | 0.6266 |
| **Older** | 0.3303 | | | 0.3514 | | | 0.3099 | | |
| **Mean Age** | 42.69 | 35.32 | 57.63 | 43.28 | 35.28 | 58.04 | 42.12 | 35.36 | 57.19 |
| **Male** | 0.4901 | 0.4746 | 0.5215 | | | | | | |
| **MS_Married** | 0.6011 | 0.5265 | 0.7523 | 0.6035 | 0.5089 | 0.7783 | 0.5987 | 0.5424 | 0.7240 |
| **MS_Single** | 0.2890 | 0.3964 | 0.0712 | 0.3107 | 0.4323 | 0.0863 | 0.2681 | 0.3639 | 0.0546 |
| **MS_Separ_Divor** | 0.0899 | 0.0722 | 0.1258 | 0.0742 | 0.0565 | 0.1071 | 0.1049 | 0.0864 | 0.1462 |
| **MS_Widowed** | 0.0201 | 0.0050 | 0.0507 | 0.0115 | 0.0024 | 0.0283 | 0.0283 | 0.0073 | 0.0752 |
| **Foreign** | 0.4447 | 0.4270 | 0.4807 | 0.4347 | 0.4238 | 0.4549 | 0.4543 | 0.4299 | 0.5088 |
| **Ethn_White** | 0.9214 | 0.9039 | 0.9570 | 0.9253 | 0.9074 | 0.9582 | 0.9178 | 0.9008 | 0.9556 |
| **Ethn_Black** | 0.0180 | 0.0224 | 0.0092 | 0.0160 | 0.0204 | 0.0080 | 0.0200 | 0.0242 | 0.0105 |
| **Ethn_Asian** | 0.0423 | 0.0509 | 0.0250 | 0.0413 | 0.0499 | 0.0253 | 0.0433 | 0.0517 | 0.0247 |
| **Ethn_Mixed** | 0.0055 | 0.0073 | 0.0020 | 0.0050 | 0.0067 | 0.0019 | 0.0060 | 0.0077 | 0.0022 |
| **Ethn_Other** | 0.0115 | 0.0142 | 0.0060 | 0.0111 | 0.0140 | 0.0057 | 0.0118 | 0.0143 | 0.0063 |
| **Health_problems** | 0.1902 | 0.1350 | 0.3022 | 0.1868 | 0.1224 | 0.3056 | 0.1934 | 0.1463 | 0.2984 |
| **Qual_Degree** | 0.1850 | 0.2052 | 0.1440 | 0.1939 | 0.2076 | 0.1687 | 0.1764 | 0.2031 | 0.1171 |
| **Qual_Postsec** | 0.0928 | 0.0884 | 0.1015 | 0.0814 | 0.0792 | 0.0854 | 0.1037 | 0.0967 | 0.1191 |
| **Qual_Secondary** | 0.4311 | 0.4635 | 0.3653 | 0.4488 | 0.4688 | 0.4117 | 0.4140 | 0.4586 | 0.3148 |
| **Qual_Primary** | 0.2833 | 0.2347 | 0.3817 | 0.2679 | 0.2361 | 0.3264 | 0.2981 | 0.2334 | 0.4421 |
| **Exp** | 25.01 | 17.41 | 40.41 | 25.58 | 17.38 | 40.72 | 24.46 | 17.44 | 40.08 |
| **#KidsAged_0to4** | 0.1886 | 0.2788 | 0.0057 | 0.1691 | 0.2555 | 0.0098 | 0.2074 | 0.3000 | 0.0012 |
| **#KidsAged _5to9** | 0.1974 | 0.2859 | 0.0179 | 0.1752 | 0.2550 | 0.0279 | 0.2187 | 0.3137 | 0.0071 |
| **#KidsAged_10to15** | 0.2602 | 0.3487 | 0.0807 | 0.2346 | 0.3066 | 0.1017 | 0.2848 | 0.3867 | 0.0579 |
| **R_England** | 0.8231 | 0.8241 | 0.8210 | 0.8237 | 0.8247 | 0.8218 | 0.8225 | 0.8235 | 0.8201 |
| **R_Wales** | 0.0483 | 0.0469 | 0.0511 | 0.0479 | 0.0465 | 0.0505 | 0.0487 | 0.0473 | 0.0517 |
| **R_Scotland** | 0.0894 | 0.0886 | 0.0909 | 0.0887 | 0.0880 | 0.0900 | 0.0900 | 0.0892 | 0.0920 |
| **R_NorthIreland** | 0.0393 | 0.0404 | 0.0370 | 0.0397 | 0.0408 | 0.0378 | 0.0388 | 0.0400 | 0.0362 |
| **Observations ('000)** | 2,628 | 1,760 | 868 | 1,288 | 835 | 453 | 1,340 | 925 | 415 |
| **Period covered: 2nd quarter of 2001 to 4th quarter of 2010** | | | | | | | | | |

**Table 2.5: Summary statistics of the sample in Hong Kong (mean values)**

| | Pooled | | | Male | | | Female | | |
|---|---|---|---|---|---|---|---|---|---|
| | **Full sample** | **Younger sample** | **Older sample** | **Full sample** | **Younger sample** | **Older sample** | **Full sample** | **Younger sample** | **Older sample** |
| **Employed** | 0.6141 | 0.7477 | 0.3326 | 0.7289 | 0.8511 | 0.4766 | 0.5057 | 0.6513 | 0.1929 |
| **Older** | 0.3218 | | | 0.3262 | | | 0.3176 | | |
| **Mean Age** | 43.31 | 33.77 | 63.42 | 43.18 | 33.77 | 62.60 | 43.43 | 33.77 | 64.21 |
| **Male** | 0.4856 | 0.4824 | 0.4923 | | | | | | |
| **MS_Married** | 0.6247 | 0.5699 | 0.7404 | 0.6456 | 0.5448 | 0.8538 | 0.6050 | 0.5932 | 0.6305 |
| **MS_Single** | 0.2852 | 0.3991 | 0.0451 | 0.3108 | 0.4361 | 0.0521 | 0.2610 | 0.3646 | 0.0383 |
| **MS_Separ_Divor** | 0.0268 | 0.0247 | 0.0311 | 0.0205 | 0.0171 | 0.0276 | 0.0327 | 0.0319 | 0.0345 |
| **MS_Widowed** | 0.0633 | 0.0063 | 0.1833 | 0.0230 | 0.0020 | 0.0665 | 0.1013 | 0.0104 | 0.2967 |
| **Foreign** | 0.2893 | 0.3733 | 0.1122 | 0.2715 | 0.3496 | 0.1101 | 0.3061 | 0.3954 | 0.1142 |
| **Qual_Degree** | 0.1016 | 0.1249 | 0.0524 | 0.1167 | 0.1371 | 0.0747 | 0.0873 | 0.1135 | 0.0309 |
| **Qual_Postsec** | 0.0511 | 0.0640 | 0.0237 | 0.0540 | 0.0664 | 0.0283 | 0.0483 | 0.0619 | 0.0192 |
| **Qual_Secondary** | 0.5204 | 0.6391 | 0.2703 | 0.5460 | 0.6475 | 0.3365 | 0.4963 | 0.6313 | 0.2061 |
| **Qual_Primary** | 0.3252 | 0.1701 | 0.6523 | 0.2820 | 0.1478 | 0.5590 | 0.3661 | 0.1909 | 0.7427 |
| **Exp** | 26.59 | 16.62 | 47.62 | 26.35 | 16.58 | 46.54 | 26.82 | 16.67 | 48.66 |
| **UnearnedY_per1000** | 17.26 | 17.52 | 16.72 | 13.38 | 12.94 | 14.30 | 20.93 | 21.80 | 19.07 |
| **Observations (‘000)** | 988 | 670 | 318 | 480 | 323 | 157 | 508 | 347 | 161 |
| **Period covered: 1991, 1996, 2001, 2006** | | | | | | | | | |

**Table 2.6: Marginal effects from binomial logits for employment probabilities in the U.S. (younger vs older)**

| | Pooled | | Male | | Female | |
|---|---|---|---|---|---|---|
| **Regressors** | **Younger** | **Older** | **Younger** | **Older** | **Younger** | **Older** |
| **Male** | 0.1226*** | 0.1042*** | | | | |
| | (119.340) | (54.082) | | | | |
| **MS_Single** | -0.0426*** | -0.0889*** | -0.1459*** | -0.1867*** | 0.0416*** | 0.0047 |
| | (-28.884) | (-25.205) | (-75.065) | (-36.589) | (19.487) | (0.937) |
| **MS_Separ_Divor** | -0.0132*** | -0.0070*** | -0.1233*** | -0.1119*** | 0.0540*** | 0.0712*** |
| | (-6.867) | (-2.634) | (-36.502) | (-27.491) | (22.081) | (20.637) |
| **MS_Widowed** | -0.1569*** | -0.0731*** | -0.2320*** | -0.1502*** | -0.1190*** | -0.0310*** |
| | (-20.661) | (-21.470) | (-13.814) | (-21.285) | (-13.733) | (-8.079) |
| **Foreign** | -0.0182*** | 0.0302*** | 0.0399*** | 0.0733*** | -0.0786*** | -0.0123*** |
| | (-11.355) | (9.240) | (23.275) | (15.467) | (-31.799) | (-3.020) |
| **Ethn_Mixed** | -0.0351*** | -0.0694*** | -0.0420*** | -0.0827*** | -0.0264*** | -0.0565*** |
| | (-9.680) | (-10.590) | (-9.327) | (-8.067) | (-4.933) | (-6.967) |
| **Ethn_Asian** | -0.0451*** | -0.0126** | -0.0723*** | -0.0525*** | -0.0113*** | 0.0190*** |
| | (-15.923) | (-2.567) | (-17.526) | (-6.919) | (-2.932) | (3.001) |
| **Ethn_Black** | -0.0749*** | -0.0659*** | -0.1081*** | -0.1077*** | -0.0466*** | -0.0447*** |
| | (-41.105) | (-22.763) | (-42.229) | (-23.407) | (-18.282) | (-12.570) |
| **Ethn_Other** | -0.1023*** | -0.0727*** | -0.1201*** | -0.1053*** | -0.0793*** | -0.0471*** |
| | (-24.694) | (-10.060) | (-21.105) | (-9.210) | (-13.583) | (-5.228) |
| **Qual_Degree** | 0.2293*** | 0.1008*** | 0.1590*** | 0.0356*** | 0.3011*** | 0.1546*** |
| | (103.893) | (17.769) | (59.567) | (4.479) | (86.206) | (19.017) |
| **Qual_Postsec** | 0.1688*** | 0.1023*** | 0.0954*** | 0.0389*** | 0.2427*** | 0.1566*** |
| | (65.271) | (18.014) | (29.125) | (4.853) | (59.743) | (19.502) |
| **Qual_Secondary** | 0.0562*** | 0.0829*** | 0.0148*** | 0.0426*** | 0.1148*** | 0.1224*** |
| | (17.488) | (15.254) | (3.638) | (5.513) | (22.878) | (16.633) |
| **Exp** | 0.0248*** | -0.0091*** | 0.0271*** | -0.0327*** | 0.0198*** | 0.0098*** |
| | (108.962) | (-6.804) | (100.739) | (-16.518) | (57.044) | (5.761) |
| **ExpSq** | -0.0006*** | -0.0003*** | -0.0008*** | -0.0001*** | -0.0004*** | -0.0005*** |
| | (-81.723) | (-22.036) | (-87.992) | (-3.896) | (-34.530) | (-26.426) |
| **UnearnedY_per1000** | -0.0006*** | -0.0000 | -0.0002*** | 0.0007*** | -0.0006*** | -0.0001*** |
| | (-66.603) | (-0.909) | (-15.679) | (17.059) | (-49.115) | (-4.604) |
| **R_Northeast** | -0.0005 | 0.0296*** | -0.0171*** | 0.0129*** | 0.0140*** | 0.0380*** |
| | (-0.320) | (11.034) | (-9.014) | (3.235) | (6.453) | (10.961) |
| **R_Midwest** | 0.0271*** | 0.0463*** | 0.0043** | 0.0317*** | 0.0487*** | 0.0554*** |
| | (19.512) | (17.584) | (2.483) | (8.223) | (23.929) | (16.125) |
| **R_West** | -0.0035** | 0.0023 | -0.0091*** | -0.0041 | 0.0034 | 0.0071** |
| | (-2.518) | (0.901) | (-5.219) | (-1.076) | (1.629) | (2.153) |
| **Yr_2010** | -0.0466*** | 0.0014 | -0.0540*** | -0.0140** | -0.0397*** | 0.0132*** |
| | (-21.438) | (0.377) | (-19.066) | (-2.516) | (-12.661) | (2.740) |
| **Yr_2009** | -0.0317*** | 0.0057 | -0.0424*** | -0.0037 | -0.0222*** | 0.0120** |
| | (-14.807) | (1.519) | (-15.296) | (-0.657) | (-7.188) | (2.484) |
| **Yr_2008** | 0.0075*** | 0.0266*** | 0.0097*** | 0.0253*** | 0.0019 | 0.0255*** |
| | (3.700) | (7.005) | (4.006) | (4.540) | (0.612) | (5.191) |
| **Yr_2007** | 0.0162*** | 0.0239*** | 0.0198*** | 0.0230*** | 0.0087*** | 0.0227*** |
| | (8.134) | (6.247) | (8.518) | (4.089) | (2.900) | (4.599) |
| **Yr_2006** | 0.0109*** | 0.0158*** | 0.0193*** | 0.0186*** | -0.0004 | 0.0121** |
| | (5.448) | (4.108) | (8.337) | (3.273) | (-0.120) | (2.449) |
| **Yr_2005** | 0.0049** | 0.0113*** | 0.0100*** | 0.0128** | -0.0017 | 0.0092* |
| | (2.444) | (2.941) | (4.207) | (2.246) | (-0.551) | (1.872) |
| **Yr_2004** | -0.0004 | 0.0064* | 0.0036 | 0.0042 | -0.0057* | 0.0076 |
| | (-0.191) | (1.648) | (1.496) | (0.728) | (-1.902) | (1.542) |
| **Pseudo R2** | 0.1229 | 0.2783 | 0.2052 | 0.2835 | 0.0793 | 0.2705 |
| **Observations** | 780,935 | 427,097 | 374,677 | 198,180 | 406,258 | 228,917 |

Control group: MS_Married, Ethn_White, Qual_Primary, R_South, Yr_2003
z-statistics in parentheses: *** p<0.01, ** p<0.05, * p<0.1

**Table 2.7: Marginal effects from binomial logits for employment probabilities in the U.K. (younger vs older)**

| | Pooled | | Male | | Female | |
|---|---|---|---|---|---|---|
| **Regressors** | **Younger** | **Older** | **Younger** | **Older** | **Younger** | **Older** |
| **Male** | 0.1166*** | 0.0773*** | | | | |
| | (212.066) | (68.456) | | | | |
| **MS_Single** | -0.0926*** | -0.1314*** | -0.0980*** | -0.2043*** | -0.0780*** | -0.0279*** |
| | (-116.890) | (-55.003) | (-104.227) | (-66.649) | (-60.800) | (-7.332) |
| **MS_Separ_Divor** | -0.0697*** | -0.0179*** | -0.1021*** | -0.1038*** | -0.0505*** | 0.0510*** |
| | (-50.924) | (-10.608) | (-45.450) | (-39.921) | (-26.728) | (22.465) |
| **MS_Widowed** | -0.1216*** | -0.0553*** | -0.1780*** | -0.1270*** | -0.1208*** | -0.0189*** |
| | (-23.479) | (-21.346) | (-15.378) | (-26.244) | (-18.522) | (-5.932) |
| **Foreign** | -0.0274*** | -0.0423*** | -0.0236*** | -0.0396*** | -0.0386*** | -0.0443*** |
| | (-19.956) | (-9.398) | (-15.937) | (-6.524) | (-16.421) | (-6.657) |
| **Ethn_Mixed** | -0.0735*** | 0.0125 | -0.0673*** | -0.0339* | -0.0823*** | 0.0480*** |
| | (-19.152) | (1.054) | (-14.485) | (-1.948) | (-13.760) | (2.855) |
| **Ethn_Asian** | -0.1116*** | -0.1733*** | -0.0572*** | -0.1421*** | -0.1844*** | -0.2182*** |
| | (-67.573) | (-42.640) | (-30.899) | (-25.314) | (-68.254) | (-37.451) |
| **Ethn_Black** | -0.0908*** | -0.0061 | -0.1156*** | -0.0628*** | -0.0727*** | 0.0296*** |
| | (-39.327) | (-1.038) | (-35.150) | (-6.900) | (-21.556) | (3.740) |
| **Ethn_Other** | -0.1412*** | -0.1225*** | -0.1118*** | -0.1361*** | -0.1765*** | -0.1163*** |
| | (-44.244) | (-15.068) | (-28.515) | (-11.499) | (-35.430) | (-10.297) |
| **Health_problems** | -0.3169*** | -0.3549*** | -0.3180*** | -0.3562*** | -0.3184*** | -0.3493*** |
| | (-269.782) | (-297.803) | (-185.701) | (-219.213) | (-196.375) | (-198.824) |
| **Qual_Degree** | 0.1497*** | 0.0478*** | 0.0837*** | -0.0292*** | 0.2115*** | 0.1317*** |
| | (304.049) | (27.018) | (154.185) | (-11.899) | (254.107) | (51.928) |
| **Qual_Postsec** | 0.1241*** | 0.0692*** | 0.0672*** | 0.0155*** | 0.1827*** | 0.1162*** |
| | (253.563) | (39.793) | (118.262) | (5.785) | (223.890) | (49.275) |
| **Qual_Secondary** | 0.1123*** | 0.0797*** | 0.0666*** | 0.0479*** | 0.1580*** | 0.1127*** |
| | (183.237) | (66.686) | (102.770) | (30.161) | (152.646) | (62.832) |
| **Exp** | 0.0087*** | -0.0844*** | 0.0071*** | -0.1051*** | 0.0115*** | -0.0608*** |
| | (67.719) | (-80.303) | (57.278) | (-77.191) | (49.924) | (-37.256) |
| **ExpSq** | -0.0002*** | 0.0008*** | -0.0002*** | 0.0010*** | -0.0003*** | 0.0005*** |
| | (-57.765) | (63.585) | (-51.218) | (63.486) | (-47.339) | (27.776) |
| **#KidsAged_0to4** | -0.0922*** | -0.0208*** | -0.0042*** | -0.0155** | -0.1911*** | -0.2374*** |
| | (-194.361) | (-3.009) | (-6.821) | (-2.191) | (-230.897) | (-10.653) |
| **#KidsAged_5to9** | -0.0536*** | -0.0314*** | -0.0112*** | -0.0174*** | -0.1040*** | -0.1627*** |
| | (-114.204) | (-7.760) | (-18.963) | (-3.959) | (-133.740) | (-18.004) |
| **#KidsAged_10to15** | -0.0316*** | -0.0084*** | -0.0085*** | 0.0159*** | -0.0612*** | -0.0624*** |
| | (-75.325) | (-4.378) | (-17.262) | (6.738) | (-88.289) | (-19.344) |
| **R_Wales** | -0.0166*** | -0.0481*** | -0.0218*** | -0.0518*** | -0.0110*** | -0.0435*** |
| | (-12.311) | (-18.630) | (-14.094) | (-15.049) | (-4.985) | (-11.329) |
| **R_Scotland** | -0.0176*** | -0.0177*** | -0.0247*** | -0.0289*** | -0.0095*** | -0.0057** |
| | (-16.942) | (-9.117) | (-20.583) | (-11.118) | (-5.647) | (-1.991) |
| **R_NorthIreland** | -0.0400*** | -0.1053*** | -0.0381*** | -0.0868*** | -0.0391*** | -0.1271*** |
| | (-25.637) | (-33.209) | (-20.936) | (-20.658) | (-15.576) | (-26.913) |
| **Yr_2010** | 0.0098*** | -0.0730*** | 0.0021 | -0.0285*** | 0.0250*** | -0.1314*** |
| | (5.788) | (-13.410) | (1.168) | (-4.060) | (8.873) | (-16.235) |
| **Yr_2009** | 0.0133*** | -0.0798*** | 0.0047*** | -0.0308*** | 0.0292*** | -0.1417*** |
| | (8.032) | (-14.616) | (2.659) | (-4.373) | (10.563) | (-17.519) |
| **Yr_2008** | 0.0288*** | -0.0643*** | 0.0231*** | -0.0097 | 0.0391*** | -0.1317*** |
| | (18.908) | (-11.941) | (15.539) | (-1.429) | (14.659) | (-16.326) |
| **Yr_2007** | 0.0278*** | 0.0975*** | 0.0252*** | 0.0840*** | 0.0343*** | 0.1109*** |
| | (18.185) | (23.170) | (17.267) | (15.346) | (12.724) | (17.162) |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Yr_2006** | 0.0038*** | 0.0548*** | 0.0046*** | 0.0457*** | 0.0019 | 0.0628*** |
| | (3.166) | (22.336) | (3.628) | (14.758) | (0.923) | (16.269) |
| **Yr_2005** | 0.0137*** | 0.0497*** | 0.0098*** | 0.0427*** | 0.0169*** | 0.0555*** |
| | (11.782) | (19.876) | (8.101) | (13.522) | (8.500) | (14.104) |
| **Yr_2004** | 0.0042*** | 0.0427*** | 0.0065*** | 0.0391*** | 0.0006 | 0.0453*** |
| | (3.310) | (16.052) | (4.969) | (11.720) | (0.282) | (10.796) |
| **Yr_2003** | 0.0020* | 0.0332*** | 0.0028** | 0.0305*** | 0.0002 | 0.0354*** |
| | (1.664) | (13.203) | (2.261) | (9.617) | (0.115) | (8.973) |
| **Yr_2002** | 0.0003 | 0.0160*** | 0.0005 | 0.0135*** | -0.0004 | 0.0188*** |
| | (0.223) | (6.239) | (0.403) | (4.153) | (-0.192) | (4.738) |
| **Pseudo R2** | 0.1922 | 0.1801 | 0.2056 | 0.1970 | 0.1949 | 0.1745 |
| **Observations** | 1,759,989 | 867,863 | 835,276 | 452,620 | 924,713 | 415,243 |

Control group: MS_Married, Ethn_White, Qual_Primary, R_England, Yr_2001
z-statistics in parentheses: *** p<0.01, ** p<0.05, * p<0.1

**Table 2.8: Marginal effects from binomial logits for employment probabilities in Hong Kong (younger vs older)**

| | Pooled | | Male | | Female | |
|---|---|---|---|---|---|---|
| **Regressors** | **Younger** | **Older** | **Younger** | **Older** | **Younger** | **Older** |
| **Male** | 0.1892*** | 0.2672*** | | | | |
| | (181.850) | (142.700) | | | | |
| **MS_Single** | 0.1027*** | -0.0065* | -0.0695*** | -0.1643*** | 0.2489*** | 0.1222*** |
| | (72.722) | (-1.689) | (-41.897) | (-28.139) | (117.714) | (20.206) |
| **MS_Separ_Divor** | 0.0122*** | -0.0109** | -0.1223*** | -0.1216*** | 0.0881*** | 0.0351*** |
| | (3.971) | (-2.535) | (-18.409) | (-14.821) | (22.084) | (8.619) |
| **MS_Widowed** | 0.0139** | -0.0244*** | -0.1377*** | -0.1252*** | 0.0905*** | 0.0056** |
| | (2.532) | (-8.085) | (-7.409) | (-17.140) | (13.753) | (2.570) |
| **Foreign** | 0.0958*** | 0.0110*** | 0.0248*** | 0.0119** | 0.1418*** | 0.0101*** |
| | (71.799) | (3.955) | (15.440) | (2.242) | (65.098) | (4.258) |
| **Qual_Degree** | 0.2038*** | -0.0474*** | 0.1014*** | -0.1110*** | 0.2654*** | -0.0033 |
| | (209.145) | (-14.205) | (103.697) | (-17.853) | (136.823) | (-0.923) |
| **Qual_Postsec** | 0.1764*** | -0.0191*** | 0.0829*** | -0.0768*** | 0.2434*** | 0.0090** |
| | (164.925) | (-3.900) | (81.919) | (-8.387) | (112.101) | (1.961) |
| **Qual_Secondary** | 0.1072*** | 0.0252*** | 0.0566*** | 0.0297*** | 0.1243*** | 0.0127*** |
| | (70.150) | (12.680) | (31.312) | (8.352) | (53.482) | (7.107) |
| **Exp** | 0.0357*** | -0.0316*** | 0.0258*** | -0.0509*** | 0.0357*** | -0.0140*** |
| | (154.759) | (-25.667) | (123.757) | (-22.644) | (89.094) | (-12.810) |
| **ExpSq** | -0.0008*** | 0.0000** | -0.0006*** | 0.0001*** | -0.0009*** | -0.0000 |
| | (-132.409) | (2.304) | (-109.393) | (3.794) | (-80.405) | (-0.921) |
| **UnearnedY_per1000** | -0.0008*** | -0.0018*** | -0.0009*** | -0.0033*** | -0.0002*** | -0.0007*** |
| | (-32.657) | (-39.764) | (-30.137) | (-35.281) | (-6.353) | (-21.675) |
| **Yr_2006** | 0.0035** | -0.0608*** | -0.0694*** | -0.1480*** | 0.0680*** | -0.0055*** |
| | (2.017) | (-26.105) | (-28.101) | (-33.128) | (24.957) | (-2.621) |
| **Yr_2001** | 0.0193*** | -0.0536*** | -0.0546*** | -0.1144*** | 0.0799*** | -0.0106*** |
| | (11.351) | (-22.571) | (-23.329) | (-24.856) | (29.733) | (-4.996) |
| **Yr_1996** | -0.0107*** | -0.0270*** | -0.0107*** | -0.0372*** | -0.0084*** | -0.0174*** |
| | (-6.714) | (-10.956) | (-6.138) | (-7.808) | (-3.291) | (-8.255) |
| **Pseudo R2** | 0.1201 | 0.3154 | 0.1901 | 0.3002 | 0.0881 | 0.2263 |
| **Observations** | 670,219 | 317,964 | 323,318 | 156,535 | 346,901 | 161,429 |

Control group: MS_Married, Qual_Primary, Yr_1991
z-statistics in parentheses: *** p<0.01, ** p<0.05, * p<0.1

**Table 2.9: Marginal effects from binomial logits for employment probabilities in the U.S. (with age dummies)**

| Regressors | Pooled | Male | Female |
|---|---|---|---|
| **Male** | 0.1310*** | | |
| | (127.924) | | |
| **MS_Single** | -0.0539*** | -0.2009*** | 0.0530*** |
| | (-33.698) | (-86.482) | (23.861) |
| **MS_Separ_Divor** | -0.0119*** | -0.1306*** | 0.0672*** |
| | (-7.088) | (-47.826) | (30.828) |
| **MS_Widowed** | -0.0778*** | -0.1591*** | -0.0504*** |
| | (-24.327) | (-23.546) | (-13.279) |
| **Foreign** | -0.0052*** | 0.0568*** | -0.0637*** |
| | (-3.216) | (28.533) | (-27.762) |
| **Ethn_Mixed** | -0.0507*** | -0.0626*** | -0.0392*** |
| | (-13.964) | (-12.555) | (-7.748) |
| **Ethn_Asian** | -0.0429*** | -0.0777*** | -0.0067* |
| | (-15.715) | (-19.040) | (-1.825) |
| **Ethn_Black** | -0.0816*** | -0.1230*** | -0.0539*** |
| | (-47.885) | (-48.879) | (-23.401) |
| **Ethn_Other** | -0.1070*** | -0.1374*** | -0.0785*** |
| | (-27.342) | (-23.903) | (-14.770) |
| **Qual_Degree** | 0.0666*** | 0.0662*** | 0.0750*** |
| | (17.105) | (13.836) | (12.537) |
| **Qual_Postsec** | 0.0550*** | 0.0217*** | 0.0925*** |
| | (15.994) | (4.778) | (17.853) |
| **Qual_Secondary** | 0.0468*** | 0.0189*** | 0.0869*** |
| | (14.954) | (4.554) | (18.379) |
| **Exp** | -0.0294*** | -0.0162*** | -0.0417*** |
| | (-44.558) | (-19.370) | (-42.871) |
| **ExpSq** | -0.0001*** | -0.0002*** | -0.0001*** |
| | (-18.843) | (-18.262) | (-7.067) |
| **UnearnedY_per1000** | -0.0005*** | -0.0001*** | -0.0005*** |
| | (-49.168) | (-4.240) | (-39.372) |
| **R_Northeast** | 0.0090*** | -0.0097*** | 0.0227*** |
| | (6.130) | (-4.861) | (11.063) |
| **R_Midwest** | 0.0386*** | 0.0151*** | 0.0588*** |
| | (27.736) | (8.102) | (29.906) |
| **R_West** | -0.0006 | -0.0067*** | 0.0065*** |
| | (-0.463) | (-3.615) | (3.348) |
| **Age_20to24** | 0.2781*** | 0.2179*** | 0.3150*** |
| | (189.477) | (139.883) | (122.739) |
| **Age_25to29** | 0.3618*** | 0.2744*** | 0.4310*** |
| | (247.296) | (164.429) | (181.969) |
| **Age_30to34** | 0.4060*** | 0.3017*** | 0.4912*** |
| | (259.903) | (153.156) | (214.881) |
| **Age_35to39** | 0.4457*** | 0.3277*** | 0.5399*** |
| | (266.901) | (143.435) | (236.321) |
| **Age_40to44** | 0.4832*** | 0.3519*** | 0.5835*** |

| | | | |
|---|---|---|---|
| | (263.146) | (131.777) | (242.274) |
| **Age_45to49** | 0.5028*** | 0.3651*** | 0.6041*** |
| | (264.291) | (127.769) | (247.874) |
| **Age_50to54** | 0.4945*** | 0.3587*** | 0.5941*** |
| | (278.597) | (134.680) | (259.670) |
| **Age_55to59** | 0.4732*** | 0.3408*** | 0.5718*** |
| | (302.965) | (147.229) | (277.868) |
| **Age_60to64** | 0.4441*** | 0.3162*** | 0.5426*** |
| | (338.155) | (164.699) | (301.277) |
| **Age_over64** | 0.5863*** | 0.3913*** | 0.7280*** |
| | (179.425) | (83.804) | (183.089) |
| **Yr_2010** | -0.0387*** | -0.0513*** | -0.0275*** |
| | (-18.712) | (-17.909) | (-9.601) |
| **Yr_2009** | -0.0252*** | -0.0379*** | -0.0146*** |
| | (-12.224) | (-13.349) | (-5.113) |
| **Yr_2008** | 0.0122*** | 0.0138*** | 0.0084*** |
| | (6.048) | (5.192) | (2.924) |
| **Yr_2007** | 0.0189*** | 0.0224*** | 0.0131*** |
| | (9.418) | (8.566) | (4.601) |
| **Yr_2006** | 0.0125*** | 0.0209*** | 0.0029 |
| | (6.214) | (7.970) | (1.004) |
| **Yr_2005** | 0.0065*** | 0.0111*** | 0.0013 |
| | (3.224) | (4.151) | (0.457) |
| **Yr_2004** | 0.0009 | 0.0040 | -0.0027 |
| | (0.443) | (1.472) | (-0.941) |
| **Observations** | 1,208,032 | 572,857 | 635,175 |

Control group: MS_Married, Ethn_White, Qual_Primary, R_South, Age_14to19, Yr_2003
z-statistics in parentheses: *** p<0.01, ** p<0.05, * p<0.1

**Table 2.10: Marginal effects from binomial logits for employment probabilities in the U.K. (with age dummies)**

| Regressors | Pooled | Male | Female |
|---|---|---|---|
| **Male** | 0.1122*** | | |
| | (213.265) | | |
| **MS_Single** | -0.1017*** | -0.1368*** | -0.0637*** |
| | (-115.823) | (-115.418) | (-48.430) |
| **MS_Separ_Divor** | -0.0456*** | -0.0944*** | -0.0093*** |
| | (-44.468) | (-58.818) | (-6.641) |
| **MS_Widowed** | -0.0412*** | -0.0977*** | -0.0297*** |
| | (-21.462) | (-27.062) | (-11.680) |
| **Foreign** | -0.0623*** | -0.0531*** | -0.0758*** |
| | (-40.796) | (-27.284) | (-31.881) |
| **Ethn_Mixed** | -0.0761*** | -0.0842*** | -0.0744*** |
| | (-18.670) | (-14.909) | (-12.553) |
| **Ethn_Asian** | -0.1362*** | -0.0834*** | -0.1987*** |
| | (-81.074) | (-38.093) | (-78.784) |
| **Ethn_Black** | -0.0902*** | -0.1291*** | -0.0644*** |
| | (-38.529) | (-35.745) | (-19.862) |
| **Ethn_Other** | -0.1581*** | -0.1458*** | -0.1776*** |
| | (-49.513) | (-32.450) | (-38.292) |
| **Qual_Degree** | 0.1349*** | 0.0754*** | 0.1938*** |
| | (211.205) | (91.318) | (201.131) |
| **Qual_Postsec** | 0.1214*** | 0.0659*** | 0.1731*** |
| | (200.959) | (77.999) | (193.446) |
| **Qual_Secondary** | 0.1032*** | 0.0672*** | 0.1449*** |
| | (181.639) | (98.617) | (161.448) |
| **Exp** | -0.0142*** | -0.0118*** | -0.0164*** |
| | (-64.473) | (-44.428) | (-45.891) |
| **ExpSq** | 0.0002*** | 0.0002*** | 0.0002*** |
| | (56.864) | (40.343) | (38.992) |
| **Health** | -0.3368*** | -0.3307*** | -0.3295*** |
| | (-399.750) | (-277.564) | (-276.424) |
| **Child4s_in_Hh** | -0.1067*** | -0.0008 | -0.2046*** |
| | (-189.703) | (-0.930) | (-227.864) |
| **Child5to9s_in_Hh** | -0.0608*** | -0.0100*** | -0.1108*** |
| | (-109.503) | (-12.148) | (-131.319) |
| **Child10to15s_in_Hh** | -0.0329*** | -0.0029*** | -0.0636*** |
| | (-67.654) | (-4.481) | (-85.417) |
| **R_Wales** | -0.0277*** | -0.0329*** | -0.0217*** |
| | (-21.629) | (-20.519) | (-11.025) |
| **R_Scotland** | -0.0171*** | -0.0259*** | -0.0070*** |
| | (-17.751) | (-21.580) | (-4.722) |
| **R_NorthIreland** | -0.0593*** | -0.0536*** | -0.0634*** |
| | (-39.087) | (-27.980) | (-27.355) |
| **Age_20to24** | 0.0854*** | 0.0770*** | 0.0922*** |
| | (66.758) | (67.853) | (38.075) |
| **Age_25to29** | 0.1447*** | 0.1181*** | 0.1729*** |

| | | | |
|---|---|---|---|
| | (132.424) | (123.805) | (83.633) |
| **Age_30to34** | 0.1754*** | 0.1376*** | 0.2152*** |
| | (153.317) | (129.957) | (102.010) |
| **Age_35to39** | 0.1979*** | 0.1511*** | 0.2416*** |
| | (158.554) | (120.808) | (106.195) |
| **Age_40to44** | 0.2071*** | 0.1567*** | 0.2478*** |
| | (154.009) | (112.738) | (99.245) |
| **Age_45to49** | 0.2035*** | 0.1564*** | 0.2379*** |
| | (142.751) | (109.052) | (86.787) |
| **Age_50to54** | 0.1882*** | 0.1482*** | 0.2148*** |
| | (111.142) | (91.964) | (64.154) |
| **Age_55to59** | 0.1481*** | 0.1274*** | 0.1543*** |
| | (59.659) | (57.906) | (31.157) |
| **Age_60to64** | 0.0739*** | 0.0696*** | 0.1206*** |
| | (18.533) | (16.862) | (20.842) |
| **Age_over64** | -0.0150** | 0.0379*** | -0.0651*** |
| | (-2.390) | (6.972) | (-5.866) |
| **Yr_2010** | 0.0166*** | 0.0159*** | 0.0097*** |
| | (9.544) | (7.707) | (3.410) |
| **Yr_2009** | 0.0171*** | 0.0172*** | 0.0094*** |
| | (9.885) | (8.414) | (3.329) |
| **Yr_2008** | 0.0322*** | 0.0356*** | 0.0202*** |
| | (19.594) | (19.264) | (7.297) |
| **Yr_2007** | 0.0706*** | 0.0601*** | 0.0818*** |
| | (49.647) | (37.999) | (34.506) |
| **Yr_2006** | 0.0190*** | 0.0171*** | 0.0187*** |
| | (16.622) | (12.921) | (10.055) |
| **Yr_2005** | 0.0242*** | 0.0200*** | 0.0274*** |
| | (21.340) | (15.167) | (14.926) |
| **Yr_2004** | 0.0158*** | 0.0171*** | 0.0128*** |
| | (12.847) | (12.174) | (6.433) |
| **Yr_2003** | 0.0111*** | 0.0116*** | 0.0098*** |
| | (9.625) | (8.645) | (5.308) |
| **Yr_2002** | 0.0048*** | 0.0046*** | 0.0049*** |
| | (4.154) | (3.378) | (2.640) |
| **Observations** | 2,627,852 | 1,287,896 | 1,339,956 |

Control group: MS_Married, Ethn_White, Qual_Primary, R_England, Age_16to19, Yr_2001

z-statistics in parentheses: *** p<0.01, ** p<0.05, * p<0.1

**Table 2.11: Marginal effects from binomial logits for employment probabilities in Hong Kong (with age dummies)**

| Regressors | Pooled | Male | Female |
|---|---|---|---|
| **Male** | 0.2954*** | | |
| | (246.121) | | |
| **MS_Single** | 0.1085*** | -0.1483*** | 0.2893*** |
| | (59.261) | (-54.482) | (114.329) |
| **MS_Separ_Divor** | 0.0094*** | -0.1426*** | 0.1003*** |
| | (2.708) | (-22.916) | (22.731) |
| **MS_Widowed** | -0.0249*** | -0.1145*** | 0.0518*** |
| | (-6.694) | (-16.294) | (11.220) |
| **Foreign** | 0.0966*** | 0.0377*** | 0.1269*** |
| | (59.200) | (18.119) | (54.622) |
| **Qual_Degree** | 0.1856*** | 0.1161*** | 0.2084*** |
| | (72.679) | (48.542) | (45.537) |
| **Qual_Postsec** | 0.1755*** | 0.0961*** | 0.2129*** |
| | (67.371) | (36.511) | (47.073) |
| **Qual_Secondary** | 0.0980*** | 0.0575*** | 0.0985*** |
| | (63.002) | (30.348) | (45.289) |
| **Exp** | 0.0044*** | 0.0178*** | -0.0006 |
| | (7.962) | (28.382) | (-0.813) |
| **ExpSq** | -0.0003*** | -0.0003*** | -0.0003*** |
| | (-40.708) | (-48.129) | (-24.495) |
| **UnearnedY_per1000** | -0.0013*** | -0.0019*** | -0.0006*** |
| | (-44.488) | (-49.290) | (-15.338) |
| **Age_20to24** | 0.3161*** | 0.1547*** | 0.4026*** |
| | (192.985) | (88.683) | (120.154) |
| **Age_25to29** | 0.3952*** | 0.1985*** | 0.5163*** |
| | (243.587) | (97.672) | (162.112) |
| **Age_30to34** | 0.3939*** | 0.1868*** | 0.5116*** |
| | (168.434) | (57.882) | (113.234) |
| **Age_35to39** | 0.3967*** | 0.1600*** | 0.5205*** |
| | (137.347) | (31.965) | (97.768) |
| **Age_40to44** | 0.4105*** | 0.1451*** | 0.5481*** |
| | (137.884) | (22.378) | (107.336) |
| **Age_45to49** | 0.4104*** | 0.1187*** | 0.5600*** |
| | (146.758) | (14.322) | (125.287) |
| **Age_50to54** | 0.3981*** | 0.0918*** | 0.5521*** |
| | (145.422) | (8.939) | (129.352) |
| **Age_55to59** | 0.3743*** | 0.0218 | 0.5283*** |
| | (115.523) | (1.469) | (104.177) |
| **Age_60to64** | 0.3461*** | -0.0874*** | 0.5058*** |
| | (81.030) | (-4.169) | (79.738) |
| **Age_over64** | 0.3272*** | -0.2163*** | 0.5182*** |
| | (38.614) | (-8.452) | (43.597) |
| **Yr_2006** | -0.0323*** | -0.1199*** | 0.0503*** |
| | (-16.005) | (-43.932) | (17.889) |
| **Yr_2001** | -0.0136*** | -0.0952*** | 0.0578*** |

| | | | |
|---|---|---|---|
| | (-6.715) | (-35.204) | (20.342) |
| **Yr_1996** | -0.0248*** | -0.0248*** | -0.0192*** |
| | (-13.047) | (-10.550) | (-7.415) |
| **Observations** | 988,183 | 479,853 | 508,330 |

Control group: MS_Married, Qual_Primary, Age_16to19, Yr_1991
z-statistics in parentheses: *** p<0.01, ** p<0.05, * p<0.1

## Table 2.12: Non-linear decompositions of older/younger differences in employment probabilities in the U.S.

| Overall Results | | | | | | |
|---|---|---|---|---|---|---|
| | **Pooled** | | **Male** | | **Female** | |
| **Older – Younger =Difference** | 0.4795*** – 0.7177*** = -0.2382*** | | 0.5442*** – 0.7715*** = -0.2273*** | | 0.4234*** – 0.6681*** = -0.2446*** | |
| **Total explained** | -0.2433*** | | -0.3584*** | | -0.1089*** | |
| **Total unexplained** | 0.0050 | | 0.1311*** | | -0.1357*** | |
| **Detailed Results** | | | | | | |
| **Regressors** | **Explained** | **Unexplained** | **Explained** | **Unexplained** | **Explained** | **Unexplained** |
| **Male** | -0.0018*** | -0.0063** | | | | |
| | (-16.383) | (-2.095) | | | | |
| **MS_Single** | 0.0119*** | -0.0005** | 0.0430*** | 0.0014*** | -0.0117*** | -0.0017*** |
| | (28.039) | (-2.016) | (67.811) | (8.611) | (-19.546) | (-7.366) |
| **MS_Separ_Divor** | -0.0006*** | 0.0004* | -0.0050*** | 0.0035*** | 0.0026*** | 0.0011** |
| | (-6.912) | (1.702) | (-33.655) | (11.602) | (19.294) | (2.221) |
| **MS_Widowed** | -0.0172*** | 0.0035** | -0.0089*** | 0.0034*** | -0.0230*** | 0.0131*** |
| | (-23.345) | (2.079) | (-16.977) | (7.814) | (-14.726) | (9.523) |
| **Foreign** | 0.0006*** | 0.0016** | -0.0018*** | -0.0001 | 0.0019*** | 0.0061*** |
| | (11.291) | (2.071) | (-19.521) | (-0.187) | (21.265) | (14.057) |
| **Ethn_Mixed** | 0.0001*** | -0.0001* | 0.0002*** | -0.0001 | 0.0001*** | -0.0004*** |
| | (8.693) | (-1.770) | (7.920) | (-1.151) | (4.618) | (-3.000) |
| **Ethn_Asian** | 0.0000 | 0.0005** | 0.0001*** | 0.0010*** | -0.0000 | 0.0010*** |
| | (1.517) | (2.026) | (2.868) | (6.333) | (-0.468) | (4.141) |
| **Ethn_Black** | -0.0004*** | 0.0007** | -0.0003*** | 0.0023*** | -0.0004*** | 0.0002 |
| | (-10.715) | (2.003) | (-4.362) | (9.679) | (-8.899) | (0.582) |
| **Ethn_Other** | 0.0004*** | 0.0002* | 0.0005*** | 0.0004*** | 0.0003*** | 0.0003*** |
| | (16.158) | (1.948) | (13.075) | (5.066) | (9.744) | (2.822) |
| **Qual_Degree** | 0.0037*** | -0.0163** | 0.0126*** | -0.0374*** | -0.0117*** | -0.0378*** |
| | (16.727) | (-2.109) | (33.679) | (-28.324) | (-25.748) | (-23.218) |
| **Qual_Postsec** | -0.0056*** | -0.0083** | -0.0017*** | -0.0136*** | -0.0125*** | -0.0240*** |
| | (-31.344) | (-2.103) | (-12.683) | (-13.799) | (-30.315) | (-14.389) |
| **Qual_Secondary** | -0.0002*** | 0.0010 | -0.0009*** | 0.0028 | 0.0062*** | -0.0006 |
| | (-3.767) | (1.076) | (-3.627) | (1.555) | (19.453) | (-0.189) |
| **Exp** | 0.6562*** | -0.4177** | 0.7012*** | -1.3172*** | 0.5837*** | -0.3419*** |
| | (195.656) | (-2.078) | (193.134) | (-42.893) | (90.588) | (-6.385) |
| **ExpSq** | -0.8960*** | 0.1987** | -1.0980*** | 0.9014*** | -0.6518*** | -0.1540*** |
| | (-142.560) | (2.018) | (-185.363) | (54.197) | (-48.175) | (-4.724) |
| **UnearnedY_per1000** | 0.0065*** | 0.0059** | 0.0018*** | 0.0109*** | 0.0084*** | 0.0148*** |
| | (53.801) | (2.105) | (15.195) | (21.846) | (39.104) | (20.517) |
| **R_Northeast** | -0.0000 | 0.0015** | -0.0002*** | 0.0034*** | 0.0002*** | 0.0033*** |
| | (-0.320) | (2.051) | (-6.555) | (8.276) | (5.527) | (5.437) |
| **R_Midwest** | -0.0003*** | 0.0005* | -0.0000** | 0.0021*** | -0.0006*** | 0.0002 |
| | (-11.028) | (1.735) | (-2.378) | (4.874) | (-9.315) | (0.313) |
| **R_West** | 0.0000** | 0.0004 | 0.0001*** | 0.0012** | -0.0001 | 0.0006 |
| | (2.499) | (1.515) | (4.744) | (2.418) | (-1.616) | (0.892) |
| **Yr_2010** | -0.0005*** | 0.0019** | -0.0005*** | 0.0038*** | -0.0004*** | 0.0050*** |

| | | | | | | |
|---|---|---|---|---|---|---|
| | (-13.728) | (2.075) | (-10.316) | (10.512) | (-9.086) | (9.432) |
| **Yr_2009** | -0.0003*** | 0.0014** | -0.0004*** | 0.0034*** | -0.0002*** | 0.0032*** |
| | (-10.752) | (2.057) | (-8.931) | (9.401) | (-6.042) | (6.116) |
| **Yr_2008** | 0.0000*** | 0.0005* | 0.0001*** | 0.0004 | 0.0000 | 0.0021*** |
| | (3.485) | (1.813) | (3.525) | (1.121) | (0.610) | (4.003) |
| **Yr_2007** | 0.0000*** | 0.0001 | 0.0001*** | -0.0006* | 0.0000* | 0.0011** |
| | (3.397) | (0.468) | (2.908) | (-1.852) | (1.767) | (2.259) |
| **Yr_2006** | -0.0000*** | 0.0000 | -0.0001*** | -0.0008** | 0.0000 | 0.0011** |
| | (-3.283) | (0.283) | (-3.067) | (-2.331) | (0.120) | (2.121) |
| **Yr_2005** | -0.0000** | 0.0001 | -0.0000*** | -0.0002 | 0.0000 | 0.0009* |
| | (-2.319) | (0.926) | (-3.292) | (-0.731) | (0.548) | (1.874) |
| **Yr_2004** | 0.0000 | 0.0002 | -0.0000 | -0.0001 | 0.0000* | 0.0011** |
| | (0.191) | (1.204) | (-1.469) | (-0.319) | (1.876) | (2.335) |
| **Constant** | | 0.2354** | | 0.5598*** | | 0.3693*** |
| | | (2.099) | | (33.827) | | (13.442) |
| **Observations** | 1,208,032 | | 572,857 | | 635,175 | |

Control group: MS_Married, Ethn_White, Qual_Primary, R_South, Yr_2003
z-statistics in parentheses: *** p<0.01, ** p<0.05, * p<0.1

## Table 2.13: Non-linear decompositions of older/younger differences in employment probabilities in the U.K.

| Overall Results | | | | | | |
|---|---|---|---|---|---|---|
| | **Pooled** | | **Male** | | **Female** | |
| **Older – Younger =Difference** | 0.6606*** – 0.8011*** = -0.1405*** | | 0.6917*** – 0.8691*** = -0.1773*** | | 0.6266*** – 0.7397*** = -0.1131*** | |
| **Total explained** | -0.0753*** | | -0.1576*** | | -0.0876*** | |
| **Total unexplained** | -0.0652*** | | -0.0197*** | | -0.0255*** | |
| **Detailed Results** | | | | | | |
| **Regressors** | **Explained** | **Unexplained** | **Explained** | **Unexplained** | **Explained** | **Unexplained** |
| **Male** | 0.0078*** | -0.0393*** | | | | |
| | (63.813) | (-74.401) | | | | |
| **MS_Single** | 0.0403*** | 0.0011*** | 0.0583*** | 0.0015*** | 0.0253*** | 0.0025*** |
| | (110.569) | (10.231) | (115.327) | (8.406) | (63.054) | (15.689) |
| **MS_Separ_Divor** | - 0.0046*** | 0.0067*** | - 0.0069*** | 0.0037*** | - 0.0031*** | 0.0105*** |
| | (-50.816) | (33.632) | (-51.050) | (9.209) | (-27.183) | (22.620) |
| **MS_Widowed** | - 0.0062*** | 0.0034*** | - 0.0051*** | 0.0017*** | - 0.0076*** | 0.0056*** |
| | (-27.859) | (17.454) | (-21.913) | (7.917) | (-20.757) | (14.650) |
| **Foreign** | - 0.0021*** | 0.0009 | - 0.0014*** | 0.0032** | - 0.0033*** | 0.0022 |
| | (-19.636) | (0.567) | (-14.699) | (2.420) | (-16.303) | (0.951) |
| **Ethn_Mixed** | 0.0005*** | 0.0002*** | 0.0005*** | 0.0001*** | 0.0004*** | 0.0002*** |
| | (20.858) | (8.717) | (16.883) | (4.681) | (14.457) | (7.236) |
| **Ethn_Asian** | 0.0033*** | -0.0001 | 0.0021*** | -0.0001** | 0.0045*** | 0.0000 |
| | (62.777) | (-1.614) | (33.571) | (-2.258) | (56.443) | (0.172) |
| **Ethn_Black** | 0.0014*** | 0.0007*** | 0.0018*** | 0.0004*** | 0.0010*** | 0.0008*** |
| | (40.195) | (18.158) | (37.752) | (8.441) | (21.945) | (11.792) |
| **Ethn_Other** | 0.0012*** | 0.0003*** | 0.0012*** | 0.0002*** | 0.0013*** | 0.0003*** |
| | (41.825) | (8.587) | (30.369) | (5.362) | (30.615) | (7.157) |
| **Health_problems** | - 0.0517*** | 0.0059*** | - 0.0584*** | 0.0118*** | - 0.0420*** | 0.0005 |
| | (-159.902) | (19.657) | (-180.865) | (10.169) | (-147.276) | (1.167) |
| **Qual_Degree** | - 0.0177*** | -0.0267*** | - 0.0083*** | -0.0215*** | - 0.0265*** | -0.0172*** |
| | (-100.200) | (-94.737) | (-49.944) | (-10.264) | (-109.512) | (-27.627) |
| **Qual_Postsec** | 0.0035*** | -0.0157*** | 0.0012*** | -0.0084*** | 0.0066*** | -0.0177*** |
| | (32.427) | (-75.427) | (12.031) | (-10.140) | (36.363) | (-27.653) |
| **Qual_Secondary** | - 0.0158*** | -0.0251*** | - 0.0072*** | -0.0197*** | - 0.0252*** | -0.0195*** |
| | (-103.153) | (-62.386) | (-54.099) | (-10.172) | (-108.147) | (-24.941) |
| **Exp** | 0.2826*** | -2.5444*** | 0.3106*** | -2.0620*** | 0.2830*** | -1.8946*** |
| | (83.207) | (-78.277) | (55.946) | (-10.449) | (50.338) | (-26.273) |
| **ExpSq** | - 0.3871*** | 1.2085*** | - 0.4564*** | 1.0232*** | - 0.4235*** | 0.9675*** |
| | (-73.621) | (81.631) | (-50.290) | (10.866) | (-48.194) | (29.928) |
| **#KidsAged_0to4** | 0.0355*** | 0.0005*** | 0.0019*** | -0.0000 | 0.0619*** | 0.0000 |
| | (165.533) | (18.126) | (6.806) | (-0.722) | (229.909) | (0.846) |
| **#KidsAged_5to9** | 0.0202*** | 0.0007*** | 0.0048*** | 0.0001** | 0.0346*** | -0.0001** |
| | (107.787) | (13.902) | (18.870) | (2.124) | (132.922) | (-2.520) |
| **#KidsAged_10to15** | 0.0119*** | 0.0023*** | 0.0033*** | 0.0015*** | 0.0218*** | 0.0007*** |
| | (69.606) | (21.254) | (17.230) | (8.031) | (86.330) | (5.798) |
| **R_Wales** | - 0.0001*** | -0.0006*** | - 0.0001*** | -0.0000 | - 0.0001*** | -0.0009*** |
| | (-9.587) | (-6.205) | (-8.376) | (-0.135) | (-4.582) | (-5.894) |
| **R_Scotland** | - 0.0001*** | 0.0006*** | - 0.0001*** | 0.0010*** | - 0.0000*** | 0.0004* |
| | (-5.748) | (4.351) | (-3.614) | (6.205) | (-3.843) | (1.893) |

| | | | | | | |
|---|---|---|---|---|---|---|
| **R_NorthIreland** | 0.0002*** | -0.0009*** | 0.0002*** | -0.0000 | 0.0002*** | -0.0016*** |
| | (12.069) | (-10.461) | (8.025) | (-0.021) | (9.003) | (-12.189) |
| **Yr_2010** | 0.0004*** | -0.0066*** | 0.0001 | -0.0015*** | 0.0011*** | -0.0129*** |
| | (5.645) | (-14.799) | (1.157) | (-3.825) | (8.483) | (-15.985) |
| **Yr_2009** | 0.0006*** | -0.0078*** | 0.0002*** | -0.0020*** | 0.0013*** | -0.0147*** |
| | (7.747) | (-16.945) | (2.597) | (-4.660) | (10.001) | (-17.101) |
| **Yr_2008** | 0.0011*** | -0.0090*** | 0.0007*** | -0.0034*** | 0.0016*** | -0.0153*** |
| | (16.872) | (-19.376) | (12.122) | (-6.853) | (13.446) | (-17.487) |
| **Yr_2007** | -0.0004*** | 0.0035*** | -0.0002*** | 0.0010*** | -0.0005*** | 0.0040*** |
| | (-13.405) | (9.704) | (-5.652) | (2.747) | (-10.936) | (7.908) |
| **Yr_2006** | -0.0000*** | 0.0031*** | -0.0000*** | 0.0015*** | -0.0000 | 0.0035*** |
| | (-3.110) | (14.924) | (-3.250) | (6.194) | (-0.920) | (11.438) |
| **Yr_2005** | -0.0002*** | 0.0016*** | -0.0001*** | 0.0008*** | -0.0003*** | 0.0018*** |
| | (-10.428) | (8.264) | (-6.440) | (3.835) | (-7.897) | (6.553) |
| **Yr_2004** | -0.0001*** | 0.0017*** | -0.0001*** | 0.0008*** | -0.0000 | 0.0019*** |
| | (-3.253) | (10.308) | (-4.427) | (4.395) | (-0.281) | (8.224) |
| **Yr_2003** | -0.0000* | 0.0019*** | -0.0001** | 0.0011*** | -0.0000 | 0.0021*** |
| | (-1.655) | (9.256) | (-2.216) | (4.711) | (-0.115) | (7.057) |
| **Yr_2002** | -0.0000 | 0.0010*** | -0.0000 | 0.0005*** | 0.0000 | 0.0012*** |
| | (-0.223) | (4.796) | (-0.403) | (2.646) | (0.192) | (3.985) |
| **Constant** | | 1.3666*** | | 1.0450*** | | 0.9632*** |
| | | (75.708) | | (10.270) | | (24.657) |
| **Observations** | 2,627,852 | | 1,287,896 | | 1,339,956 | |

Control group: MS_Married, Ethn_White, Qual_Primary, R_England, Yr_2001
z-statistics in parentheses: *** p<0.01, ** p<0.05, * p<0.1

## Table 2.14: Non-linear decompositions of older/younger differences in employment probability in Hong Kong

| Overall Results | | | | | | |
|---|---|---|---|---|---|---|
| | **Pooled** | | **Male** | | **Female** | |
| **Older – Younger =Difference** | 0.3326*** – 0.7477*** = -0.4151*** | | 0.4766*** – 0.8511*** = -0.3745*** | | 0.1929*** – 0.6513*** = -0.4584*** | |
| **Total explained** | -0.5111*** | | -0.5535*** | | -0.5074*** | |
| **Total unexplained** | 0.0960*** | | 0.1790*** | | 0.0490*** | |
| **Detailed Results** | | | | | | |
| **Regressors** | **Explained** | **Unexplained** | **Explained** | **Unexplained** | **Explained** | **Unexplained** |
| **Male** | 0.0014*** | 0.0119*** | | | | |
| | (9.173) | (29.012) | | | | |
| **MS_Single** | -0.0284*** | -0.0019*** | 0.0304*** | 0.0000 | -0.0512*** | -0.0005*** |
| | (-69.452) | (-27.194) | (42.675) | (0.349) | (-87.190) | (-8.687) |
| **MS_Separ_Divor** | 0.0001*** | -0.0003*** | -0.0011*** | 0.0008*** | 0.0001*** | -0.0002*** |
| | (3.800) | (-4.327) | (-16.388) | (7.841) | (4.698) | (-2.983) |
| **MS_Widowed** | 0.0019** | -0.0026*** | -0.0072*** | 0.0022*** | 0.0165*** | -0.0050*** |
| | (2.465) | (-5.770) | (-10.036) | (4.613) | (12.131) | (-9.064) |
| **Foreign** | -0.0197*** | -0.0038*** | -0.0073*** | -0.0017*** | -0.0240*** | -0.0027*** |
| | (-61.748) | (-28.994) | (-14.783) | (-8.096) | (-51.754) | (-20.871) |
| **Qual_Degree** | -0.0169*** | -0.0071*** | -0.0119*** | -0.0112*** | -0.0172*** | -0.0022*** |
| | (-80.617) | (-63.464) | (-45.455) | (-49.586) | (-59.572) | (-31.541) |
| **Qual_Postsec** | -0.0083*** | -0.0026*** | -0.0061*** | -0.0034*** | -0.0083*** | -0.0012*** |
| | (-64.238) | (-42.543) | (-36.864) | (-31.191) | (-47.539) | (-24.423) |
| **Qual_Secondary** | -0.0285*** | -0.0080*** | -0.0195*** | -0.0103*** | -0.0302*** | -0.0038*** |
| | (-65.253) | (-33.139) | (-31.826) | (-20.097) | (-46.660) | (-20.468) |
| **Exp** | 0.8345*** | -1.1823*** | 0.9228*** | -1.5335*** | 0.6671*** | -0.6286*** |
| | (288.027) | (-61.591) | (232.576) | (-56.549) | (167.013) | (-30.532) |
| **ExpSq** | -1.2480*** | 0.7624*** | -1.4479*** | 1.1236*** | -1.0620*** | 0.4019*** |
| | (-319.449) | (71.617) | (-270.973) | (75.734) | (-201.712) | (33.565) |
| **UnearnedY_per1000** | 0.0005*** | -0.0059*** | -0.0014*** | -0.0039*** | 0.0004*** | -0.0052*** |
| | (15.568) | (-18.628) | (-19.104) | (-8.262) | (6.258) | (-16.050) |
| **Yr_2006** | 0.0001** | -0.0077*** | -0.0043*** | 0.0011* | 0.0016*** | -0.0051*** |
| | (2.010) | (-21.137) | (-24.954) | (1.811) | (18.315) | (-14.371) |
| **Yr_2001** | 0.0000 | -0.0074*** | -0.0003*** | 0.0012** | -0.0002*** | -0.0056*** |
| | (0.681) | (-23.616) | (-4.260) | (2.300) | (-3.159) | (-17.704) |
| **Yr_1996** | 0.0002*** | -0.0013*** | 0.0004*** | -0.0006 | 0.0001*** | -0.0013*** |
| | (6.594) | (-5.383) | (6.038) | (-1.396) | (3.253) | (-5.583) |
| **Constant** | | 0.5527*** | | 0.6149*** | | 0.3084*** |
| | | (57.494) | | (43.512) | | (30.681) |
| **Observations** | 988,183 | | 479,853 | | 508,330 | |

Control group: MS_Married, Qual_Primary, Yr_1991
z-statistics in parentheses: *** p<0.01, ** p<0.05, * p<0.1

## Appendix for Chapter 4

**Table 4.5: Summary statistics for unemployed job-seekers in pooled sample (mean values)**

| | Pooled | | |
|---|---|---|---|
| | **Full sample** | **Younger sample** | **Older sample** |
| **Want FTE** | 0.6600 | 0.6717 | 0.6108 |
| **Want PTE** | 0.1965 | 0.1941 | 0.2067 |
| **Want SE** | 0.0247 | 0.0221 | 0.0360 |
| **No preference** | 0.1188 | 0.1122 | 0.1465 |
| **Mean Age** | 36.03 | 31.30 | 55.82 |
| **Age_16to19** | 0.1011 | 0.1252 | |
| **Age_20to24** | 0.1578 | 0.1955 | |
| **Age_25to29** | 0.1205 | 0.1492 | |
| **Age_30to34** | 0.1133 | 0.1403 | |
| **Age_35to39** | 0.1122 | 0.1390 | |
| **Age_40to44** | 0.1090 | 0.1350 | |
| **Age_45to49** | 0.0934 | 0.1157 | |
| **Age_50to54** | 0.0825 | | 0.4276 |
| **Age_55to59** | 0.0734 | | 0.3809 |
| **Age_60to64** | 0.0328 | | 0.1703 |
| **Age_over64** | 0.0041 | | 0.0212 |
| **Male** | 0.5853 | 0.5636 | 0.6761 |
| **MS_Married** | 0.3369 | 0.2795 | 0.5774 |
| **MS_Single** | 0.5488 | 0.6398 | 0.1679 |
| **MS_Separ_Divor** | 0.1023 | 0.0757 | 0.2137 |
| **MS_Widowed** | 0.0120 | 0.0051 | 0.0410 |
| **Foreign** | 0.5680 | 0.5659 | 0.5768 |
| **Ethn_White** | 0.8531 | 0.8404 | 0.9062 |
| **Ethn_Black** | 0.0454 | 0.0498 | 0.0268 |
| **Ethn_Asian** | 0.0658 | 0.0705 | 0.0464 |
| **Ethn_Mixed** | 0.0128 | 0.0147 | 0.0050 |
| **Ethn_Other** | 0.0214 | 0.0230 | 0.0146 |
| **Health_problems** | 0.1880 | 0.1613 | 0.2996 |
| **#KidsAged_0to4** | 0.1878 | 0.2300 | 0.0115 |
| **#KidsAged_5to9** | 0.2076 | 0.2504 | 0.0284 |
| **#KidsAged_10to15** | 0.2744 | 0.3148 | 0.1050 |
| **R_England** | 0.8191 | 0.8169 | 0.8281 |
| **R_Wales** | 0.0474 | 0.0477 | 0.0461 |
| **R_Scotland** | 0.0953 | 0.0958 | 0.0932 |
| **R_NorthIreland** | 0.0382 | 0.0396 | 0.0326 |
| **Qual_Degree** | 0.1160 | 0.1127 | 0.1297 |
| **Qual_Postsec** | 0.0542 | 0.0494 | 0.0743 |
| **Qual_Secondary** | 0.4484 | 0.4606 | 0.3974 |
| **Qual_Primary** | 0.3758 | 0.3717 | 0.3931 |
| **DurUnemp_Less1** | 0.7066 | 0.7271 | 0.6208 |
| **DurUnemp_1to3** | 0.2066 | 0.2000 | 0.2342 |
| **DurUnemp_3to5** | 0.0399 | 0.0361 | 0.0562 |
| **DurUnemp_5plus** | 0.0454 | 0.0353 | 0.0880 |

| | | | |
|---|---|---|---|
| **LInd_Manuf** | 0.1355 | 0.1243 | 0.1825 |
| **LInd_Agri_Fish** | 0.0081 | 0.0083 | 0.0075 |
| **LInd_Energy_Water** | 0.0089 | 0.0075 | 0.0149 |
| **LInd_Constr** | 0.0835 | 0.0809 | 0.0944 |
| **LInd_Dis_Hotel_Restau** | 0.2087 | 0.2228 | 0.1494 |
| **LInd_Trans_Comm** | 0.0636 | 0.0606 | 0.0762 |
| **LInd_Bank_Fin_Ins** | 0.1185 | 0.1166 | 0.1266 |
| **LInd_Pub_Edu_Health** | 0.1236 | 0.1151 | 0.1593 |
| **LInd_Others** | 0.0461 | 0.0471 | 0.0422 |
| **Benefit** | 0.6886 | 0.7030 | 0.6284 |
| **Observations** | 111,275 | 89,820 | 21,455 |

**Note: Sample period: 2001q2 to 2012q1**

**Table 4.6: Summary statistics for unemployed job-seekers in males and females sub-samples (mean values)**

| | Male | | | Female | | |
|---|---|---|---|---|---|---|
| | Full sample | Younger sample | Older sample | Full sample | Younger sample | Older sample |
| **Want FTE** | 0.7561 | 0.7802 | 0.6720 | 0.5243 | 0.5316 | 0.4831 |
| **Want PTE** | 0.0619 | 0.0482 | 0.1095 | 0.3865 | 0.3825 | 0.4096 |
| **Want SE** | 0.0301 | 0.0263 | 0.0434 | 0.0172 | 0.0166 | 0.0206 |
| **No preference** | 0.1519 | 0.1453 | 0.1751 | 0.0720 | 0.0693 | 0.0868 |
| **Mean Age** | 36.46 | 30.77 | 56.35 | 35.41 | 31.99 | 54.71 |
| **Age_16to19** | 0.1086 | 0.1397 | | 0.0905 | 0.1065 | |
| **Age_20to24** | 0.1651 | 0.2124 | | 0.1475 | 0.1736 | |
| **Age_25to29** | 0.1150 | 0.1479 | | 0.1282 | 0.1509 | |
| **Age_30to34** | 0.1017 | 0.1308 | | 0.1297 | 0.1526 | |
| **Age_35to39** | 0.0987 | 0.1270 | | 0.1313 | 0.1546 | |
| **Age_40to44** | 0.0990 | 0.1274 | | 0.1230 | 0.1448 | |
| **Age_45to49** | 0.0892 | 0.1147 | | 0.0993 | 0.1169 | |
| **Age_50to54** | 0.0845 | | 0.3794 | 0.0796 | | 0.5284 |
| **Age_55to59** | 0.0831 | | 0.3733 | 0.0598 | | 0.3969 |
| **Age_60to64** | 0.0502 | | 0.2255 | 0.0083 | | 0.0550 |
| **Age_over64** | 0.0049 | | 0.0219 | 0.0030 | | 0.0197 |
| **Male** | | | | | | |
| **MS_Married** | 0.3119 | 0.2346 | 0.5815 | 0.3723 | 0.3374 | 0.5689 |
| **MS_Single** | 0.5896 | 0.7039 | 0.1907 | 0.4912 | 0.5569 | 0.1202 |
| **MS_Separ_Divor** | 0.0908 | 0.0594 | 0.2005 | 0.1185 | 0.0967 | 0.2415 |
| **MS_Widowed** | 0.0077 | 0.0021 | 0.0273 | 0.0181 | 0.0089 | 0.0695 |
| **Foreign** | 0.5616 | 0.5582 | 0.5733 | 0.5771 | 0.5758 | 0.5841 |
| **Ethn_White** | 0.8598 | 0.8457 | 0.9089 | 0.8436 | 0.8335 | 0.9007 |
| **Ethn_Black** | 0.0417 | 0.0467 | 0.0243 | 0.0506 | 0.0538 | 0.0322 |
| **Ethn_Asian** | 0.0643 | 0.0693 | 0.0467 | 0.0681 | 0.0720 | 0.0456 |
| **Ethn_Mixed** | 0.0119 | 0.0140 | 0.0045 | 0.0141 | 0.0155 | 0.0062 |
| **Ethn_Other** | 0.0206 | 0.0224 | 0.0144 | 0.0225 | 0.0239 | 0.0150 |
| **Health_problems** | 0.1852 | 0.1547 | 0.2914 | 0.1920 | 0.1699 | 0.3167 |
| **#KidsAged_0to4** | 0.1582 | 0.1989 | 0.0162 | 0.2297 | 0.2702 | 0.0017 |
| **#KidsAged_5to9** | 0.1547 | 0.1892 | 0.0342 | 0.2823 | 0.3294 | 0.0163 |
| **#KidsAged_10to15** | 0.2250 | 0.2574 | 0.1117 | 0.3441 | 0.3890 | 0.0909 |
| **R_England** | 0.8110 | 0.8078 | 0.8219 | 0.8306 | 0.8287 | 0.8408 |
| **R_Wales** | 0.0483 | 0.0491 | 0.0456 | 0.0461 | 0.0459 | 0.0471 |
| **R_Scotland** | 0.0965 | 0.0971 | 0.0947 | 0.0935 | 0.0941 | 0.0901 |
| **R_NorthIreland** | 0.0442 | 0.0460 | 0.0377 | 0.0299 | 0.0313 | 0.0220 |
| **Qual_Degree** | 0.1093 | 0.1032 | 0.1306 | 0.1254 | 0.1250 | 0.1276 |
| **Qual_Postsec** | 0.0499 | 0.0446 | 0.0687 | 0.0602 | 0.0556 | 0.0862 |
| **Qual_Secondary** | 0.4405 | 0.4457 | 0.4223 | 0.4597 | 0.4799 | 0.3454 |
| **Qual_Primary** | 0.3944 | 0.4008 | 0.3723 | 0.3496 | 0.3342 | 0.4365 |
| **DurUnemp_Less1** | 0.6624 | 0.6846 | 0.5851 | 0.7691 | 0.7821 | 0.6954 |
| **DurUnemp_1to3** | 0.2274 | 0.2227 | 0.2439 | 0.1772 | 0.1707 | 0.2140 |
| **DurUnemp_3to5** | 0.0485 | 0.0442 | 0.0636 | 0.0278 | 0.0255 | 0.0407 |
| **DurUnemp_5plus** | 0.0598 | 0.0465 | 0.1065 | 0.0251 | 0.0208 | 0.0495 |
| **LInd_Manuf** | 0.1751 | 0.1625 | 0.2192 | 0.0796 | 0.0750 | 0.1059 |
| **LInd_Agri_Fish** | 0.0113 | 0.0119 | 0.0090 | 0.0037 | 0.0035 | 0.0043 |
| **LInd_Energy_Water** | 0.0122 | 0.0101 | 0.0196 | 0.0043 | 0.0041 | 0.0050 |
| **LInd_Constr** | 0.1335 | 0.1340 | 0.1315 | 0.0129 | 0.0122 | 0.0168 |
| **LInd_Dis_Hotel_Restau** | 0.1840 | 0.1987 | 0.1325 | 0.2436 | 0.2540 | 0.1848 |
| **LInd_Trans_Comm** | 0.0815 | 0.0781 | 0.0931 | 0.0384 | 0.0380 | 0.0409 |
| **LInd_Bank_Fin_Ins** | 0.1158 | 0.1136 | 0.1232 | 0.1224 | 0.1204 | 0.1338 |
| **LInd_Pub_Edu_Health** | 0.0675 | 0.0580 | 0.1005 | 0.2029 | 0.1889 | 0.2821 |
| **LInd_Others** | 0.0394 | 0.0395 | 0.0392 | 0.0558 | 0.0571 | 0.0484 |
| **Benefit** | 0.6532 | 0.6577 | 0.6376 | 0.7386 | 0.7615 | 0.6093 |
| **Observations** | 65,130 | 50,624 | 14,506 | 46,145 | 39,196 | 6,949 |

**Note: Sample period: 2001q2 to 2012q1**

**Table 4.7: Summary statistics for economically-active including employed and ILO unemployed in pooled sample (mean values)**

| | Pooled | | |
|---|---|---|---|
| | **Full sample** | **Younger sample** | **Older sample** |
| **UE** | 0.0475 | 0.0537 | 0.0320 |
| **FTE** | 0.6264 | 0.6599 | 0.5430 |
| **PTE** | 0.1967 | 0.1791 | 0.2406 |
| **SE** | 0.1293 | 0.1073 | 0.1844 |
| **Mean Age** | 41.54 | 35.47 | 56.68 |
| **Age_16to19** | 0.0230 | 0.0323 | |
| **Age_20to24** | 0.0729 | 0.1021 | |
| **Age_25to29** | 0.0992 | 0.1390 | |
| **Age_30to34** | 0.1168 | 0.1636 | |
| **Age_35to39** | 0.1341 | 0.1879 | |
| **Age_40to44** | 0.1395 | 0.1955 | |
| **Age_45to49** | 0.1282 | 0.1996 | |
| **Age_50to54** | 0.1148 | | 0.4010 |
| **Age_55to59** | 0.0960 | | 0.3353 |
| **Age_60to64** | 0.0541 | | 0.1890 |
| **Age_over64** | 0.0214 | | 0.0747 |
| **Male** | 0.5273 | 0.5175 | 0.5516 |
| **MS_Married** | 0.5976 | 0.5298 | 0.7663 |
| **MS_Single** | 0.3027 | 0.3969 | 0.0679 |
| **MS_Separ_Divor** | 0.0856 | 0.0691 | 0.1266 |
| **MS_Widowed** | 0.0142 | 0.0041 | 0.0392 |
| **Foreign** | 0.4740 | 0.4700 | 0.4841 |
| **Ethn_White** | 0.9273 | 0.9144 | 0.9596 |
| **Ethn_Black** | 0.0179 | 0.0210 | 0.0101 |
| **Ethn_Asian** | 0.0379 | 0.0445 | 0.0214 |
| **Ethn_Mixed** | 0.0056 | 0.0070 | 0.0023 |
| **Ethn_Other** | 0.0102 | 0.0119 | 0.0058 |
| **Health_problems** | 0.1202 | 0.0923 | 0.1896 |
| **#KidsAged_0to4** | 0.1766 | 0.2447 | 0.0068 |
| **#KidsAged_5to9** | 0.1920 | 0.2606 | 0.0210 |
| **#KidsAged_10to15** | 0.2630 | 0.3299 | 0.0965 |
| **R_England** | 0.8279 | 0.8261 | 0.8323 |
| **R_Wales** | 0.0460 | 0.0458 | 0.0467 |
| **R_Scotland** | 0.0893 | 0.0894 | 0.0889 |
| **R_NorthIreland** | 0.0368 | 0.0387 | 0.0321 |
| **Qual_Degree** | 0.2163 | 0.2336 | 0.1731 |
| **Qual_Postsec** | 0.1002 | 0.0963 | 0.1099 |
| **Qual_Secondary** | 0.4514 | 0.4737 | 0.3960 |
| **Qual_Primary** | 0.2249 | 0.1892 | 0.3140 |
| **Benefit** | 0.3080 | 0.3387 | 0.2314 |
| **Observations ('000)** | 2,342 | 1,671 | 670 |

**Note: Sample period: 2001q2 to 2012q1**

**Table 4.8: Summary statistics for economically-active including employed and ILO unemployed in males and females sub-samples (mean values)**

| | Male | | | Female | | |
|---|---|---|---|---|---|---|
| | **Full sample** | **Younger sample** | **Older sample** | **Full sample** | **Younger sample** | **Older sample** |
| **UE** | 0.0528 | 0.0585 | 0.0392 | 0.0417 | 0.0486 | 0.0231 |
| **FTE** | 0.7194 | 0.7603 | 0.6236 | 0.5227 | 0.5521 | 0.4438 |
| **PTE** | 0.0533 | 0.0371 | 0.0911 | 0.3568 | 0.3315 | 0.4246 |
| **SE** | 0.1746 | 0.1441 | 0.2461 | 0.0788 | 0.0678 | 0.1085 |
| **Mean Age** | 41.87 | 35.36 | 57.08 | 41.18 | 35.58 | 56.19 |
| **Age_16to19** | 0.0250 | 0.0358 | | 0.0208 | 0.0285 | |
| **Age_20to24** | 0.0731 | 0.1044 | | 0.0726 | 0.0996 | |
| **Age_25to29** | 0.0953 | 0.1361 | | 0.1035 | 0.1421 | |
| **Age_30to34** | 0.1147 | 0.1638 | | 0.1191 | 0.1635 | |
| **Age_35to39** | 0.1324 | 0.1890 | | 0.1360 | 0.1867 | |
| **Age_40to44** | 0.1352 | 0.1930 | | 0.1443 | 0.1981 | |
| **Age_45to49** | 0.1246 | 0.1779 | | 0.1322 | 0.1815 | |
| **Age_50to54** | 0.1123 | | 0.3749 | 0.1176 | | 0.4331 |
| **Age_55to59** | 0.0977 | | 0.3261 | 0.0941 | | 0.3465 |
| **Age_60to64** | 0.0642 | | 0.2143 | 0.0429 | | 0.1578 |
| **Age_over64** | 0.0254 | | 0.0847 | 0.0170 | | 0.0625 |
| **Male** | | | | | | |
| **MS_Married** | 0.6074 | 0.5240 | 0.8024 | 0.5866 | 0.5361 | 0.7220 |
| **MS_Single** | 0.3167 | 0.4200 | 0.0752 | 0.2870 | 0.3721 | 0.0590 |
| **MS_Separ_Divor** | 0.0681 | 0.0539 | 0.1013 | 0.1051 | 0.0854 | 0.1577 |
| **MS_Widowed** | 0.0078 | 0.0020 | 0.0212 | 0.0213 | 0.0063 | 0.0614 |
| **Foreign** | 0.4702 | 0.4671 | 0.4775 | 0.4783 | 0.4731 | 0.4922 |
| **Ethn_White** | 0.9245 | 0.9102 | 0.9580 | 0.9304 | 0.9188 | 0.9616 |
| **Ethn_Black** | 0.0162 | 0.0194 | 0.0086 | 0.0197 | 0.0226 | 0.0120 |
| **Ethn_Asian** | 0.0422 | 0.0498 | 0.0247 | 0.0331 | 0.0389 | 0.0174 |
| **Ethn_Mixed** | 0.0052 | 0.0065 | 0.0021 | 0.0062 | 0.0074 | 0.0027 |
| **Ethn_Other** | 0.0107 | 0.0127 | 0.0059 | 0.0096 | 0.0111 | 0.0056 |
| **Health_problems** | 0.1156 | 0.0830 | 0.1916 | 0.1253 | 0.1023 | 0.1871 |
| **#KidsAged_0to4** | 0.1894 | 0.2654 | 0.0117 | 0.1623 | 0.2226 | 0.0008 |
| **#KidsAged_5to9** | 0.1906 | 0.2581 | 0.0328 | 0.1936 | 0.2634 | 0.0065 |
| **#KidsAged_10to15** | 0.2488 | 0.3028 | 0.1225 | 0.2789 | 0.3589 | 0.0645 |
| **R_England** | 0.8296 | 0.8283 | 0.8328 | 0.8259 | 0.8237 | 0.8318 |
| **R_Wales** | 0.0454 | 0.0451 | 0.0459 | 0.0468 | 0.0465 | 0.0476 |
| **R_Scotland** | 0.0872 | 0.0874 | 0.0869 | 0.0915 | 0.0916 | 0.0913 |
| **R_NorthIreland** | 0.0378 | 0.0392 | 0.0344 | 0.0358 | 0.0382 | 0.0292 |
| **Qual_Degree** | 0.2145 | 0.2244 | 0.1916 | 0.2182 | 0.2435 | 0.1505 |
| **Qual_Postsec** | 0.0857 | 0.0835 | 0.0907 | 0.1164 | 0.1101 | 0.1335 |
| **Qual_Secondary** | 0.4624 | 0.4761 | 0.4304 | 0.4392 | 0.4711 | 0.3536 |
| **Qual_Primary** | 0.2301 | 0.2088 | 0.2802 | 0.2191 | 0.1682 | 0.3556 |
| **Benefit** | 0.1623 | 0.1638 | 0.1587 | 0.4705 | 0.5264 | 0.3208 |
| **Observations ('000)** | 1,234 | 865 | 370 | 1,106 | 806 | 301 |

**Note: Sample period: 2001q2 to 2012q1**

**Table 4.9: Summary statistics for part-timers in pooled sample (mean values)**

| | Pooled | | |
|---|---|---|---|
| | **Full sample** | **Younger sample** | **Older sample** |
| **Voluntary PTE** | 0.7871 | 0.7395 | 0.8755 |
| **Involuntary PTE** | 0.2129 | 0.2605 | 0.1245 |
| **Mean Age** | 44.08 | 36.53 | 58.09 |
| **Age_16to19** | 0.0199 | 0.0306 | |
| **Age_20to24** | 0.0489 | 0.0752 | |
| **Age_25to29** | 0.0651 | 0.1003 | |
| **Age_30to34** | 0.1048 | 0.1613 | |
| **Age_35to39** | 0.1440 | 0.2216 | |
| **Age_40to44** | 0.1457 | 0.2242 | |
| **Age_45to49** | 0.1214 | 0.1868 | |
| **Age_50to54** | 0.1107 | | 0.3161 |
| **Age_55to59** | 0.1104 | | 0.3153 |
| **Age_60to64** | 0.0797 | | 0.2275 |
| **Age_over64** | 0.0494 | | 0.1411 |
| **Male** | 0.1427 | 0.1071 | 0.2088 |
| **MS_Married** | 0.6956 | 0.6451 | 0.7894 |
| **MS_Single** | 0.1918 | 0.2721 | 0.0428 |
| **MS_Separ_Divor** | 0.0859 | 0.0761 | 0.1041 |
| **MS_Widowed** | 0.0267 | 0.0068 | 0.0637 |
| **Foreign** | 0.4684 | 0.4650 | 0.4746 |
| **Ethn_White** | 0.9385 | 0.9205 | 0.9719 |
| **Ethn_Black** | 0.0153 | 0.0197 | 0.0071 |
| **Ethn_Asian** | 0.0322 | 0.0417 | 0.0146 |
| **Ethn_Mixed** | 0.0048 | 0.0064 | 0.0019 |
| **Ethn_Other** | 0.0085 | 0.0109 | 0.0040 |
| **Health_problems** | 0.1467 | 0.1147 | 0.2059 |
| **#KidsAged_0to4** | 0.2296 | 0.3521 | 0.0024 |
| **#KidsAged_5to9** | 0.2748 | 0.4176 | 0.0099 |
| **#KidsAged_10to15** | 0.3497 | 0.5001 | 0.0706 |
| **R_England** | 0.8313 | 0.8253 | 0.8424 |
| **R_Wales** | 0.0474 | 0.0479 | 0.0466 |
| **R_Scotland** | 0.0891 | 0.0920 | 0.0837 |
| **R_NorthIreland** | 0.0322 | 0.0348 | 0.0273 |
| **Qual_Degree** | 0.1467 | 0.1608 | 0.1205 |
| **Qual_Postsec** | 0.1094 | 0.1067 | 0.1145 |
| **Qual_Secondary** | 0.4559 | 0.5135 | 0.3490 |
| **Qual_Primary** | 0.2808 | 0.2118 | 0.4088 |
| **Private** | 0.6295 | 0.6396 | 0.6109 |
| **Ind_Manuf** | 0.0466 | 0.0432 | 0.0528 |
| **Ind_Agri_Fish** | 0.0050 | 0.0043 | 0.0063 |
| **Ind_Energy_Water** | 0.0039 | 0.0042 | 0.0033 |
| **Ind_Constr** | 0.0179 | 0.0169 | 0.0196 |
| **Ind_Dis_Hotel_Restau** | 0.2589 | 0.2740 | 0.2310 |
| **Ind_Trans_Comm** | 0.0366 | 0.0360 | 0.0377 |
| **Ind_Bank_Fin_Ins** | 0.1176 | 0.1202 | 0.1128 |
| **Ind_Pub_Edu_Health** | 0.4514 | 0.4423 | 0.4684 |
| **Ind_Others** | 0.0607 | 0.0572 | 0.0672 |
| **WorkHour** | 20.05 | 20.42 | 19.36 |
| **Temporary** | 0.0886 | 0.0841 | 0.0968 |
| **Tenure** | 7.316 | 5.697 | 10.32 |
| **Homeworker** | 0.0250 | 0.0214 | 0.0316 |
| **SecJob** | 0.0745 | 0.0764 | 0.0710 |
| **Benefit** | 0.6149 | 0.7285 | 0.4042 |
| **Observations ('000)** | 461 | 299 | 161 |

**Note: Sample period: 2001q2 to 2012q1**

**Table 4.10: Summary statistics for part-timers in males and female samples (mean values)**

| | Male | | | Female | | |
|---|---|---|---|---|---|---|
| | Full sample | Younger sample | Older sample | Full sample | Younger sample | Older sample |
| **Voluntary PTE** | 0.6745 | 0.4982 | 0.8422 | 0.8059 | 0.7685 | 0.8842 |
| **Involuntary PTE** | 0.3255 | 0.5018 | 0.1578 | 0.1941 | 0.2315 | 0.1158 |
| **Mean Age** | 46.94 | 31.63 | 61.52 | 43.60 | 37.11 | 57.19 |
| **Age_16to19** | 0.0544 | 0.1115 | | 0.0141 | 0.0209 | |
| **Age_20to24** | 0.1025 | 0.2102 | | 0.0399 | 0.0590 | |
| **Age_25to29** | 0.0691 | 0.1417 | | 0.0645 | 0.0953 | |
| **Age_30to34** | 0.0627 | 0.1286 | | 0.1118 | 0.1653 | |
| **Age_35to39** | 0.0698 | 0.1430 | | 0.1564 | 0.2311 | |
| **Age_40to44** | 0.0671 | 0.1376 | | 0.1587 | 0.2346 | |
| **Age_45to49** | 0.0621 | 0.1273 | | 0.1312 | 0.1939 | |
| **Age_50to54** | 0.0743 | | 0.1451 | 0.1168 | | 0.3612 |
| **Age_55to59** | 0.1204 | | 0.2350 | 0.1088 | | 0.3365 |
| **Age_60to64** | 0.1543 | | 0.3012 | 0.0673 | | 0.2081 |
| **Age_over64** | 0.1633 | | 0.3187 | 0.0305 | | 0.0942 |
| **Male** | | | | | | |
| **MS_Married** | 0.5872 | 0.3614 | 0.8022 | 0.7136 | 0.6791 | 0.7860 |
| **MS_Single** | 0.3283 | 0.5927 | 0.0767 | 0.1691 | 0.2336 | 0.0338 |
| **MS_Separ_Divor** | 0.0642 | 0.0429 | 0.0846 | 0.0895 | 0.0801 | 0.1093 |
| **MS_Widowed** | 0.0202 | 0.0030 | 0.0366 | 0.0278 | 0.0072 | 0.0709 |
| **Foreign** | 0.5315 | 0.5790 | 0.4862 | 0.4579 | 0.4513 | 0.4716 |
| **Ethn_White** | 0.8714 | 0.7770 | 0.9612 | 0.9496 | 0.9377 | 0.9747 |
| **Ethn_Black** | 0.0273 | 0.0474 | 0.0081 | 0.0133 | 0.0164 | 0.0068 |
| **Ethn_Asian** | 0.0741 | 0.1265 | 0.0243 | 0.0252 | 0.0315 | 0.0121 |
| **Ethn_Mixed** | 0.0069 | 0.0127 | 0.0014 | 0.0044 | 0.0056 | 0.0020 |
| **Ethn_Other** | 0.0195 | 0.0351 | 0.0046 | 0.0066 | 0.0080 | 0.0038 |
| **Health_problems** | 0.1939 | 0.1423 | 0.2430 | 0.1388 | 0.1114 | 0.1961 |
| **#KidsAged_0to4** | 0.1262 | 0.2503 | 0.0082 | 0.2468 | 0.3643 | 0.0009 |
| **#KidsAged_5to9** | 0.1272 | 0.2369 | 0.0227 | 0.2993 | 0.4392 | 0.0065 |
| **#KidsAged_10to15** | 0.1682 | 0.2765 | 0.0652 | 0.3799 | 0.5269 | 0.0721 |
| **R_England** | 0.8448 | 0.8297 | 0.8591 | 0.8290 | 0.8248 | 0.8380 |
| **R_Wales** | 0.0454 | 0.0468 | 0.0441 | 0.0478 | 0.0480 | 0.0472 |
| **R_Scotland** | 0.0850 | 0.0929 | 0.0774 | 0.0898 | 0.0919 | 0.0854 |
| **R_NorthIreland** | 0.0248 | 0.0306 | 0.0194 | 0.0334 | 0.0354 | 0.0293 |
| **Qual_Degree** | 0.1992 | 0.1850 | 0.2126 | 0.1380 | 0.1579 | 0.0962 |
| **Qual_Postsec** | 0.0818 | 0.0676 | 0.0953 | 0.1141 | 0.1114 | 0.1195 |
| **Qual_Secondary** | 0.4080 | 0.4392 | 0.3783 | 0.4639 | 0.5225 | 0.3413 |
| **Qual_Primary** | 0.3038 | 0.3014 | 0.3060 | 0.2769 | 0.2010 | 0.4359 |
| **Private** | 0.7544 | 0.8034 | 0.7076 | 0.6087 | 0.6199 | 0.5853 |
| **Ind_Manuf** | 0.0740 | 0.0525 | 0.0944 | 0.0420 | 0.0421 | 0.0418 |
| **Ind_Agri_Fish** | 0.0101 | 0.0088 | 0.0113 | 0.0042 | 0.0038 | 0.0050 |
| **Ind_Energy_Water** | 0.0064 | 0.0051 | 0.0077 | 0.0035 | 0.0041 | 0.0021 |
| **Ind_Constr** | 0.0324 | 0.0308 | 0.0340 | 0.0154 | 0.0153 | 0.0159 |
| **Ind_Dis_Hotel_Restau** | 0.3144 | 0.4211 | 0.2128 | 0.2497 | 0.2564 | 0.2358 |
| **Ind_Trans_Comm** | 0.0844 | 0.0815 | 0.0872 | 0.0286 | 0.0305 | 0.0246 |
| **Ind_Bank_Fin_Ins** | 0.1258 | 0.1086 | 0.1422 | 0.1162 | 0.1216 | 0.1050 |
| **Ind_Pub_Edu_Health** | 0.2677 | 0.2088 | 0.3239 | 0.4820 | 0.4703 | 0.5065 |
| **Ind_Others** | 0.0824 | 0.0794 | 0.0852 | 0.0571 | 0.0545 | 0.0625 |
| **WorkHour** | 20.04 | 20.88 | 19.23 | 20.05 | 20.36 | 19.39 |
| **Temporary** | 0.1788 | 0.1804 | 0.1773 | 0.0736 | 0.0726 | 0.0756 |
| **Tenure** | 5.879 | 3.180 | 8.449 | 7.556 | 6.000 | 10.81 |
| **Homeworker** | 0.0214 | 0.0084 | 0.0338 | 0.0256 | 0.0230 | 0.0310 |
| **SecJob** | 0.0870 | 0.0965 | 0.0779 | 0.0724 | 0.0740 | 0.0691 |
| **Benefit** | 0.3377 | 0.2776 | 0.3950 | 0.6610 | 0.7826 | 0.4066 |
| **Observations (‘000)** | 66 | 32 | 34 | 395 | 267 | 128 |

**Note: Sample period: 2001q2 to 2012q1**

## Table 4.11: Marginal effects from multinomial logits for job preferences of unemployed job-seekers (full sample)

| | Younger | | | Older | | |
|---|---|---|---|---|---|---|
| | JobPreference (ref: no preference): | | | JobPreference (ref: no preference): | | |
| **Regressors** | **FTE** | **PTE** | **SE** | **FTE** | **PTE** | **SE** |
| **Male** | 0.216*** | -0.280*** | 0.003*** | 0.220*** | -0.305*** | 0.013*** |
| | (61.806) | (-93.884) | (3.826) | (26.156) | (-37.836) | (5.793) |
| **MS_Single** | 0.024*** | -0.012*** | -0.002* | 0.079*** | -0.054*** | 0.003 |
| | (6.072) | (-4.455) | (-1.668) | (8.467) | (-7.872) | (0.734) |
| **MS_Separ_Divor** | 0.007 | -0.010*** | 0.001 | 0.035*** | -0.064*** | 0.012*** |
| | (1.210) | (-2.921) | (0.466) | (4.057) | (-11.388) | (3.669) |
| **MS_Widowed** | -0.070*** | 0.051*** | 0.003 | -0.033* | 0.000 | 0.025*** |
| | (-3.128) | (3.410) | (0.489) | (-1.813) | (0.015) | (2.919) |
| **Foreign** | 0.001 | 0.000 | -0.003 | 0.061** | -0.087*** | 0.004 |
| | (0.096) | (0.035) | (-1.602) | (2.358) | (-3.756) | (0.684) |
| **Ethn_Mixed** | -0.026** | 0.013 | -0.001 | 0.102** | -0.065** | 0.010 |
| | (-2.089) | (1.471) | (-0.148) | (2.543) | (-2.480) | (0.617) |
| **Ethn_Asian** | 0.028*** | -0.014*** | -0.004*** | 0.052*** | -0.059*** | 0.007 |
| | (5.218) | (-3.834) | (-2.894) | (3.384) | (-6.443) | (1.154) |
| **Ethn_Black** | 0.018*** | -0.018*** | 0.001 | 0.071*** | -0.067*** | -0.002 |
| | (2.885) | (-4.479) | (0.546) | (3.674) | (-5.823) | (-0.257) |
| **Ethn_Other** | -0.017* | -0.008 | 0.011*** | 0.009 | -0.047*** | 0.020* |
| | (-1.768) | (-1.307) | (3.313) | (0.337) | (-2.729) | (1.678) |
| **Health_problems** | -0.041*** | 0.043*** | 0.002* | -0.085*** | 0.077*** | 0.005* |
| | (-9.974) | (13.693) | (1.951) | (-11.039) | (12.386) | (1.894) |
| **#KidsAged_0to4** | -0.076*** | 0.066*** | 0.005*** | -0.003 | 0.019 | 0.012** |
| | (-26.779) | (35.515) | (7.166) | (-0.111) | (0.801) | (1.963) |
| **#KidsAged_5to9** | -0.062*** | 0.052*** | 0.002*** | -0.086*** | 0.058*** | 0.017*** |
| | (-23.060) | (30.587) | (2.682) | (-4.930) | (4.338) | (4.727) |
| **#KidsAged_10to15** | -0.032*** | 0.027*** | 0.000 | -0.075*** | 0.041*** | 0.003 |
| | (-13.683) | (17.938) | (0.301) | (-8.507) | (6.155) | (1.064) |
| **R_Wales** | 0.012* | -0.008* | -0.003* | 0.000 | -0.001 | 0.006 |
| | (1.833) | (-1.788) | (-1.896) | (0.001) | (-0.050) | (1.106) |
| **R_Scotland** | 0.041*** | 0.001 | -0.007*** | 0.055*** | -0.015* | -0.009*** |
| | (8.997) | (0.276) | (-6.600) | (5.014) | (-1.758) | (-2.937) |
| **R_NorthIreland** | 0.042*** | -0.035*** | -0.002 | 0.001 | -0.012 | -0.007 |
| | (6.178) | (-7.817) | (-1.058) | (0.074) | (-0.846) | (-1.337) |
| **Qual_Degree** | -0.011** | -0.055*** | 0.014*** | -0.169*** | -0.049*** | 0.038*** |
| | (-2.016) | (-20.607) | (7.200) | (-13.489) | (-7.141) | (6.209) |
| **Qual_Postsec** | -0.070*** | -0.010** | 0.012*** | -0.130*** | -0.019** | 0.021*** |
| | (-8.998) | (-2.164) | (4.477) | (-8.610) | (-2.069) | (3.266) |
| **Qual_Secondary** | -0.038*** | 0.013*** | 0.006*** | -0.046*** | -0.007 | 0.011*** |
| | (-11.636) | (5.446) | (5.948) | (-5.812) | (-1.269) | (3.893) |
| **DurUnemp_1to3** | 0.015*** | -0.023*** | -0.004*** | -0.011 | -0.005 | -0.009*** |
| | (4.010) | (-9.172) | (-4.422) | (-1.368) | (-0.829) | (-3.696) |
| **DurUnemp_3to5** | 0.024*** | -0.028*** | -0.002 | -0.005 | -0.014 | -0.010*** |
| | (3.221) | (-5.805) | (-1.228) | (-0.299) | (-1.266) | (-2.638) |
| **DurUnemp_5plus** | 0.025*** | -0.033*** | -0.001 | 0.007 | -0.036*** | -0.003 |
| | (3.244) | (-6.658) | (-0.646) | (0.499) | (-3.819) | (-0.640) |
| **LInd_Agri_Fish** | -0.009 | -0.062*** | 0.008 | -0.111*** | -0.005 | -0.009 |
| | (-0.517) | (-7.214) | (1.449) | (-2.583) | (-0.164) | (-0.634) |
| **LInd_Energy_Water** | 0.057*** | -0.057*** | -0.006* | -0.098*** | 0.041 | -0.003 |
| | (3.856) | (-6.553) | (-1.893) | (-3.237) | (1.634) | (-0.394) |
| **LInd_Constr** | -0.092*** | -0.066*** | 0.034*** | -0.099*** | -0.098*** | 0.059*** |
| | (-13.177) | (-17.375) | (10.760) | (-6.975) | (-13.120) | (6.927) |
| **LInd_Dis_Hotel_Restau** | 0.004 | -0.001 | -0.003*** | -0.050*** | 0.022*** | 0.009** |
| | (1.018) | (-0.542) | (-2.926) | (-4.474) | (2.606) | (1.989) |
| **LInd_Trans_Comm** | 0.036*** | -0.047*** | 0.001 | -0.024* | -0.006 | 0.006 |
| | (6.064) | (-12.765) | (0.562) | (-1.678) | (-0.534) | (1.192) |
| **LInd_Bank_Fin_Ins** | 0.004 | -0.029*** | 0.001 | -0.023** | -0.032*** | 0.012** |

| | | | | | | |
|---|---|---|---|---|---|---|
| | (0.807) | (-9.776) | (0.663) | (-2.000) | (-4.195) | (2.546) |
| **LInd_Pub_Edu_Health** | 0.008 | 0.005* | -0.007*** | -0.078*** | 0.083*** | 0.006 |
| | (1.530) | (1.670) | (-6.239) | (-6.653) | (8.741) | (1.326) |
| **LInd_Others** | -0.060*** | -0.016*** | 0.029*** | -0.089*** | -0.018 | 0.069*** |
| | (-7.633) | (-3.777) | (8.295) | (-4.705) | (-1.552) | (5.630) |
| **Benefit** | 0.012*** | 0.022*** | -0.013*** | 0.155*** | -0.085*** | -0.029*** |
| | (3.545) | (8.583) | (-11.915) | (20.591) | (-14.096) | (-9.957) |
| **Yr_2012** | -0.073*** | 0.014 | 0.003 | -0.072** | 0.055 | -0.018*** |
| | (-5.016) | (1.470) | (0.776) | (-1.973) | (1.629) | (-4.236) |
| **Yr_2011** | -0.039*** | -0.003 | 0.001 | -0.076** | 0.056* | -0.011* |
| | (-3.504) | (-0.452) | (0.226) | (-2.357) | (1.911) | (-1.789) |
| **Yr_2010** | -0.040*** | -0.001 | 0.002 | -0.066** | 0.061** | -0.010 |
| | (-3.600) | (-0.094) | (0.753) | (-2.069) | (2.032) | (-1.643) |
| **Yr_2009** | -0.031*** | -0.010 | 0.004 | -0.050 | 0.051* | -0.011** |
| | (-2.880) | (-1.515) | (1.270) | (-1.575) | (1.750) | (-1.996) |
| **Yr_2008** | -0.022** | 0.012 | 0.003 | -0.051 | 0.087*** | -0.015*** |
| | (-2.011) | (1.602) | (1.059) | (-1.514) | (2.639) | (-2.995) |
| **Yr_2007** | -0.004 | 0.011 | 0.002 | -0.062* | 0.109*** | -0.009 |
| | (-0.371) | (1.471) | (0.737) | (-1.801) | (3.109) | (-1.523) |
| **Yr_2006** | -0.008 | 0.006 | -0.004*** | -0.018 | -0.008 | -0.004 |
| | (-1.030) | (1.164) | (-2.662) | (-0.943) | (-0.622) | (-0.840) |
| **Yr_2005** | -0.028*** | 0.021*** | 0.004 | -0.013 | 0.000 | 0.006 |
| | (-3.353) | (3.441) | (1.593) | (-0.660) | (0.006) | (0.989) |
| **Yr_2004** | -0.012 | 0.001 | 0.007*** | 0.015 | -0.006 | -0.000 |
| | (-1.578) | (0.254) | (2.772) | (0.849) | (-0.437) | (-0.007) |
| **Yr_2003** | -0.009 | 0.001 | 0.002 | -0.010 | 0.007 | -0.011*** |
| | (-1.232) | (0.229) | (0.890) | (-0.529) | (0.539) | (-2.657) |
| **Yr_2002** | -0.008 | 0.003 | 0.002 | 0.007 | 0.002 | -0.003 |
| | (-1.062) | (0.532) | (0.914) | (0.375) | (0.126) | (-0.552) |
| **Age_20to24** | -0.107*** | 0.047*** | 0.026*** | | | |
| | (-13.993) | (8.695) | (4.858) | | | |
| **Age_25to29** | -0.176*** | 0.062*** | 0.048*** | | | |
| | (-19.352) | (9.971) | (6.035) | | | |
| **Age_30to34** | -0.227*** | 0.068*** | 0.058*** | | | |
| | (-23.704) | (10.438) | (6.346) | | | |
| **Age_35to39** | -0.249*** | 0.061*** | 0.081*** | | | |
| | (-23.882) | (9.364) | (7.071) | | | |
| **Age_40to44** | -0.267*** | 0.075*** | 0.081*** | | | |
| | (-25.407) | (10.549) | (6.976) | | | |
| **Age_45to49** | -0.259*** | 0.068*** | 0.082*** | | | |
| | (-23.325) | (9.136) | (6.668) | | | |
| **Age_55to59** | | | | -0.048*** | 0.050*** | 0.003 |
| | | | | (-6.213) | (7.996) | (1.319) |
| **Age_60to64** | | | | -0.179*** | 0.170*** | 0.013*** |
| | | | | (-15.781) | (14.975) | (3.452) |
| **Age_over64** | | | | -0.534*** | 0.495*** | 0.056*** |
| | | | | (-32.755) | (18.444) | (3.740) |
| **Pseudo R2** | | 0.1698 | | | 0.1355 | |
| **Observations** | | 89,820 | | | 21,455 | |

Control group: MS_Married, Ethn_White, Age_16to19 for the younger sample,
Age_50to54 for the older sample, R_England, Qual_Primary, DurUnemp_Less1, LInd_Manuf, Yr_2001
z-statistics in parentheses: *** p<0.01, ** p<0.05, * p<0.1

## Table 4.12: Marginal effects from multinomial logits for job preferences of unemployed job-seekers (males sample)

| | Younger | | | Older | | |
|---|---|---|---|---|---|---|
| | JobPreference (ref: no preference): | | | JobPreference (ref: no preference): | | |
| **Regressors** | **FTE** | **PTE** | **SE** | **FTE** | **PTE** | **SE** |
| **MS_Single** | 0.008 | 0.012*** | -0.001 | 0.054*** | -0.013** | 0.000 |
| | (1.630) | (4.926) | (-0.694) | (5.033) | (-2.119) | (0.066) |
| **MS_Separ_Divor** | -0.035*** | 0.027*** | 0.002 | -0.006 | -0.028*** | 0.014*** |
| | (-4.081) | (4.524) | (1.066) | (-0.552) | (-5.013) | (3.343) |
| **MS_Widowed** | -0.191*** | 0.167*** | -0.008 | -0.075*** | 0.032** | 0.031** |
| | (-3.853) | (3.680) | (-1.168) | (-2.882) | (2.082) | (2.456) |
| **Foreign** | -0.021** | 0.025*** | -0.004 | -0.009 | -0.011 | 0.004 |
| | (-2.190) | (6.780) | (-1.417) | (-0.301) | (-0.597) | (0.409) |
| **Ethn_Mixed** | -0.053*** | 0.029*** | -0.005 | 0.089* | -0.046* | -0.004 |
| | (-3.163) | (3.275) | (-1.185) | (1.765) | (-1.890) | (-0.261) |
| **Ethn_Asian** | -0.005 | 0.013*** | -0.002 | 0.006 | -0.022** | 0.013 |
| | (-0.764) | (3.408) | (-0.806) | (0.328) | (-2.409) | (1.510) |
| **Ethn_Black** | -0.030*** | 0.029*** | 0.001 | 0.068*** | -0.029** | -0.003 |
| | (-3.450) | (5.501) | (0.460) | (2.911) | (-2.329) | (-0.311) |
| **Ethn_Other** | -0.037*** | 0.016** | 0.012*** | -0.014 | -0.014 | 0.020 |
| | (-2.881) | (2.268) | (2.590) | (-0.415) | (-0.831) | (1.304) |
| **Health_problems** | -0.049*** | 0.052*** | 0.003* | -0.080*** | 0.068*** | 0.006* |
| | (-9.396) | (14.938) | (1.917) | (-8.741) | (11.296) | (1.865) |
| **#KidsAged_0to4** | -0.012*** | 0.003 | 0.003*** | -0.004 | 0.028* | 0.013* |
| | (-3.332) | (1.440) | (3.557) | (-0.139) | (1.791) | (1.696) |
| **#KidsAged_5to9** | -0.011*** | 0.003* | 0.001 | -0.053*** | 0.018* | 0.020*** |
| | (-3.168) | (1.663) | (0.881) | (-2.897) | (1.693) | (4.512) |
| **#KidsAged_10to15** | -0.011*** | 0.006*** | 0.000 | -0.044*** | 0.008 | 0.002 |
| | (-3.835) | (4.742) | (0.098) | (-4.445) | (1.246) | (0.721) |
| **R_Wales** | 0.004 | -0.005 | -0.004** | 0.008 | -0.004 | 0.001 |
| | (0.462) | (-1.442) | (-2.004) | (0.449) | (-0.434) | (0.156) |
| **R_Scotland** | 0.048*** | -0.001 | -0.006*** | 0.066*** | -0.011 | -0.014*** |
| | (9.010) | (-0.309) | (-4.015) | (5.313) | (-1.525) | (-3.804) |
| **R_NorthIreland** | 0.016** | -0.016*** | 0.001 | -0.011 | -0.013 | -0.009 |
| | (2.006) | (-4.693) | (0.293) | (-0.528) | (-1.106) | (-1.311) |
| **Qual_Degree** | -0.044*** | -0.012*** | 0.007*** | -0.202*** | -0.021*** | 0.036*** |
| | (-6.238) | (-4.185) | (3.113) | (-13.299) | (-3.381) | (4.860) |
| **Qual_Postsec** | -0.102*** | 0.013** | 0.010*** | -0.133*** | 0.003 | 0.009 |
| | (-9.647) | (2.495) | (3.063) | (-7.139) | (0.384) | (1.299) |
| **Qual_Secondary** | -0.044*** | 0.011*** | 0.005*** | -0.064*** | 0.006 | 0.012*** |
| | (-10.987) | (5.605) | (4.448) | (-6.887) | (1.219) | (3.366) |
| **DurUnemp_1to3** | 0.008* | -0.010*** | -0.006*** | -0.024** | 0.002 | -0.011*** |
| | (1.785) | (-5.137) | (-5.008) | (-2.468) | (0.349) | (-3.711) |
| **DurUnemp_3to5** | 0.016* | -0.008** | -0.004* | -0.019 | -0.012 | -0.013*** |
| | (1.939) | (-2.355) | (-1.888) | (-1.135) | (-1.341) | (-2.669) |
| **DurUnemp_5plus** | 0.001 | -0.001 | -0.003 | -0.008 | -0.017** | -0.005 |
| | (0.153) | (-0.259) | (-1.424) | (-0.518) | (-2.249) | (-0.989) |
| **LInd_Agri_Fish** | -0.052*** | -0.016** | 0.013* | -0.164*** | -0.003 | -0.007 |
| | (-2.664) | (-2.543) | (1.770) | (-3.403) | (-0.108) | (-0.388) |
| **LInd_Energy_Water** | 0.016 | -0.019*** | -0.006 | -0.128*** | 0.042** | 0.003 |
| | (0.921) | (-3.145) | (-1.517) | (-3.972) | (2.199) | (0.246) |
| **LInd_Constr** | -0.149*** | -0.027*** | 0.034*** | -0.156*** | -0.061*** | 0.068*** |
| | (-20.211) | (-13.412) | (10.285) | (-10.354) | (-11.601) | (6.978) |
| **LInd_Dis_Hotel_Restau** | -0.004 | 0.005** | -0.002 | -0.062*** | 0.018** | 0.012* |
| | (-0.778) | (1.970) | (-1.493) | (-4.437) | (2.286) | (1.959) |
| **LInd_Trans_Comm** | -0.001 | -0.015*** | 0.001 | -0.032** | 0.002 | 0.007 |
| | (-0.104) | (-5.719) | (0.650) | (-2.054) | (0.212) | (1.039) |
| **LInd_Bank_Fin_Ins** | -0.029*** | -0.009*** | 0.002 | -0.057*** | -0.018*** | 0.019*** |
| | (-4.481) | (-3.459) | (1.146) | (-3.970) | (-2.696) | (2.793) |
| **LInd_Pub_Edu_Health** | 0.001 | 0.012*** | -0.009*** | -0.082*** | 0.080*** | 0.012* |

| | | | | | | |
|---|---|---|---|---|---|---|
| | (0.081) | (2.979) | (-5.208) | (-5.209) | (7.045) | (1.810) |
| **LInd_Others** | -0.068*** | -0.004 | 0.027*** | -0.128*** | -0.009 | 0.087*** |
| | (-6.325) | (-0.980) | (5.777) | (-5.319) | (-0.847) | (5.113) |
| **Benefit** | 0.063*** | -0.021*** | -0.016*** | 0.163*** | -0.072*** | -0.033*** |
| | (15.438) | (-9.860) | (-11.936) | (18.371) | (-12.340) | (-8.906) |
| **Yr_2012** | -0.048*** | -0.014*** | 0.002 | -0.014 | -0.007 | -0.021*** |
| | (-2.640) | (-2.899) | (0.360) | (-0.357) | (-0.303) | (-3.729) |
| **Yr_2011** | -0.027* | -0.016*** | -0.002 | -0.031 | 0.011 | -0.012 |
| | (-1.931) | (-3.940) | (-0.578) | (-0.854) | (0.482) | (-1.496) |
| **Yr_2010** | -0.041*** | -0.015*** | 0.005 | -0.004 | -0.006 | -0.011 |
| | (-2.851) | (-3.768) | (1.082) | (-0.116) | (-0.322) | (-1.433) |
| **Yr_2009** | -0.032** | -0.020*** | 0.006 | 0.014 | -0.016 | -0.013* |
| | (-2.278) | (-5.541) | (1.335) | (0.405) | (-0.864) | (-1.679) |
| **Yr_2008** | -0.003 | -0.013*** | 0.004 | 0.024 | 0.010 | -0.017** |
| | (-0.223) | (-2.995) | (0.961) | (0.711) | (0.430) | (-2.530) |
| **Yr_2007** | 0.018 | -0.010** | 0.005 | 0.026 | 0.023 | -0.008 |
| | (1.484) | (-2.307) | (1.070) | (0.761) | (0.889) | (-0.973) |
| **Yr_2006** | -0.010 | 0.011** | -0.005** | -0.031 | 0.002 | -0.004 |
| | (-1.069) | (2.178) | (-2.515) | (-1.394) | (0.131) | (-0.674) |
| **Yr_2005** | -0.019* | 0.009* | 0.004 | -0.020 | -0.005 | 0.013 |
| | (-1.909) | (1.673) | (1.341) | (-0.905) | (-0.436) | (1.502) |
| **Yr_2004** | -0.004 | -0.002 | 0.006** | 0.021 | 0.001 | 0.001 |
| | (-0.418) | (-0.503) | (1.963) | (1.038) | (0.049) | (0.082) |
| **Yr_2003** | -0.013 | 0.005 | 0.002 | -0.006 | 0.009 | -0.011** |
| | (-1.364) | (1.032) | (0.787) | (-0.301) | (0.738) | (-2.116) |
| **Yr_2002** | -0.009 | 0.004 | 0.002 | 0.010 | 0.009 | -0.004 |
| | (-0.958) | (0.865) | (0.650) | (0.525) | (0.708) | (-0.699) |
| **Age_20to24** | -0.072*** | -0.003 | 0.023*** | | | |
| | (-7.901) | (-1.085) | (4.229) | | | |
| **Age_25to29** | -0.116*** | -0.011*** | 0.040*** | | | |
| | (-10.382) | (-4.157) | (4.965) | | | |
| **Age_30to34** | -0.184*** | -0.007** | 0.060*** | | | |
| | (-14.587) | (-2.273) | (5.714) | | | |
| **Age_35to39** | -0.206*** | -0.005 | 0.077*** | | | |
| | (-15.215) | (-1.641) | (6.172) | | | |
| **Age_40to44** | -0.217*** | -0.010*** | 0.084*** | | | |
| | (-15.553) | (-3.172) | (6.299) | | | |
| **Age_45to49** | -0.214*** | -0.015*** | 0.083*** | | | |
| | (-14.607) | (-5.200) | (6.015) | | | |
| **Age_55to59** | | | | -0.033*** | 0.042*** | -0.000 |
| | | | | (-3.540) | (6.421) | (-0.069) |
| **Age_60to64** | | | | -0.118*** | 0.098*** | 0.013*** |
| | | | | (-10.045) | (10.464) | (3.129) |
| **Age_over64** | | | | -0.541*** | 0.480*** | 0.060*** |
| | | | | (-25.177) | (14.136) | (3.204) |
| **Pseudo R2** | | 0.0652 | | | 0.0936 | |
| **Observations** | | 50,624 | | | 14,506 | |

Control group: MS_Married, Ethn_White, Age_16to19 for the younger sample,
Age_50to54 for the older sample, R_England, Qual_Primary, DurUnemp_Less1, LInd_Manuf, Yr_2001
z-statistics in parentheses: *** p<0.01, ** p<0.05, * p<0.1

## Table 4.13: Marginal effects from multinomial logits for job preferences of unemployed job-seekers (females sample)

| | Younger | | | Older | | |
|---|---|---|---|---|---|---|
| | JobPreference (ref: no preference): | | | JobPreference (ref: no preference): | | |
| **Regressors** | **FTE** | **PTE** | **SE** | **FTE** | **PTE** | **SE** |
| **MS_Single** | 0.045*** | -0.046*** | -0.002 | 0.161 | -0.166 | 0.005 |
| | (6.129) | (-6.383) | (-1.551) | (0.001) | (-0.018) | (0.000) |
| **MS_Separ_Divor** | 0.066*** | -0.062*** | -0.001 | 0.137 | -0.152 | 0.003 |
| | (6.855) | (-6.984) | (-0.909) | (0.001) | (-0.007) | (0.000) |
| **MS_Widowed** | -0.052* | 0.051* | 0.004 | 0.028 | -0.038 | 0.007 |
| | (-1.802) | (1.834) | (0.803) | (0.000) | (-0.000) | (0.000) |
| **Foreign** | 0.034** | -0.040*** | -0.001 | 0.226 | -0.255 | 0.004 |
| | (2.315) | (-2.723) | (-0.678) | (0.002) | (-0.011) | (0.000) |
| **Ethn_Mixed** | 0.015 | -0.012 | 0.003 | 0.178 | -0.155 | 0.020 |
| | (0.663) | (-0.530) | (0.657) | (0.000) | (-0.001) | (0.000) |
| **Ethn_Asian** | 0.049*** | -0.034*** | -0.004*** | 0.150 | -0.147 | -0.003 |
| | (4.396) | (-3.095) | (-3.166) | (0.024) | (-0.002) | (-0.000) |
| **Ethn_Black** | 0.101*** | -0.098*** | -0.000 | 0.123 | -0.162 | -0.003 |
| | (8.635) | (-9.065) | (-0.041) | (0.018) | (-0.002) | (-0.000) |
| **Ethn_Other** | 0.014 | -0.037** | 0.006* | 0.051 | -0.094 | 0.007 |
| | (0.761) | (-2.119) | (1.869) | (0.000) | (-0.002) | (0.000) |
| **Health_problems** | -0.067*** | 0.069*** | 0.001 | -0.103*** | 0.097 | 0.002 |
| | (-8.989) | (9.467) | (0.894) | (-7.365) | (0.001) | (0.000) |
| **#KidsAged_0to4** | -0.258*** | 0.247*** | 0.006*** | -0.302 | 0.243 | 0.019 |
| | (-40.700) | (42.488) | (7.132) | (-0.001) | (0.001) | (0.000) |
| **#KidsAged_5to9** | -0.175*** | 0.170*** | 0.002** | -0.333 | 0.308 | 0.006 |
| | (-33.576) | (35.354) | (2.392) | (-0.023) | (0.002) | (0.000) |
| **#KidsAged_10to15** | -0.078*** | 0.078*** | -0.000 | -0.180 | 0.158 | 0.002 |
| | (-17.837) | (18.851) | (-0.079) | (-0.006) | (0.002) | (0.000) |
| **R_Wales** | 0.028** | -0.017 | -0.001 | -0.014 | 0.013 | 0.010 |
| | (2.125) | (-1.316) | (-0.383) | (-0.000) | (0.000) | (0.000) |
| **R_Scotland** | 0.031*** | 0.000 | -0.007*** | 0.029 | -0.019 | 0.002 |
| | (3.264) | (0.048) | (-6.200) | (0.001) | (-0.001) | (0.000) |
| **R_NorthIreland** | 0.099*** | -0.080*** | -0.006*** | 0.023 | 0.019 | -0.007 |
| | (6.492) | (-5.575) | (-3.385) | (0.000) | (0.000) | (-0.000) |
| **Qual_Degree** | 0.083*** | -0.157*** | 0.023*** | -0.056 | -0.120 | 0.032 |
| | (8.704) | (-19.485) | (6.545) | (-0.000) | (-0.000) | (0.000) |
| **Qual_Postsec** | -0.007 | -0.050*** | 0.013*** | -0.092 | -0.058 | 0.035 |
| | (-0.520) | (-4.290) | (3.322) | (-0.000) | (-0.000) | (0.000) |
| **Qual_Secondary** | -0.023*** | 0.012* | 0.005*** | 0.003 | -0.036 | 0.006 |
| | (-3.524) | (1.942) | (3.588) | (0.000) | (-0.001) | (0.000) |
| **DurUnemp_1to3** | 0.020*** | -0.039*** | 0.000 | 0.023 | -0.025 | -0.002 |
| | (2.665) | (-5.534) | (0.025) | (0.001) | (-0.001) | (-0.000) |
| **DurUnemp_3to5** | 0.014 | -0.048*** | 0.002 | 0.025 | -0.009 | -0.003 |
| | (0.835) | (-3.081) | (0.682) | (0.001) | (-0.000) | (-0.000) |
| **DurUnemp_5plus** | 0.042** | -0.080*** | 0.005 | 0.030 | -0.074 | 0.003 |
| | (2.248) | (-4.742) | (1.154) | (0.001) | (-0.023) | (0.000) |
| **LInd_Agri_Fish** | 0.068 | -0.177*** | -0.006 | 0.025 | 0.069 | -0.012 |
| | (1.508) | (-5.021) | (-1.285) | (0.000) | (0.001) | (-0.000) |
| **LInd_Energy_Water** | 0.156*** | -0.148*** | -0.006 | 0.082 | -0.078 | -0.012 |
| | (4.099) | (-4.345) | (-1.315) | (0.001) | (-0.001) | (-0.000) |
| **LInd_Constr** | 0.053** | -0.079*** | -0.003 | 0.125 | -0.138 | -0.006 |
| | (2.172) | (-3.532) | (-1.032) | (0.002) | (-0.001) | (-0.000) |
| **LInd_Dis_Hotel_Restau** | 0.005 | -0.002 | -0.003** | -0.023 | 0.026 | -0.000 |
| | (0.622) | (-0.254) | (-2.487) | (-0.002) | (0.004) | (-0.000) |
| **LInd_Trans_Comm** | 0.100*** | -0.104*** | 0.002 | -0.017 | -0.021 | 0.005 |
| | (7.020) | (-7.959) | (0.619) | (-0.000) | (-0.000) | (0.000) |
| **LInd_Bank_Fin_Ins** | 0.059*** | -0.071*** | 0.000 | 0.055 | -0.065 | -0.001 |
| | (6.262) | (-8.037) | (0.191) | (0.022) | (-0.002) | (-0.000) |
| **LInd_Pub_Edu_Health** | 0.008 | 0.004 | -0.005*** | -0.082 | 0.106 | -0.004 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | (0.991) | (0.494) | (-4.917) | (-0.001) | (0.003) | (-0.000) |
| **LInd_Others** | -0.036*** | -0.030** | 0.022*** | -0.001 | -0.025 | 0.015 |
| | (-2.780) | (-2.510) | (5.604) | (-0.000) | (-0.000) | (0.000) |
| **Benefit** | -0.053*** | 0.079*** | -0.008*** | 0.152 | -0.131 | -0.013 |
| | (-7.054) | (10.949) | (-4.988) | (0.001) | (-0.001) | (-0.000) |
| **Yr_2012** | -0.097*** | 0.061** | 0.002 | -0.172 | 0.167 | -0.008 |
| | (-4.101) | (2.521) | (0.441) | (-0.001) | (0.002) | (-0.000) |
| **Yr_2011** | -0.045** | 0.016 | 0.002 | -0.155 | 0.140 | -0.006 |
| | (-2.348) | (0.844) | (0.694) | (-0.001) | (0.002) | (-0.000) |
| **Yr_2010** | -0.039** | 0.028 | -0.002 | -0.187 | 0.194 | -0.006 |
| | (-2.019) | (1.454) | (-0.665) | (-0.001) | (0.005) | (-0.000) |
| **Yr_2009** | -0.030 | 0.012 | 0.000 | -0.181 | 0.193 | -0.006 |
| | (-1.560) | (0.650) | (0.090) | (-0.001) | (0.004) | (-0.000) |
| **Yr_2008** | -0.049** | 0.055*** | 0.000 | -0.177 | 0.208 | -0.007 |
| | (-2.474) | (2.715) | (0.152) | (-0.001) | (0.003) | (-0.000) |
| **Yr_2007** | -0.037* | 0.046** | -0.002 | -0.224 | 0.255 | -0.006 |
| | (-1.862) | (2.304) | (-0.572) | (-0.002) | (0.005) | (-0.000) |
| **Yr_2006** | -0.001 | -0.003 | -0.003 | 0.014 | -0.034 | -0.002 |
| | (-0.094) | (-0.197) | (-1.335) | (0.001) | (-0.001) | (-0.000) |
| **Yr_2005** | -0.038** | 0.039*** | 0.002 | 0.006 | 0.012 | -0.007 |
| | (-2.488) | (2.624) | (0.739) | (0.000) | (0.000) | (-0.000) |
| **Yr_2004** | -0.017 | 0.003 | 0.006* | 0.014 | -0.026 | -0.001 |
| | (-1.151) | (0.241) | (1.865) | (0.001) | (-0.001) | (-0.000) |
| **Yr_2003** | -0.005 | -0.002 | 0.001 | -0.016 | 0.004 | -0.006 |
| | (-0.329) | (-0.145) | (0.462) | (-0.000) | (0.000) | (-0.000) |
| **Yr_2002** | -0.009 | 0.004 | 0.002 | 0.003 | -0.020 | 0.001 |
| | (-0.647) | (0.313) | (0.737) | (0.000) | (-0.004) | (0.000) |
| **Age_20to24** | -0.167*** | 0.139*** | 0.027** | | | |
| | (-12.866) | (9.556) | (2.209) | | | |
| **Age_25to29** | -0.259*** | 0.180*** | 0.058*** | | | |
| | (-19.137) | (10.148) | (2.764) | | | |
| **Age_30to34** | -0.286*** | 0.199*** | 0.048*** | | | |
| | (-22.522) | (11.560) | (2.616) | | | |
| **Age_35to39** | -0.312*** | 0.187*** | 0.079*** | | | |
| | (-22.856) | (9.151) | (2.984) | | | |
| **Age_40to44** | -0.353*** | 0.240*** | 0.071*** | | | |
| | (-28.277) | (11.556) | (2.845) | | | |
| **Age_45to49** | -0.351*** | 0.238*** | 0.079*** | | | |
| | (-26.929) | (10.312) | (2.773) | | | |
| **Age_55to59** | | | | -0.087 | 0.079 | 0.005 |
| | | | | (-0.002) | (0.001) | (0.000) |
| **Age_60to64** | | | | -0.352 | 0.361 | 0.014 |
| | | | | (-0.009) | (0.001) | (0.000) |
| **Age_over64** | | | | -0.439 | 0.401 | 0.054 |
| | | | | (-0.037) | (0.000) | (0.000) |
| **Pseudo R2** | | 0.1231 | | | 0.0910 | |
| **Observations** | | 39,196 | | | 6,949 | |

Control group: MS_Married, Ethn_White, Age_16to19 for the younger sample,
Age_50to54 for the older sample, R_England, Qual_Primary, DurUnemp_Less1, LInd_Manuf, Yr_2001
z-statistics in parentheses: *** p<0.01, ** p<0.05, * p<0.1

**Table 4.14: Marginal effects from multinomial logits for employment outcomes of the economically-active (full sample)**

| | Younger | | | Older | | |
|---|---|---|---|---|---|---|
| | EconActivity (ref: UE): | | | EconActivity (ref: UE): | | |
| **Regressors** | **FTE** | **PTE** | **SE** | **FTE** | **PTE** | **SE** |
| **Male** | 0.149*** | -0.231*** | 0.067*** | 0.203*** | -0.350*** | 0.126*** |
| | (179.459) | (-352.467) | (119.808) | (145.811) | (-299.051) | (121.199) |
| **MS_Single** | -0.026*** | -0.013*** | 0.007*** | 0.039*** | -0.066*** | 0.003 |
| | (-27.453) | (-22.336) | (9.835) | (15.549) | (-38.370) | (1.432) |
| **MS_Separ_Divor** | 0.007*** | -0.028*** | -0.002** | 0.083*** | -0.087*** | -0.009*** |
| | (4.974) | (-41.226) | (-2.049) | (44.317) | (-75.713) | (-5.386) |
| **MS_Widowed** | -0.010* | -0.007** | 0.001 | 0.057*** | -0.044*** | -0.010*** |
| | (-1.929) | (-2.575) | (0.139) | (16.536) | (-22.246) | (-3.497) |
| **Foreign** | -0.011*** | -0.003** | 0.005*** | 0.017*** | -0.051*** | 0.028*** |
| | (-5.284) | (-1.975) | (3.189) | (3.157) | (-11.652) | (6.759) |
| **Ethn_Mixed** | -0.024*** | 0.001 | 0.002 | 0.035*** | -0.036*** | -0.014 |
| | (-5.518) | (0.206) | (0.552) | (2.748) | (-3.902) | (-1.290) |
| **Ethn_Asian** | -0.062*** | 0.008*** | 0.023*** | -0.007 | -0.050*** | 0.039*** |
| | (-33.706) | (6.425) | (17.171) | (-1.592) | (-16.301) | (10.251) |
| **Ethn_Black** | 0.008*** | -0.013*** | -0.036*** | 0.151*** | -0.073*** | -0.099*** |
| | (3.422) | (-9.578) | (-24.656) | (27.612) | (-19.055) | (-25.654) |
| **Ethn_Other** | -0.053*** | 0.013*** | 0.003 | -0.000 | -0.051*** | 0.027*** |
| | (-15.492) | (5.508) | (1.229) | (-0.054) | (-8.834) | (3.783) |
| **Health_problems** | -0.036*** | 0.020*** | 0.001 | -0.025*** | 0.026*** | -0.005*** |
| | (-30.078) | (24.662) | (1.038) | (-15.171) | (19.496) | (-3.944) |
| **#KidsAged_0to4** | -0.045*** | 0.036*** | 0.022*** | -0.016** | 0.001 | 0.021*** |
| | (-64.917) | (77.324) | (44.575) | (-2.152) | (0.111) | (4.277) |
| **#KidsAged_5to9** | -0.051*** | 0.032*** | 0.022*** | -0.020*** | -0.006 | 0.033*** |
| | (-81.273) | (78.437) | (48.894) | (-4.751) | (-1.333) | (11.503) |
| **#KidsAged_10to15** | -0.022*** | 0.012*** | 0.015*** | 0.002 | -0.001 | 0.011*** |
| | (-39.845) | (32.627) | (38.467) | (1.186) | (-0.676) | (7.768) |
| **R_Wales** | 0.009*** | -0.003*** | -0.006*** | 0.004 | -0.014*** | 0.010*** |
| | (6.004) | (-3.019) | (-5.141) | (1.326) | (-6.026) | (4.219) |
| **R_Scotland** | 0.011*** | 0.003*** | -0.020*** | 0.047*** | -0.020*** | -0.030*** |
| | (9.826) | (3.824) | (-23.584) | (21.609) | (-11.791) | (-17.158) |
| **R_NorthIreland** | -0.005*** | -0.019*** | 0.022*** | -0.012*** | -0.036*** | 0.049*** |
| | (-2.659) | (-19.161) | (15.555) | (-3.391) | (-14.147) | (15.550) |
| **Qual_Degree** | 0.110*** | -0.068*** | -0.021*** | 0.023*** | -0.080*** | 0.064*** |
| | (123.707) | (-128.797) | (-29.447) | (11.676) | (-64.015) | (37.018) |
| **Qual_Postsec** | 0.087*** | -0.040*** | -0.026*** | 0.053*** | -0.048*** | 0.003 |
| | (81.856) | (-66.120) | (-30.835) | (23.898) | (-33.618) | (1.529) |
| **Qual_Secondary** | 0.042*** | -0.027*** | 0.003*** | 0.019*** | -0.043*** | 0.027*** |
| | (47.151) | (-45.161) | (4.547) | (12.598) | (-37.613) | (20.858) |
| **Benefit** | -0.261*** | 0.131*** | -0.010*** | -0.209*** | 0.079*** | 0.012*** |
| | (-254.759) | (161.288) | (-17.054) | (-108.916) | (48.974) | (7.772) |
| **Yr_2012** | -0.029*** | 0.012*** | 0.012*** | -0.012* | 0.031*** | -0.021*** |
| | (-8.175) | (4.864) | (4.409) | (-1.661) | (4.753) | (-4.007) |
| **Yr_2011** | -0.022*** | 0.009*** | 0.009*** | -0.008 | 0.035*** | -0.027*** |
| | (-8.248) | (5.074) | (4.332) | (-1.225) | (6.337) | (-6.224) |
| **Yr_2010** | -0.020*** | 0.009*** | 0.008*** | -0.006 | 0.034*** | -0.027*** |
| | (-7.411) | (4.910) | (4.027) | (-1.012) | (6.188) | (-6.269) |
| **Yr_2009** | -0.014*** | 0.004** | 0.008*** | 0.005 | 0.033*** | -0.038*** |
| | (-5.272) | (2.387) | (3.781) | (0.876) | (6.075) | (-9.027) |
| **Yr_2008** | -0.001 | 0.000 | 0.007*** | 0.006 | 0.036*** | -0.036*** |

| | | | | | | |
|---|---|---|---|---|---|---|
| | (-0.533) | (0.074) | (3.705) | (0.965) | (6.535) | (-8.540) |
| **Yr_2007** | -0.001 | 0.002 | 0.007*** | 0.000 | 0.036*** | -0.028*** |
| | (-0.318) | (0.905) | (3.370) | (0.001) | (6.546) | (-6.563) |
| **Yr_2006** | -0.011*** | -0.000 | 0.011*** | 0.021*** | -0.015*** | -0.003 |
| | (-6.552) | (-0.319) | (8.154) | (6.864) | (-6.322) | (-1.257) |
| **Yr_2005** | -0.000 | -0.004*** | 0.008*** | 0.018*** | -0.013*** | -0.001 |
| | (-0.061) | (-3.495) | (5.891) | (5.589) | (-5.262) | (-0.370) |
| **Yr_2004** | -0.007*** | 0.001 | 0.010*** | 0.010*** | -0.008*** | 0.001 |
| | (-4.526) | (1.373) | (7.470) | (3.126) | (-3.116) | (0.416) |
| **Yr_2003** | -0.009*** | 0.001 | 0.008*** | 0.003 | -0.004 | 0.001 |
| | (-5.301) | (1.316) | (6.650) | (0.970) | (-1.437) | (0.545) |
| **Yr_2002** | 0.001 | -0.001 | 0.001 | 0.006* | -0.003 | -0.004 |
| | (0.479) | (-0.853) | (0.600) | (1.946) | (-1.289) | (-1.417) |
| **Age_20to24** | -0.012*** | -0.052*** | 0.084*** | | | |
| | (-2.704) | (-54.433) | (18.492) | | | |
| **Age_25to29** | -0.046*** | -0.080*** | 0.155*** | | | |
| | (-9.288) | (-103.619) | (29.974) | | | |
| **Age_30to34** | -0.095*** | -0.084*** | 0.212*** | | | |
| | (-17.964) | (-103.745) | (38.022) | | | |
| **Age_35to39** | -0.125*** | -0.082*** | 0.244*** | | | |
| | (-23.431) | (-94.730) | (43.163) | | | |
| **Age_40to44** | -0.149*** | -0.080*** | 0.267*** | | | |
| | (-27.398) | (-88.076) | (46.315) | | | |
| **Age_45to49** | -0.196*** | -0.069*** | 0.302*** | | | |
| | (-34.687) | (-70.215) | (49.520) | | | |
| **Age_55to59** | | | | -0.077*** | 0.049*** | 0.024*** |
| | | | | (-50.399) | (37.626) | (17.982) |
| **Age_60to64** | | | | -0.181*** | 0.121*** | 0.070*** |
| | | | | (-93.747) | (62.100) | (41.114) |
| **Age_over64** | | | | -0.430*** | 0.272*** | 0.179*** |
| | | | | (-175.326) | (76.004) | (53.930) |
| **Pseudo R2** | | 0.1998 | | | 0.1520 | |
| **Observations** | | 1,671,070 | | | 670,457 | |

Control group: MS_Married, Ethn_White, Age_16to19 for the younger sample, Age_50to54 for the older sample, R_England, Qual_Primary, Yr_2001
z-statistics in parentheses: *** p<0.01, ** p<0.05, * p<0.1

**Table 4.15: Marginal effects from multinomial logits for employment outcomes of the economically-active (males sample)**

| | Younger | | | Older | | |
|---|---|---|---|---|---|---|
| | EconActivity (ref: UE): | | | EconActivity (ref: UE): | | |
| **Regressors** | **FTE** | **PTE** | **SE** | **FTE** | **PTE** | **SE** |
| **MS_Single** | -0.063*** | 0.019*** | 0.015*** | -0.047*** | 0.024*** | -0.006** |
| | (-53.339) | (34.926) | (14.340) | (-14.049) | (12.158) | (-2.121) |
| **MS_Separ_Divor** | -0.050*** | 0.013*** | 0.010*** | -0.029*** | -0.005*** | 0.015*** |
| | (-23.497) | (11.188) | (5.703) | (-10.079) | (-3.782) | (5.700) |
| **MS_Widowed** | -0.067*** | 0.021*** | 0.047*** | -0.016*** | 0.007*** | 0.008 |
| | (-6.667) | (4.063) | (5.212) | (-2.628) | (2.824) | (1.511) |
| **Foreign** | -0.012*** | 0.018*** | -0.011*** | -0.014** | -0.010*** | 0.017*** |
| | (-4.901) | (21.739) | (-4.734) | (-2.007) | (-2.731) | (2.686) |
| **Ethn_Mixed** | -0.046*** | 0.027*** | 0.001 | 0.027 | -0.012 | -0.029* |
| | (-7.951) | (9.656) | (0.235) | (1.523) | (-1.331) | (-1.811) |
| **Ethn_Asian** | -0.125*** | 0.058*** | 0.048*** | -0.090*** | 0.013*** | 0.060*** |
| | (-52.046) | (40.029) | (23.484) | (-15.776) | (4.217) | (11.358) |
| **Ethn_Black** | -0.079*** | 0.066*** | -0.032*** | 0.092*** | -0.003 | -0.118*** |
| | (-21.886) | (27.193) | (-12.934) | (11.018) | (-0.626) | (-17.627) |
| **Ethn_Other** | -0.092*** | 0.063*** | 0.005 | -0.073*** | -0.006 | 0.055*** |
| | (-20.522) | (22.174) | (1.282) | (-6.430) | (-1.139) | (5.202) |
| **Health_problems** | -0.039*** | 0.028*** | 0.002* | -0.016*** | 0.018*** | -0.001 |
| | (-24.157) | (32.274) | (1.792) | (-7.570) | (15.880) | (-0.451) |
| **#KidsAged_0to4** | -0.010*** | -0.002*** | 0.022*** | -0.021*** | 0.003 | 0.024*** |
| | (-12.140) | (-5.549) | (31.945) | (-3.141) | (0.705) | (4.072) |
| **#KidsAged_5to9** | -0.016*** | 0.001*** | 0.019*** | -0.030*** | 0.007*** | 0.031*** |
| | (-20.576) | (3.458) | (28.188) | (-7.296) | (3.062) | (8.549) |
| **#KidsAged_10to15** | -0.015*** | -0.001*** | 0.020*** | 0.010*** | -0.012*** | 0.014*** |
| | (-22.294) | (-3.803) | (33.971) | (4.394) | (-8.583) | (7.231) |
| **R_Wales** | -0.004* | 0.004*** | -0.001 | -0.009** | -0.008*** | 0.019*** |
| | (-1.926) | (4.630) | (-0.703) | (-2.225) | (-4.715) | (5.041) |
| **R_Scotland** | 0.012*** | 0.008*** | -0.024*** | 0.038*** | -0.008*** | -0.033*** |
| | (8.016) | (10.899) | (-18.730) | (13.103) | (-5.530) | (-12.682) |
| **R_NorthIreland** | -0.058*** | -0.001 | 0.053*** | -0.060*** | -0.034*** | 0.092*** |
| | (-24.340) | (-1.630) | (24.140) | (-12.804) | (-19.914) | (20.460) |
| **Qual_Degree** | 0.073*** | -0.008*** | -0.053*** | -0.061*** | 0.020*** | 0.046*** |
| | (68.703) | (-19.175) | (-54.557) | (-23.780) | (15.066) | (19.291) |
| **Qual_Postsec** | 0.065*** | -0.008*** | -0.045*** | -0.000 | 0.012*** | -0.008*** |
| | (47.933) | (-14.564) | (-36.510) | (-0.120) | (7.206) | (-2.807) |
| **Qual_Secondary** | 0.024*** | -0.011*** | -0.001 | -0.018*** | -0.003*** | 0.023*** |
| | (22.913) | (-26.812) | (-1.170) | (-8.937) | (-3.318) | (12.472) |
| **Benefit** | -0.216*** | 0.038*** | -0.046*** | -0.254*** | 0.062*** | -0.020*** |
| | (-133.408) | (50.982) | (-52.825) | (-83.289) | (31.808) | (-7.625) |
| **Yr_2012** | -0.036*** | 0.002 | 0.031*** | 0.001 | 0.013** | -0.013 |
| | (-7.811) | (1.510) | (7.120) | (0.123) | (2.344) | (-1.552) |
| **Yr_2011** | -0.029*** | 0.001 | 0.026*** | 0.016** | 0.007 | -0.020*** |
| | (-8.239) | (0.684) | (7.879) | (2.029) | (1.528) | (-2.800) |
| **Yr_2010** | -0.028*** | 0.000 | 0.026*** | 0.014* | 0.009** | -0.020*** |
| | (-8.017) | (0.439) | (7.752) | (1.676) | (1.960) | (-2.797) |
| **Yr_2009** | -0.025*** | -0.003*** | 0.027*** | 0.025*** | 0.009** | -0.032*** |
| | (-7.364) | (-3.293) | (8.036) | (3.196) | (1.979) | (-4.700) |
| **Yr_2008** | -0.016*** | -0.008*** | 0.028*** | 0.028*** | 0.012** | -0.031*** |
| | (-4.685) | (-8.620) | (8.422) | (3.493) | (2.528) | (-4.606) |
| **Yr_2007** | -0.013*** | -0.008*** | 0.027*** | 0.024*** | 0.009** | -0.023*** |

| | | | | | | |
|---|---|---|---|---|---|---|
| | (-3.785) | (-9.522) | (8.202) | (2.967) | (1.991) | (-3.361) |
| **Yr_2006** | -0.020*** | 0.006*** | 0.014*** | 0.013*** | -0.001 | -0.007* |
| | (-9.390) | (6.307) | (7.178) | (3.273) | (-0.707) | (-1.902) |
| **Yr_2005** | -0.012*** | 0.004*** | 0.011*** | 0.006 | 0.002 | -0.003 |
| | (-5.849) | (4.321) | (5.585) | (1.471) | (1.080) | (-0.874) |
| **Yr_2004** | -0.015*** | 0.004*** | 0.015*** | 0.000 | 0.002 | 0.001 |
| | (-7.148) | (3.849) | (7.529) | (0.092) | (1.128) | (0.332) |
| **Yr_2003** | -0.014*** | 0.004*** | 0.010*** | -0.000 | 0.002 | -0.000 |
| | (-6.748) | (4.049) | (5.500) | (-0.061) | (1.047) | (-0.062) |
| **Yr_2002** | -0.003 | 0.002* | 0.002 | 0.007* | -0.001 | -0.006* |
| | (-1.553) | (1.832) | (1.149) | (1.748) | (-0.260) | (-1.759) |
| **Age_20to24** | -0.051*** | -0.017*** | 0.083*** | | | |
| | (-9.436) | (-45.714) | (15.032) | | | |
| **Age_25to29** | -0.109*** | -0.029*** | 0.159*** | | | |
| | (-17.864) | (-93.400) | (25.772) | | | |
| **Age_30to34** | -0.160*** | -0.033*** | 0.217*** | | | |
| | (-25.057) | (-99.959) | (33.586) | | | |
| **Age_35to39** | -0.191*** | -0.035*** | 0.252*** | | | |
| | (-29.627) | (-94.679) | (38.559) | | | |
| **Age_40to44** | -0.213*** | -0.035*** | 0.275*** | | | |
| | (-32.551) | (-93.896) | (41.435) | | | |
| **Age_45to49** | -0.256*** | -0.034*** | 0.315*** | | | |
| | (-37.289) | (-92.241) | (45.346) | | | |
| **Age_55to59** | | | | -0.081*** | 0.051*** | 0.025*** |
| | | | | (-37.864) | (32.236) | (12.826) |
| **Age_60to64** | | | | -0.206*** | 0.135*** | 0.067*** |
| | | | | (-82.980) | (57.477) | (29.116) |
| **Age_over64** | | | | -0.458*** | 0.236*** | 0.246*** |
| | | | | (-133.708) | (48.973) | (50.937) |
| **Pseudo R2** | | 0.1319 | | | 0.1116 | |
| **Observations** | | 864,841 | | | 369,816 | |

Control group: MS_Married, Ethn_White, Age_16to19 for the younger sample, Age_50to54 for the older sample, R_England, Qual_Primary, Yr_2001
z-statistics in parentheses: *** p<0.01, ** p<0.05, * p<0.1

**Table 4.16: Marginal effects from multinomial logits for employment outcomes of the economically-active (females sample)**

| | Younger | | | Older | | |
|---|---|---|---|---|---|---|
| | EconActivity (ref: UE): | | | EconActivity (ref: UE): | | |
| **Regressors** | **FTE** | **PTE** | **SE** | **FTE** | **PTE** | **SE** |
| **MS_Single** | 0.040*** | -0.067*** | -0.002** | 0.161*** | -0.186*** | 0.011*** |
| | (24.062) | (-44.497) | (-2.311) | (39.034) | (-50.509) | (4.447) |
| **MS_Separ_Divor** | 0.079*** | -0.090*** | -0.010*** | 0.199*** | -0.183*** | -0.022*** |
| | (38.182) | (-52.155) | (-11.021) | (75.594) | (-73.852) | (-14.857) |
| **MS_Widowed** | 0.010 | -0.027*** | -0.012*** | 0.108*** | -0.083*** | -0.022*** |
| | (1.365) | (-4.337) | (-4.077) | (24.698) | (-20.881) | (-10.522) |
| **Foreign** | 0.014*** | -0.050*** | 0.024*** | 0.047*** | -0.082*** | 0.031*** |
| | (3.581) | (-13.331) | (13.879) | (6.060) | (-10.409) | (7.302) |
| **Ethn_Mixed** | 0.012 | -0.038*** | 0.002 | 0.041** | -0.055*** | 0.000 |
| | (1.596) | (-5.798) | (0.594) | (2.193) | (-2.938) | (0.004) |
| **Ethn_Asian** | 0.018*** | -0.063*** | -0.002 | 0.112*** | -0.142*** | 0.010** |
| | (5.463) | (-22.660) | (-1.175) | (15.280) | (-21.407) | (2.111) |
| **Ethn_Black** | 0.112*** | -0.114*** | -0.036*** | 0.209*** | -0.165*** | -0.060*** |
| | (29.943) | (-36.299) | (-28.530) | (23.927) | (-19.916) | (-16.397) |
| **Ethn_Other** | 0.006 | -0.062*** | 0.004 | 0.092*** | -0.110*** | -0.002 |
| | (0.961) | (-11.992) | (1.524) | (7.129) | (-8.992) | (-0.271) |
| **Health_problems** | -0.055*** | 0.030*** | 0.002** | -0.033*** | 0.027*** | -0.001 |
| | (-26.829) | (15.960) | (2.574) | (-13.308) | (11.104) | (-0.648) |
| **#KidsAged_0to4** | -0.179*** | 0.159*** | 0.029*** | -0.047 | 0.059* | -0.008 |
| | (-114.479) | (116.829) | (43.762) | (-1.498) | (1.955) | (-0.397) |
| **#KidsAged_5to9** | -0.153*** | 0.124*** | 0.027*** | -0.052*** | 0.006 | 0.049*** |
| | (-116.156) | (108.768) | (49.839) | (-4.350) | (0.488) | (8.798) |
| **#KidsAged_10to15** | -0.062*** | 0.054*** | 0.010*** | -0.027*** | 0.039*** | 0.001 |
| | (-55.425) | (55.029) | (20.067) | (-6.880) | (10.279) | (0.265) |
| **R_Wales** | 0.027*** | -0.015*** | -0.010*** | 0.020*** | -0.019*** | -0.001 |
| | (9.511) | (-5.658) | (-8.332) | (4.279) | (-4.196) | (-0.286) |
| **R_Scotland** | 0.013*** | -0.004** | -0.013*** | 0.057*** | -0.035*** | -0.022*** |
| | (6.235) | (-2.196) | (-14.619) | (16.807) | (-10.716) | (-12.034) |
| **R_NorthIreland** | 0.083*** | -0.063*** | -0.016*** | 0.050*** | -0.028*** | -0.018*** |
| | (27.478) | (-23.546) | (-12.503) | (8.685) | (-4.987) | (-5.665) |
| **Qual_Degree** | 0.199*** | -0.189*** | 0.018*** | 0.129*** | -0.221*** | 0.099*** |
| | (111.071) | (-129.620) | (17.520) | (40.513) | (-87.945) | (39.626) |
| **Qual_Postsec** | 0.142*** | -0.112*** | -0.003*** | 0.105*** | -0.120*** | 0.024*** |
| | (68.436) | (-64.207) | (-2.729) | (33.128) | (-42.634) | (10.653) |
| **Qual_Secondary** | 0.075*** | -0.059*** | 0.008*** | 0.061*** | -0.089*** | 0.033*** |
| | (43.359) | (-38.201) | (9.498) | (25.656) | (-40.319) | (20.783) |
| **Benefit** | -0.268*** | 0.213*** | -0.009*** | -0.186*** | 0.123*** | 0.015*** |
| | (-167.254) | (144.121) | (-10.995) | (-70.521) | (43.892) | (8.505) |
| **Yr_2012** | -0.045*** | 0.049*** | -0.012*** | -0.022** | 0.038*** | -0.023*** |
| | (-7.073) | (7.885) | (-5.294) | (-2.050) | (3.529) | (-4.801) |
| **Yr_2011** | -0.039*** | 0.045*** | -0.013*** | -0.029*** | 0.055*** | -0.030*** |
| | (-7.632) | (9.148) | (-7.084) | (-3.269) | (5.951) | (-7.386) |
| **Yr_2010** | -0.036*** | 0.045*** | -0.012*** | -0.023** | 0.050*** | -0.030*** |
| | (-7.211) | (9.242) | (-6.770) | (-2.517) | (5.448) | (-7.503) |
| **Yr_2009** | -0.025*** | 0.038*** | -0.014*** | -0.011 | 0.046*** | -0.036*** |
| | (-4.981) | (7.762) | (-7.758) | (-1.203) | (4.945) | (-9.472) |
| **Yr_2008** | -0.010** | 0.033*** | -0.016*** | -0.013 | 0.047*** | -0.033*** |
| | (-2.002) | (6.939) | (-9.251) | (-1.398) | (5.092) | (-8.422) |
| **Yr_2007** | -0.015*** | 0.040*** | -0.016*** | -0.021** | 0.051*** | -0.026*** |

| | | | | | | |
|---|---|---|---|---|---|---|
| | (-3.114) | (8.184) | (-9.414) | (-2.340) | (5.520) | (-6.325) |
| **Yr_2006** | 0.000 | -0.007*** | 0.004*** | 0.031*** | -0.030*** | -0.001 |
| | (0.130) | (-2.680) | (2.822) | (6.318) | (-6.392) | (-0.237) |
| **Yr_2005** | 0.016*** | -0.014*** | 0.002 | 0.032*** | -0.030*** | 0.001 |
| | (5.252) | (-5.057) | (1.355) | (6.398) | (-6.397) | (0.194) |
| **Yr_2004** | -0.001 | 0.002 | 0.002 | 0.022*** | -0.020*** | 0.000 |
| | (-0.474) | (0.686) | (1.640) | (4.441) | (-4.165) | (0.013) |
| **Yr_2003** | -0.003 | 0.000 | 0.005*** | 0.007 | -0.010** | 0.003 |
| | (-0.989) | (0.170) | (3.201) | (1.479) | (-2.137) | (0.866) |
| **Yr_2002** | 0.002 | -0.002 | -0.000 | 0.005 | -0.006 | -0.001 |
| | (0.841) | (-0.700) | (-0.137) | (1.007) | (-1.240) | (-0.223) |
| **Age_20to24** | 0.014 | -0.118*** | 0.127*** | | | |
| | (1.508) | (-26.951) | (10.372) | | | |
| **Age_25to29** | 0.010 | -0.174*** | 0.198*** | | | |
| | (0.893) | (-42.802) | (14.071) | | | |
| **Age_30to34** | -0.034*** | -0.174*** | 0.247*** | | | |
| | (-2.884) | (-39.638) | (16.387) | | | |
| **Age_35to39** | -0.080*** | -0.161*** | 0.285*** | | | |
| | (-6.841) | (-33.111) | (18.381) | | | |
| **Age_40to44** | -0.128*** | -0.144*** | 0.320*** | | | |
| | (-11.025) | (-26.926) | (20.061) | | | |
| **Age_45to49** | -0.194*** | -0.111*** | 0.349*** | | | |
| | (-17.051) | (-17.503) | (20.857) | | | |
| **Age_55to59** | | | | -0.082*** | 0.063*** | 0.017*** |
| | | | | (-38.187) | (28.110) | (11.073) |
| **Age_60to64** | | | | -0.154*** | 0.119*** | 0.055*** |
| | | | | (-50.958) | (35.216) | (22.160) |
| **Age_over64** | | | | -0.327*** | 0.175*** | 0.168*** |
| | | | | (-101.910) | (34.140) | (34.966) |
| **Pseudo R2** | | 0.1516 | | | 0.0810 | |
| **Observations** | | 806,229 | | | 300,641 | |

Control group: MS_Married, Ethn_White, Age_16to19 for the younger sample, Age_50to54 for the older sample, R_England, Qual_Primary, Yr_2001
z-statistics in parentheses: *** p<0.01, ** p<0.05, * p<0.1

## Table 4.17: Marginal effects from binomial logits for working part-time involuntarily of part-timers

| | Pooled | | Male | | Female | |
|---|---|---|---|---|---|---|
| **Regressors** | **Younger** | **Older** | **Younger** | **Older** | **Younger** | **Older** |
| **Male** | 0.146*** | 0.069*** | | | | |
| | (45.289) | (27.685) | | | | |
| **MS_Single** | 0.059*** | 0.066*** | -0.001 | 0.046*** | 0.064*** | 0.078*** |
| | (24.431) | (15.474) | (-0.104) | (6.415) | (25.699) | (14.136) |
| **MS_Separ_Divor** | 0.087*** | 0.080*** | -0.028* | 0.053*** | 0.091*** | 0.085*** |
| | (25.303) | (26.487) | (-1.804) | (7.518) | (26.656) | (25.661) |
| **MS_Widowed** | 0.016 | 0.032*** | -0.265*** | -0.001 | 0.027*** | 0.035*** |
| | (1.566) | (8.313) | (-5.814) | (-0.067) | (2.689) | (8.697) |
| **Foreign** | 0.001 | 0.023*** | -0.064*** | 0.047*** | 0.014** | 0.016*** |
| | (0.165) | (3.984) | (-4.892) | (3.364) | (2.558) | (2.622) |
| **Ethn_Mixed** | 0.055*** | 0.030* | 0.046* | 0.014 | 0.060*** | 0.030* |
| | (5.295) | (1.791) | (1.756) | (0.288) | (5.272) | (1.757) |
| **Ethn_Asian** | 0.061*** | 0.046*** | 0.039*** | 0.049*** | 0.040*** | 0.040*** |
| | (13.848) | (7.030) | (3.979) | (3.936) | (8.112) | (5.156) |
| **Ethn_Black** | 0.083*** | 0.072*** | 0.019 | 0.106*** | 0.095*** | 0.061*** |
| | (13.121) | (7.042) | (1.347) | (4.271) | (13.303) | (5.536) |
| **Ethn_Other** | 0.063*** | 0.076*** | 0.046*** | 0.110*** | 0.057*** | 0.059*** |
| | (7.626) | (5.723) | (2.766) | (3.419) | (5.926) | (4.263) |
| **Health_problems** | 0.022*** | 0.005*** | -0.043*** | -0.003 | 0.025*** | 0.006*** |
| | (8.810) | (3.182) | (-4.956) | (-0.832) | (9.587) | (3.058) |
| **#KidsAged_0to4** | -0.070*** | 0.001 | -0.027*** | 0.009 | -0.083*** | -0.054** |
| | (-39.210) | (0.068) | (-4.550) | (0.777) | (-43.960) | (-2.294) |
| **#KidsAged_5to9** | -0.014*** | 0.003 | -0.011* | 0.005 | -0.019*** | -0.010 |
| | (-9.528) | (0.634) | (-1.956) | (0.651) | (-13.046) | (-1.354) |
| **#KidsAged_10to15** | 0.006*** | 0.007*** | 0.018*** | 0.006 | 0.001 | 0.003 |
| | (4.612) | (3.275) | (3.550) | (1.270) | (1.140) | (1.229) |
| **R_Wales** | -0.002 | -0.002 | 0.001 | 0.016* | -0.003 | -0.007* |
| | (-0.417) | (-0.586) | (0.071) | (1.797) | (-0.941) | (-1.944) |
| **R_Scotland** | 0.014*** | 0.011*** | 0.027*** | 0.008 | 0.012*** | 0.011*** |
| | (4.926) | (4.112) | (2.619) | (1.284) | (4.312) | (4.029) |
| **R_NorthIreland** | -0.060*** | -0.023*** | 0.014 | -0.008 | -0.067*** | -0.026*** |
| | (-15.128) | (-5.928) | (0.808) | (-0.669) | (-17.679) | (-6.626) |
| **Qual_Degree** | -0.040*** | 0.000 | -0.046*** | -0.026*** | -0.028*** | 0.012*** |
| | (-15.720) | (0.116) | (-4.923) | (-5.393) | (-10.656) | (4.180) |
| **Qual_Postsec** | -0.034*** | -0.008*** | -0.029** | -0.007 | -0.026*** | -0.008*** |
| | (-11.567) | (-3.348) | (-2.308) | (-1.185) | (-8.900) | (-3.146) |
| **Qual_Secondary** | -0.012*** | -0.001 | -0.022*** | -0.010** | -0.006*** | 0.002 |
| | (-6.111) | (-0.447) | (-2.964) | (-2.547) | (-2.754) | (0.959) |
| **Private** | -0.038*** | -0.017*** | -0.028*** | -0.014*** | -0.037*** | -0.017*** |
| | (-15.686) | (-8.793) | (-2.895) | (-2.655) | (-15.697) | (-8.370) |
| **Ind_Agri_Fish** | -0.004 | -0.032*** | 0.010 | -0.041*** | -0.017 | -0.028*** |
| | (-0.282) | (-3.990) | (0.288) | (-2.649) | (-1.228) | (-2.756) |
| **Ind_Energy_Water** | -0.064*** | -0.011 | -0.176*** | -0.027 | -0.044*** | 0.004 |
| | (-5.392) | (-0.935) | (-4.472) | (-1.441) | (-3.402) | (0.216) |
| **Ind_Constr** | -0.024*** | -0.019*** | -0.024 | -0.023** | -0.032*** | -0.017** |
| | (-3.319) | (-3.466) | (-1.157) | (-2.193) | (-4.064) | (-2.383) |
| **Ind_Dis_Hotel_Restau** | 0.021*** | 0.001 | -0.011 | 0.002 | 0.025*** | 0.001 |
| | (4.814) | (0.306) | (-0.847) | (0.244) | (5.479) | (0.134) |
| **Ind_Trans_Comm** | 0.015** | 0.006 | 0.013 | 0.010 | 0.003 | 0.003 |
| | (2.513) | (1.204) | (0.836) | (1.108) | (0.497) | (0.542) |
| **Ind_Bank_Fin_Ins** | -0.009** | -0.000 | -0.013 | 0.006 | -0.005 | -0.002 |
| | (-2.018) | (-0.123) | (-0.852) | (0.704) | (-1.117) | (-0.426) |
| **Ind_Pub_Edu_Health** | 0.004 | 0.001 | -0.052*** | 0.007 | 0.011** | 0.001 |
| | (0.856) | (0.349) | (-3.372) | (0.900) | (2.426) | (0.160) |
| **Ind_Others** | 0.018*** | 0.009** | -0.021 | 0.015 | 0.024*** | 0.007 |
| | (3.299) | (2.063) | (-1.303) | (1.630) | (4.196) | (1.335) |

| | | | | | | |
|---|---|---|---|---|---|---|
| **WorkHour** | -0.004*** | -0.002*** | -0.001** | -0.002*** | -0.005*** | -0.002*** |
| | (-38.536) | (-20.733) | (-2.089) | (-7.401) | (-42.464) | (-20.470) |
| **Temporary** | 0.078*** | 0.041*** | 0.061*** | 0.045*** | 0.080*** | 0.041*** |
| | (24.697) | (14.620) | (7.722) | (8.618) | (23.405) | (12.024) |
| **Tenure** | -0.009*** | -0.004*** | -0.021*** | -0.005*** | -0.008*** | -0.003*** |
| | (-54.587) | (-41.791) | (-24.297) | (-19.613) | (-46.776) | (-34.848) |
| **Homeworker** | -0.105*** | -0.044*** | -0.099*** | -0.016* | -0.095*** | -0.050*** |
| | (-22.295) | (-13.425) | (-3.159) | (-1.682) | (-21.480) | (-15.499) |
| **SecJob** | -0.013*** | 0.016*** | -0.124*** | 0.001 | -0.002 | 0.019*** |
| | (-4.620) | (6.026) | (-12.396) | (0.223) | (-0.722) | (6.343) |
| **Benefit** | -0.026*** | 0.016*** | 0.041*** | 0.043*** | -0.022*** | 0.017*** |
| | (-10.688) | (8.366) | (5.461) | (7.983) | (-8.958) | (8.002) |
| **Yr_2012** | 0.109*** | 0.032*** | 0.206*** | 0.008 | 0.077*** | 0.036*** |
| | (11.436) | (3.461) | (9.946) | (0.412) | (7.847) | (3.367) |
| **Yr_2011** | 0.084*** | 0.026*** | 0.171*** | -0.000 | 0.058*** | 0.031*** |
| | (11.408) | (3.386) | (9.861) | (-0.004) | (7.649) | (3.539) |
| **Yr_2010** | 0.067*** | 0.017** | 0.169*** | -0.009 | 0.041*** | 0.022*** |
| | (9.362) | (2.341) | (9.768) | (-0.622) | (5.587) | (2.732) |
| **Yr_2009** | 0.050*** | 0.002 | 0.135*** | -0.023* | 0.028*** | 0.008 |
| | (7.257) | (0.369) | (7.533) | (-1.656) | (3.971) | (1.093) |
| **Yr_2008** | 0.017*** | -0.012** | 0.046** | -0.049*** | 0.006 | -0.003 |
| | (2.654) | (-2.087) | (2.453) | (-4.409) | (0.873) | (-0.393) |
| **Yr_2007** | 0.012* | -0.019*** | 0.051*** | -0.052*** | -0.001 | -0.010 |
| | (1.852) | (-3.427) | (2.696) | (-4.754) | (-0.144) | (-1.605) |
| **Yr_2006** | 0.003 | -0.003 | -0.011 | -0.014* | 0.004 | -0.000 |
| | (0.884) | (-0.738) | (-0.708) | (-1.681) | (1.049) | (-0.012) |
| **Yr_2005** | -0.016*** | -0.001 | -0.044*** | -0.011 | -0.013*** | 0.001 |
| | (-4.160) | (-0.328) | (-2.837) | (-1.361) | (-3.352) | (0.171) |
| **Yr_2004** | -0.027*** | -0.007** | -0.028* | -0.019** | -0.027*** | -0.004 |
| | (-7.442) | (-1.990) | (-1.829) | (-2.482) | (-7.600) | (-1.058) |
| **Yr_2003** | -0.014*** | -0.000 | 0.003 | -0.003 | -0.015*** | -0.000 |
| | (-3.717) | (-0.055) | (0.209) | (-0.335) | (-4.159) | (-0.113) |
| **Yr_2002** | -0.009** | -0.004 | 0.004 | -0.012 | -0.010*** | -0.003 |
| | (-2.567) | (-1.349) | (0.288) | (-1.546) | (-2.911) | (-0.751) |
| **Age_20to24** | -0.034*** | | -0.023** | | -0.040*** | |
| | (-7.889) | | (-2.135) | | (-8.394) | |
| **Age_25to29** | -0.079*** | | -0.052*** | | -0.087*** | |
| | (-20.020) | | (-4.218) | | (-21.867) | |
| **Age_30to34** | -0.094*** | | -0.078*** | | -0.102*** | |
| | (-23.844) | | (-5.854) | | (-25.019) | |
| **Age_35to39** | -0.092*** | | -0.080*** | | -0.104*** | |
| | (-22.186) | | (-5.967) | | (-23.935) | |
| **Age_40to44** | -0.095*** | | -0.080*** | | -0.110*** | |
| | (-22.861) | | (-5.733) | | (-25.465) | |
| **Age_45to49** | -0.101*** | | -0.092*** | | -0.116*** | |
| | (-24.847) | | (-6.386) | | (-28.298) | |
| **Age_55to59** | | -0.034*** | | -0.045*** | | -0.031*** |
| | | (-23.818) | | (-11.770) | | (-20.416) |
| **Age_60to64** | | -0.089*** | | -0.099*** | | -0.091*** |
| | | (-64.766) | | (-25.740) | | (-59.976) |
| **Age_over64** | | -0.103*** | | -0.189*** | | -0.086*** |
| | | (-79.906) | | (-39.567) | | (-63.463) |
| **Pseudo R2** | 0.0917 | 0.1048 | 0.0499 | 0.1242 | 0.0749 | 0.0990 |
| **Observations** | 299,326 | 161,338 | 32,063 | 33,684 | 267,263 | 127,654 |

Control group: MS_Married, Ethn_White, Age_16to19 for the younger sample, Age_50to54 for the older sample, R_England, Qual_Primary, Ind_Manuf, Yr_2001
z-statistics in parentheses: *** p<0.01, ** p<0.05, * p<0.1

# Appendix for Chapter 6

## Construction of the spell-data file

The extensive data collected by the BHPS are stored in different records and so re-organization of the data is needed before use. Our goal is to derive a consistent work-life history file that combines the respondents' spell records for economic activities, from Wave 1 to Wave 18, with their socio-demographic and job information such as gender and industries of work. The data file is in 'long format' for survival analyses. As mentioned in the previous sub-section, we use the *wLIFEMST*, *wHHRESP*, *wJOBHIST* and *wINDRESP* files for spell-data construction[57].

Taylor *et al.* (2010) explained that the *wLIFEMST* records contain information on respondents' economic activities in the period after they first left full time education up to their first interview. The records consist of three files: *bLIFEMST*, *kLIFEMST* and *lLIFEMST*, which contain information of the base sample and the other two additional samples respectively. This differs from the other three records, which have 18 files, one for each wave. The information in the *wLIFEMST* records is used to create the variables on previous working experience[58]. The *wHHRESP* records contain survey responses on household-level information at the time of interview. The information in these records is used to construct the variable on the number of children in the households. The *wJOBHIST* records contain information on the economic activities and job-related characteristics of the respondents in the period from the first of September in the reference year (previous wave) up to the date of interview. The *wINDRESP* records contain the

[57] The prefix letter 'w' on the filenames refer to the waves from "a" (Wave 1) to "r" (Wave 18).
[58] The creation of variables is discussed in next subsection.

main annual survey data on respondents' economic statuses and other socio-demographic information such as gender and number of children at the time of interview[59].

Generating our spell-data file involves seven steps similar to those of Mare (2006). Firstly, merge each wave's *wINDRESP* and *wHHRESP* records, clean the variables and then save each wave's merged file with the name *wCHAR*. Secondly, combine the *wCHAR* files from all waves into one file and save it as *BHPS_CHAR* containing respondents' characteristics from Waves 1 to 18. Thirdly, merge the *wJOBHIST* and *wINDRESP* records for each wave and clean the variables needed to construct the spell records, saving each wave's merged files with the name *wSPELL*. Fourthly, combine the *wSPELL* files into one file and save this as *BHPS_SPELL* containing respondents' economic status history from Wave 1 to 18. Fifthly, merge the *BHPS_SPELL* file with the *BHPS_CHAR* file ensuring that at the start of each spell we record each respondent's socio-economic characteristics and save this file as *BHPS_SPELL_CHAR*. This ensures that all 'time-fixed' variables are predetermined at the start of each spell and are therefore exogenous[60]. Sixthly, combine the three *wLIFEMST* files into a single work experience file called *BHPS_LIFEMST*[61]. Lastly, combine the *BHPS_SPELL_CHAR* file with the *BHPS_LIFEMST* file, drop the unwanted variables and save the file as *BHPS_FINAL*. This is our complete spell-data file with spell information such as start and end time and socio-demographic characteristics for each spell.

We drop any spells irrelevant for our analyses. Firstly, spells starting before the date of interview in Wave 1 are dropped to ensure that the 'time-fixed' independent variables

[59] The BHPS has *XWAVEDAT* records which contains respondents' 'time-fixed' data such as gender. However, since all those information are also available in the *wINDRESP* records, we just use those information in the *wINDRESP* records for simplicity.
[60] All our independent variables are 'time-fixed' except the variable on elapsed duration of spells. More account is made in Section 6.2.
[61] We explain the creation of variables in Section 6.2.

are predetermined before the start of each spell. Secondly, spells of those whose questions were answered by another household member (proxy respondents) are dropped. Thirdly, spells with zero or negative durations are dropped. Fourthly, spells with negative unearned income are dropped. Lastly, spells with missing information except missing dates are dropped. In addition, four measures, based on Halpin (1997), Paull (2003) and Mare (2006), are carried out to amend any data inconsistencies such as seam effects[62]. First, left censored spells are dropped. The missing start date of any subsequent spells is assigned to equal the end date of their previous spell. Second, dates with missing month are assigned to be in June. Third, the missing end date of any spells is assigned to equal the start date of their next spell. Last, the end date of any spells overlapping or having time gaps with their subsequent spell is assigned to equal the start date of the subsequent spell. After spell editing, the dataset consist of 24,834 spells.

[62] Seam effects refer to the inconsistencies of data between consecutive spells. They arise from measurement or recall errors in repeated collection of the panel data (Halpin, 1997).

**Table 6.3: Summary statistics for the unemployment spells (mean values)**

| | Pooled | Male | Female |
|---|---|---|---|
| **Mean Age** | 30.07 | 30.21 | 29.87 |
| **Age_16to24** | 0.4523 | 0.4437 | 0.4644 |
| **Age_25to34** | 0.2313 | 0.2429 | 0.2149 |
| **Age_35to44** | 0.1569 | 0.1570 | 0.1569 |
| **Age_45to54** | 0.1173 | 0.1106 | 0.1267 |
| **Age_over54** | 0.0421 | 0.0458 | 0.0369 |
| **Male** | 0.5842 | | |
| **MS_Married** | 0.2878 | 0.2913 | 0.2829 |
| **MS_Single** | 0.6460 | 0.6587 | 0.6281 |
| **MS_SepDivWid** | 0.0662 | 0.0501 | 0.0890 |
| **Health_problems** | 0.1127 | 0.1128 | 0.1124 |
| **#KidsAged_0to4** | 0.1414 | 0.1550 | 0.1224 |
| **#KidsAged_5to11** | 0.2630 | 0.2664 | 0.2582 |
| **#KidsAged_12to15** | 0.1944 | 0.1943 | 0.1947 |
| **UnearnedY_per1000** | 2.410 | 2.361 | 2.478 |
| **Benef_UE_Ysupp** | 0.3783 | 0.4248 | 0.3131 |
| **R_England_S** | 0.3055 | 0.2902 | 0.3270 |
| **R_England_M** | 0.1864 | 0.1920 | 0.1784 |
| **R_England_N** | 0.2070 | 0.2214 | 0.1867 |
| **R_nonEng** | 0.3012 | 0.2964 | 0.3079 |
| **Qual_Degree** | 0.1383 | 0.1343 | 0.1438 |
| **Qual_Sec_Postsec** | 0.6588 | 0.6459 | 0.6770 |
| **Qual_Primary** | 0.2029 | 0.2197 | 0.1792 |
| **PrevExp_FTE_yrs** | 2.030 (4.740) | 2.370 (5.297) | 1.553 (3.774) |
| **PrevExp_PTE_yrs** | 0.5054 (1.822) | 0.1965 (0.9408) | 0.9395 (2.534) |
| **PrevExp_SE_yrs** | 0.0978 (0.6864) | 0.1194 (0.7674) | 0.0674 (0.5515) |
| **Annual_UE_rate** | 6.906 | 6.995 | 6.781 |
| **Exit state:** | | | |
| **FTE** | 0.4091 | 0.4717 | 0.3210 |
| ***Duration:*** | 9.217 (16.03) | 10.22 (17.04) | 7.150 (13.50) |
| **PTE** | 0.1330 | 0.0724 | 0.2181 |
| ***Duration:*** | 9.621 (15.18) | 10.79 (15.97) | 9.075 (14.78) |
| **SE** | 0.0309 | 0.0416 | 0.0159 |
| ***Duration:*** | 11.96 (17.30) | 12 (16.21) | 11.83 (21.07) |
| **Inact** | 0.1188 | 0.1080 | 0.1339 |
| ***Duration:*** | 13.19 (17.76) | 12.47 (16.17) | 14.01 (19.40) |
| **Censored** | 0.3083 | 0.3063 | 0.3111 |
| ***Duration:*** | 11.79 (20.98) | 12.40 (21.46) | 10.95 (20.29) |
| **Persons** | 4,150 | 2,303 | 1,847 |
| **Spells** | 6,053 | 3,536 | 2,517 |

Note: People aged 16 or over from BHPS Waves 1-18 (1991-2008)
Previous experiences are in years and durations are in months
Standard deviation in brackets

**Table 6.4: Summary statistics for the full-time employment spells (mean values)**

| | Pooled | Male | Female |
|---|---|---|---|
| **Mean Age** | 29.30 | 29.71 | 28.77 |
| **Age_16to24** | 0.4561 | 0.4347 | 0.4835 |
| **Age_25to34** | 0.2583 | 0.2702 | 0.2429 |
| **Age_35to44** | 0.1575 | 0.1608 | 0.1533 |
| **Age_45to54** | 0.0959 | 0.0950 | 0.0971 |
| **Age_over54** | 0.0323 | 0.0394 | 0.0232 |
| **Male** | 0.5630 | | |
| **MS_Married** | 0.3025 | 0.3229 | 0.2761 |
| **MS_Single** | 0.6462 | 0.6386 | 0.6560 |
| **MS_SepDivWid** | 0.0512 | 0.0382 | 0.0679 |
| **Health_problems** | 0.0865 | 0.0832 | 0.0908 |
| **#KidsAged_0to4** | 0.1440 | 0.1788 | 0.0991 |
| **#KidsAged_5to11** | 0.2571 | 0.2668 | 0.2446 |
| **#KidsAged_12to15** | 0.1995 | 0.1868 | 0.2160 |
| **UnearnedY_per1000** | 2.246 | 2.128 | 2.398 |
| **R_England_S** | 0.3070 | 0.2918 | 0.3266 |
| **R_England_M** | 0.1790 | 0.1879 | 0.1676 |
| **R_England_N** | 0.2048 | 0.2184 | 0.1873 |
| **R_nonEng** | 0.3092 | 0.3020 | 0.3185 |
| **Qual_Degree** | 0.1535 | 0.1350 | 0.1773 |
| **Qual_Sec_Postsec** | 0.6885 | 0.6891 | 0.6878 |
| **Qual_Primary** | 0.1580 | 0.1759 | 0.1349 |
| **PrevExp_FTE_yrs** | 1.648 (4.455) | 1.780 (4.875) | 1.479 (3.842) |
| **PrevExp_PTE_yrs** | 0.4043 (1.471) | 0.1854 (0.8342) | 0.6862 (1.978) |
| **PrevExp_SE_yrs** | 0.1074 (0.7704) | 0.1438 (0.9202) | 0.0605 (0.5135) |
| **Ind_Sec** | 0.3463 | 0.4232 | 0.2472 |
| **Ind_Tert** | 0.4415 | 0.4038 | 0.4901 |
| **Ind_PubEduHealth** | 0.1140 | 0.0738 | 0.1659 |
| **Ind_Others** | 0.0981 | 0.0992 | 0.0968 |
| **Annual_UE_rate** | 6.816 | 6.864 | 6.755 |
| **Exit state:** | | | |
| **UE** | 0.2843 | 0.3322 | 0.2226 |
| ***Duration:*** | 18.43 (25.39) | 18.37 (25.19) | 18.54 (25.78) |
| **PTE** | 0.0764 | 0.0463 | 0.1152 |
| ***Duration:*** | 21.08 (27.06) | 20.04 (26.86) | 21.61 (27.19) |
| **SE** | 0.0217 | 0.0294 | 0.0117 |
| ***Duration:*** | 29.38 (27.59) | 29.86 (29.13) | 27.85 (22.16) |
| **Inact** | 0.1442 | 0.1010 | 0.1999 |
| ***Duration:*** | 26.13 (30.97) | 26.25 (32.83) | 26.06 (29.72) |
| **Censored** | 0.4735 | 0.4912 | 0.4506 |
| ***Duration:*** | 36.83 (39.76) | 38.61 (40.94) | 34.32 (37.91) |
| **Persons** | 5,731 | 3,119 | 2,612 |
| **Spells** | 7,988 | 4,497 | 3,491 |

Note: People aged 16 or over from BHPS Waves 1-18 (1991-2008)
Previous experiences are in years and durations are in months
Standard deviation in brackets

**Table 6.5: Summary statistics for the part-time employment spells (mean values)**

| | Pooled | Male | Female |
|---|---|---|---|
| **Mean Age** | 32.13 | 30.10 | 32.75 |
| **Age_16to24** | 0.3560 | 0.5307 | 0.3028 |
| **Age_25to34** | 0.2696 | 0.1820 | 0.2963 |
| **Age_35to44** | 0.1871 | 0.0961 | 0.2148 |
| **Age_45to54** | 0.1150 | 0.0777 | 0.1264 |
| **Age_over54** | 0.0721 | 0.1135 | 0.0594 |
| **Male** | 0.2334 | | |
| **MS_Married** | 0.4414 | 0.2781 | 0.4911 |
| **MS_Single** | 0.4796 | 0.6861 | 0.4167 |
| **MS_SepDivWid** | 0.0790 | 0.0358 | 0.0921 |
| **Health_problems** | 0.1203 | 0.1135 | 0.1223 |
| **#KidsAged_0to4** | 0.2524 | 0.1411 | 0.2863 |
| **#KidsAged_5to11** | 0.4541 | 0.2751 | 0.5086 |
| **#KidsAged_12to15** | 0.2202 | 0.2086 | 0.2238 |
| **UnearnedY_per1000** | 2.340 | 2.331 | 2.343 |
| **Benef_UE_Ysupp** | 0.1594 | 0.2239 | 0.1397 |
| **R_England_S** | 0.3080 | 0.3384 | 0.2988 |
| **R_England_M** | 0.1916 | 0.1820 | 0.1945 |
| **R_England_N** | 0.2071 | 0.2065 | 0.2073 |
| **R_nonEng** | 0.2932 | 0.2730 | 0.2994 |
| **Qual_Degree** | 0.1098 | 0.1339 | 0.1024 |
| **Qual_Sec_Postsec** | 0.6815 | 0.6769 | 0.6829 |
| **Qual_Primary** | 0.2088 | 0.1892 | 0.2148 |
| **PrevExp_FTE_yrs** | 1.441 (3.769) | 1.668 (4.333) | 1.373 (3.578) |
| **PrevExp_PTE_yrs** | 0.8496 (2.447) | 0.2673 (1.214) | 1.027 (2.689) |
| **PrevExp_SE_yrs** | 0.0816 (0.5997) | 0.1098 (0.7662) | 0.0730 (0.5387) |
| **Ind_Sec** | 0.2496 | 0.2965 | 0.2353 |
| **Ind_Tert** | 0.4856 | 0.4724 | 0.4896 |
| **Ind_PubEduHealth** | 0.1794 | 0.1360 | 0.1927 |
| **Ind_Others** | 0.0854 | 0.0951 | 0.0825 |
| **Annual_UE_rate** | 6.804 | 6.734 | 6.825 |
| **Exit state:** | | | |
| **UE** | 0.1613 | 0.2239 | 0.1422 |
| ***Duration:*** | 17.55 (23.03) | 12.35 (16.94) | 20.04 (25.07) |
| **FTE** | 0.1911 | 0.2853 | 0.1625 |
| ***Duration:*** | 19.20 (23.91) | 14.32 (18.49) | 21.81 (26.00) |
| **SE** | 0.0162 | 0.0256 | 0.0134 |
| ***Duration:*** | 21.99 (29.27) | 14.68 (20.35) | 26.23 (32.86) |
| **Inact** | 0.2422 | 0.1268 | 0.2773 |
| ***Duration:*** | 20.61 (22.82) | 13.27 (15.21) | 21.64 (23.51) |
| **Censored** | 0.3892 | 0.3384 | 0.4046 |
| ***Duration:*** | 31.58 (35.89) | 20.18 (26.54) | 34.49 (37.36) |
| **Persons** | 3,204 | 828 | 2,376 |
| **Spells** | 4,191 | 978 | 3,213 |

Note: People aged 16 or over from BHPS Waves 1-18 (1991-2008)
Previous experiences are in years and durations are in months
Standard deviation in brackets

**Table 6.6: Summary statistics for the self-employment spells (mean values)**

| | Pooled | Male | Female |
|---|---|---|---|
| **Mean Age** | 36.35 | 35.91 | 37.12 |
| **Age_16to24** | 0.1474 | 0.1670 | 0.1135 |
| **Age_25to34** | 0.3611 | 0.3517 | 0.3773 |
| **Age_35to44** | 0.2362 | 0.2345 | 0.2393 |
| **Age_45to54** | 0.1789 | 0.1670 | 0.1994 |
| **Age_over54** | 0.0765 | 0.0799 | 0.0706 |
| **Male** | 0.6333 | | |
| **MS_Married** | 0.4972 | 0.4760 | 0.5337 |
| **MS_Single** | 0.4151 | 0.4512 | 0.3528 |
| **MS_SepDivWid** | 0.0877 | 0.0728 | 0.1135 |
| **Health_problems** | 0.1181 | 0.1083 | 0.1350 |
| **#KidsAged_0to4** | 0.2508 | 0.2433 | 0.2638 |
| **#KidsAged_5to11** | 0.3138 | 0.2718 | 0.3865 |
| **#KidsAged_12to15** | 0.1552 | 0.1581 | 0.1503 |
| **UnearnedY_per1000** | 2.214 | 2.017 | 2.556 |
| **Benef_UE_Ysupp** | 0.1496 | 0.1865 | 0.0859 |
| **R_England_S** | 0.4229 | 0.4156 | 0.4356 |
| **R_England_M** | 0.1620 | 0.1652 | 0.1564 |
| **R_England_N** | 0.1755 | 0.1758 | 0.1748 |
| **R_nonEng** | 0.2396 | 0.2433 | 0.2331 |
| **Qual_Degree** | 0.1901 | 0.1652 | 0.2331 |
| **Qual_Sec_Postsec** | 0.6344 | 0.6572 | 0.5951 |
| **Qual_Primary** | 0.1755 | 0.1776 | 0.1718 |
| **PrevExp_FTE_yrs** | 1.970 (4.527) | 2.436 (5.262) | 1.165 (2.662) |
| **PrevExp_PTE_yrs** | 0.3777 (1.459) | 0.1994 (0.9298) | 0.6856 (2.042) |
| **PrevExp_SE_yrs** | 0.2891 (1.394) | 0.3345 (1.578) | 0.2106 (0.9983) |
| **Ind_Sec** | 0.3150 | 0.4192 | 0.1350 |
| **Ind_Tert** | 0.4027 | 0.3712 | 0.4571 |
| **Ind_PubEduHealth** | 0.1147 | 0.0515 | 0.2239 |
| **Ind_Others** | 0.1676 | 0.1581 | 0.1840 |
| **Annual_UE_rate** | 7.251 | 7.274 | 7.212 |
| **Exit state:** | | | |
| **UE** | 0.1642 | 0.1954 | 0.1104 |
| ***Duration:*** | 17.39 (22.25) | 15.73 (19.58) | 22.47 (28.67) |
| **FTE** | 0.2216 | 0.2806 | 0.1196 |
| ***Duration:*** | 24.38 (28.71) | 22.96 (28.17) | 30.13 (30.50) |
| **PTE** | 0.0765 | 0.0355 | 0.1472 |
| ***Duration:*** | 25.12 (23.75) | 22 (26.03) | 26.42 (22.90) |
| **Inact** | 0.1474 | 0.1030 | 0.2239 |
| ***Duration:*** | 22.18 (25.47) | 26.93 (30.63) | 18.41 (19.90) |
| **Censored** | 0.3903 | 0.3854 | 0.3988 |
| ***Duration:*** | 29.39 (35.25) | 26.50 (33.38) | 34.23 (37.81) |
| **Persons** | 773 | 484 | 289 |
| **Spells** | 889 | 563 | 326 |

Note: People aged 16 or over from BHPS Waves 1-18 (1991-2008)
Previous experiences are in years and durations are in months
Standard deviation in brackets

**Table 6.7: Hazard ratios from competing risks Cox model on exiting from unemployment (full sample)**

| | UE spell ending with: | | | |
|---|---|---|---|---|
| **Regressors** | **FTE** | **PTE** | **SE** | **Inact** |
| **Male** | 1.358*** | 0.318*** | 2.325*** | 0.788*** |
| | (6.868) | (-14.263) | (4.510) | (-3.058) |
| **MS_Single** | 1.169** | 0.685*** | 0.859 | 1.020 |
| | (2.448) | (-3.685) | (-0.745) | (0.168) |
| **MS_SepDivWid** | 0.693*** | 0.548*** | 1.499 | 1.226 |
| | (-3.426) | (-3.924) | (1.626) | (1.295) |
| **Health_problems** | 0.761*** | 1.171 | 1.140 | 1.305** |
| | (-3.895) | (1.518) | (0.607) | (2.483) |
| **#KidsAged_0to4** | 0.781*** | 1.103 | 1.145 | 0.943 |
| | (-4.496) | (1.243) | (0.891) | (-0.641) |
| **#KidsAged_5to11** | 0.905*** | 1.231*** | 0.934 | 0.968 |
| | (-2.631) | (3.834) | (-0.563) | (-0.481) |
| **#KidsAged_12to15** | 0.942 | 1.086 | 0.752 | 1.099 |
| | (-1.292) | (1.138) | (-1.412) | (1.180) |
| **UnearnedY_per1000** | 1.019 | 0.955* | 1.084** | 0.916*** |
| | (1.598) | (-1.928) | (2.063) | (-3.334) |
| **Benef_UE_Ysupp** | 0.946 | 0.853** | 0.842 | 0.889 |
| | (-1.307) | (-2.035) | (-1.125) | (-1.484) |
| **R_England_M** | 1.049 | 0.936 | 0.569** | 0.783** |
| | (0.825) | (-0.643) | (-2.515) | (-2.114) |
| **R_England_N** | 0.959 | 0.901 | 0.729 | 1.001 |
| | (-0.720) | (-1.052) | (-1.633) | (0.011) |
| **R_nonEng** | 0.925 | 0.717*** | 0.549*** | 0.895 |
| | (-1.341) | (-3.254) | (-2.665) | (-1.044) |
| **Qual_Degree** | 0.784*** | 0.975 | 1.181 | 1.294* |
| | (-3.093) | (-0.187) | (0.654) | (1.775) |
| **Qual_Sec_Postsec** | 1.013 | 1.009 | 1.096 | 1.254** |
| | (0.242) | (0.095) | (0.483) | (2.129) |
| **PrevExp_FTE_yrs** | 1.031*** | 0.987 | 0.977 | 0.995 |
| | (7.860) | (-1.318) | (-1.410) | (-0.503) |
| **PrevExp_PTE_yrs** | 0.956*** | 1.085*** | 0.993 | 1.059*** |
| | (-2.610) | (6.357) | (-0.139) | (2.709) |
| **PrevExp_SE_yrs** | 0.966 | 1.000 | 1.215*** | 1.023 |
| | (-1.005) | (0.001) | (3.516) | (0.329) |
| **ln_UE_rate** | 1.130 | 0.884 | 1.638 | 0.778 |
| | (1.415) | (-0.794) | (1.454) | (-1.571) |
| **Elaps_Dur_yrs** | 0.548*** | 0.609*** | 0.870 | 0.888* |
| | (-19.309) | (-8.820) | (-1.087) | (-1.827) |
| **Elaps_Dur_yrs_Sq** | 1.038*** | 1.030*** | 1.001 | 1.000 |
| | (12.115) | (5.059) | (0.088) | (-0.024) |
| **Age_25to34** | 0.874** | 0.832* | 2.675*** | 0.785** |
| | (-2.385) | (-1.668) | (4.251) | (-2.266) |
| **Age_35to44** | 0.672*** | 0.764** | 2.254*** | 0.489*** |
| | (-5.311) | (-2.130) | (3.023) | (-5.007) |
| **Age_45to54** | 0.622*** | 0.702** | 2.258*** | 0.376*** |
| | (-5.262) | (-2.382) | (2.727) | (-5.499) |
| **Age_over54** | 0.483*** | 0.934 | 2.156* | 0.539*** |
| | (-5.060) | (-0.342) | (1.870) | (-2.586) |
| **Failures (exits)** | 2,476 | 805 | 187 | 719 |
| **UE spells** | 6,053 | 6,053 | 6,053 | 6,053 |
| **Person-months** | 64,272 | 64,272 | 64,272 | 64,272 |
| **Log-likelihood** | -15704 | -4949.2 | -1152.8 | -4624.5 |

Control group: MS_Married, Age_16to24, R_England_S, Qual_Primary
z-statistics in parentheses: *** p<0.01, ** p<0.05, * p<0.1

**Table 6.8: Hazard ratios from competing risks Cox model on exiting from unemployment (males sample)**

| | UE spell ending with: | | | |
|---|---|---|---|---|
| **Regressors** | **FTE** | **PTE** | **SE** | **Inact** |
| **MS_Single** | 1.056 | 0.957 | 0.638* | 1.370* |
| | (0.696) | (-0.220) | (-1.897) | (1.860) |
| **MS_SepDivWid** | 0.707** | 0.545 | 1.501 | 1.157 |
| | (-2.483) | (-1.508) | (1.419) | (0.575) |
| **Health_problems** | 0.711*** | 1.230 | 0.975 | 1.311* |
| | (-3.968) | (1.181) | (-0.099) | (1.886) |
| **#KidsAged_0to4** | 0.885** | 0.998 | 1.083 | 0.854 |
| | (-2.038) | (-0.016) | (0.477) | (-1.210) |
| **#KidsAged_5to11** | 0.914** | 1.108 | 0.909 | 1.015 |
| | (-2.085) | (1.052) | (-0.721) | (0.178) |
| **#KidsAged_12to15** | 0.953 | 1.087 | 0.878 | 0.985 |
| | (-0.864) | (0.642) | (-0.625) | (-0.137) |
| **UnearnedY_per1000** | 1.003 | 0.922* | 1.071 | 0.872*** |
| | (0.173) | (-1.827) | (1.287) | (-3.510) |
| **Benef_UE_Ysupp** | 0.919* | 1.090 | 0.950 | 0.908 |
| | (-1.662) | (0.664) | (-0.304) | (-0.914) |
| **R_England_M** | 0.992 | 0.856 | 0.627* | 0.569*** |
| | (-0.107) | (-0.880) | (-1.857) | (-3.309) |
| **R_England_N** | 0.995 | 0.893 | 0.821 | 1.016 |
| | (-0.070) | (-0.656) | (-0.908) | (0.116) |
| **R_nonEng** | 1.019 | 0.544*** | 0.651* | 0.868 |
| | (0.256) | (-3.193) | (-1.686) | (-0.946) |
| **Qual_Degree** | 0.780*** | 1.561** | 1.053 | 1.182 |
| | (-2.579) | (1.992) | (0.172) | (0.853) |
| **Qual_Sec_Postsec** | 1.030 | 1.108 | 1.129 | 1.191 |
| | (0.457) | (0.622) | (0.580) | (1.309) |
| **PrevExp_FTE_yrs** | 1.025*** | 1.005 | 0.978 | 0.994 |
| | (5.440) | (0.359) | (-1.240) | (-0.453) |
| **PrevExp_PTE_yrs** | 0.958 | 1.110*** | 1.067 | 0.967 |
| | (-1.305) | (2.817) | (1.032) | (-0.495) |
| **PrevExp_SE_yrs** | 0.971 | 1.062 | 1.202*** | 0.943 |
| | (-0.762) | (0.623) | (2.743) | (-0.556) |
| **ln_UE_rate** | 1.027 | 0.448*** | 1.352 | 0.641** |
| | (0.250) | (-3.023) | (0.788) | (-2.043) |
| **Elaps_Dur_yrs** | 0.610*** | 0.674*** | 0.902 | 0.924 |
| | (-13.167) | (-3.498) | (-0.685) | (-0.803) |
| **Elaps_Dur_yrs_Sq** | 1.030*** | 1.030** | 0.999 | 0.991 |
| | (7.902) | (2.097) | (-0.043) | (-0.742) |
| **Age_25to34** | 0.831*** | 0.627** | 2.449*** | 0.684*** |
| | (-2.712) | (-2.541) | (3.366) | (-2.630) |
| **Age_35to44** | 0.623*** | 0.455*** | 1.823* | 0.557*** |
| | (-5.212) | (-3.257) | (1.939) | (-3.120) |
| **Age_45to54** | 0.564*** | 0.572** | 1.768* | 0.453*** |
| | (-5.192) | (-2.033) | (1.671) | (-3.239) |
| **Age_over54** | 0.419*** | 0.742 | 1.726 | 0.628 |
| | (-4.962) | (-0.828) | (1.190) | (-1.505) |
| **Failures (exits)** | 1,668 | 256 | 147 | 382 |
| **UE spells** | 3,536 | 3,536 | 3,536 | 3,536 |
| **Person-months** | 39,758 | 39,758 | 39,758 | 39,758 |
| **Log-likelihood** | -9828.9 | -1527.4 | -854.98 | -2263.9 |

Control group: MS_Married, Age_16to24, R_England_S, Qual_Primary
z-statistics in parentheses: *** p<0.01, ** p<0.05, * p<0.1

## Table 6.9: Hazard ratios from competing risks Cox model on exiting from unemployment (females sample)

| | UE spell ending with: | | | |
|---|---|---|---|---|
| **Regressors** | **FTE** | **PTE** | **SE** | **Inact** |
| **MS_Single** | 1.500*** | 0.595*** | 2.607** | 0.795 |
| | (3.510) | (-4.215) | (2.069) | (-1.381) |
| **MS_SepDivWid** | 0.722* | 0.494*** | 1.606 | 1.229 |
| | (-1.881) | (-4.184) | (0.846) | (0.987) |
| **Health_problems** | 0.799* | 1.160 | 2.005 | 1.250 |
| | (-1.795) | (1.129) | (1.541) | (1.361) |
| **#KidsAged_0to4** | 0.451*** | 1.283** | 1.466 | 1.107 |
| | (-5.485) | (2.552) | (0.923) | (0.782) |
| **#KidsAged_5to11** | 0.848** | 1.357*** | 1.089 | 0.903 |
| | (-2.067) | (4.392) | (0.262) | (-0.882) |
| **#KidsAged_12to15** | 0.933 | 1.094 | 0.199 | 1.234* |
| | (-0.804) | (1.017) | (-1.630) | (1.851) |
| **UnearnedY_per1000** | 1.044** | 0.943** | 1.072 | 0.946 |
| | (2.517) | (-1.996) | (1.322) | (-1.552) |
| **Benef_UE_Ysupp** | 1.001 | 0.776** | 0.364** | 0.837 |
| | (0.011) | (-2.492) | (-2.372) | (-1.444) |
| **R_England_M** | 1.143 | 0.933 | 0.411 | 1.105 |
| | (1.340) | (-0.540) | (-1.645) | (0.617) |
| **R_England_N** | 0.912 | 0.865 | 0.421* | 0.976 |
| | (-0.883) | (-1.176) | (-1.773) | (-0.149) |
| **R_nonEng** | 0.822* | 0.737** | 0.323** | 0.893 |
| | (-1.946) | (-2.472) | (-2.237) | (-0.739) |
| **Qual_Degree** | 0.858 | 0.762 | 1.479 | 1.638** |
| | (-1.075) | (-1.560) | (0.723) | (2.158) |
| **Qual_Sec_Postsec** | 1.094 | 0.968 | 0.910 | 1.436** |
| | (0.816) | (-0.282) | (-0.192) | (1.995) |
| **PrevExp_FTE_yrs** | 1.059*** | 0.977 | 0.990 | 1.006 |
| | (6.670) | (-1.641) | (-0.216) | (0.316) |
| **PrevExp_PTE_yrs** | 0.975 | 1.064*** | 0.935 | 1.090*** |
| | (-1.234) | (4.199) | (-0.722) | (3.633) |
| **PrevExp_SE_yrs** | 0.984 | 0.993 | 1.304* | 1.172* |
| | (-0.181) | (-0.077) | (1.957) | (1.654) |
| **ln_UE_rate** | 1.373** | 1.139 | 3.297 | 0.953 |
| | (2.077) | (0.671) | (1.537) | (-0.201) |
| **Elaps_Dur_yrs** | 0.397*** | 0.598*** | 0.706 | 0.855* |
| | (-14.782) | (-7.613) | (-1.355) | (-1.678) |
| **Elaps_Dur_yrs_Sq** | 1.063*** | 1.031*** | 1.017 | 1.009 |
| | (10.251) | (4.427) | (0.604) | (0.840) |
| **Age_25to34** | 0.942 | 0.903 | 3.303** | 0.880 |
| | (-0.559) | (-0.730) | (2.411) | (-0.791) |
| **Age_35to44** | 0.727** | 1.001 | 3.647** | 0.421*** |
| | (-2.357) | (0.005) | (2.256) | (-3.853) |
| **Age_45to54** | 0.740* | 0.845 | 4.984** | 0.319*** |
| | (-1.871) | (-0.933) | (2.432) | (-4.264) |
| **Age_over54** | 0.725 | 1.118 | 2.371 | 0.525* |
| | (-1.269) | (0.447) | (0.756) | (-1.685) |
| **Failures (exits)** | 808 | 549 | 40 | 337 |
| **UE spells** | 2,517 | 2,517 | 2,517 | 2,517 |
| **Person-months** | 24,514 | 24,514 | 24,514 | 24,514 |
| **Log-likelihood** | -4243.5 | -2882.4 | -186.61 | -1838.5 |

Control group: MS_Married, Age_16to24, R_England_S, Qual_Primary
z-statistics in parentheses: *** p<0.01, ** p<0.05, * p<0.1

**Table 6.10: Hazard ratios from competing risks Cox model on exiting from full-time employment (full sample)**

| | FTE spell ending with: | | | |
|---|---|---|---|---|
| **Regressors** | **UE** | **PTE** | **SE** | **Inact** |
| **Male** | 1.420*** | 0.425*** | 2.080*** | 0.505*** |
| | (7.548) | (-9.492) | (3.907) | (-10.740) |
| **MS_Single** | 1.688*** | 1.257* | 1.306 | 1.002 |
| | (7.957) | (1.816) | (1.217) | (0.017) |
| **MS_SepDivWid** | 1.228* | 1.267 | 1.077 | 1.024 |
| | (1.883) | (1.315) | (0.190) | (0.165) |
| **Health_problems** | 1.309*** | 1.322** | 1.464 | 1.553*** |
| | (3.720) | (2.035) | (1.432) | (4.608) |
| **#KidsAged_0to4** | 0.921 | 1.175 | 1.181 | 0.997 |
| | (-1.488) | (1.644) | (0.961) | (-0.036) |
| **#KidsAged_5to11** | 1.077** | 1.316*** | 0.850 | 1.012 |
| | (1.989) | (4.314) | (-1.060) | (0.212) |
| **#KidsAged_12to15** | 0.924 | 0.911 | 1.161 | 1.037 |
| | (-1.635) | (-1.031) | (0.926) | (0.554) |
| **UnearnedY_per1000** | 0.909*** | 0.910*** | 0.987 | 0.950*** |
| | (-6.418) | (-3.318) | (-0.255) | (-2.693) |
| **R_England_M** | 1.099 | 1.110 | 0.677* | 0.892 |
| | (1.572) | (0.877) | (-1.746) | (-1.302) |
| **R_England_N** | 0.950 | 1.140 | 0.662* | 0.855* |
| | (-0.850) | (1.160) | (-1.952) | (-1.875) |
| **R_nonEng** | 0.978 | 0.975 | 0.675* | 0.838** |
| | (-0.369) | (-0.222) | (-1.792) | (-2.174) |
| **Qual_Degree** | 0.463*** | 0.507*** | 1.397 | 1.042 |
| | (-9.002) | (-3.934) | (1.130) | (0.345) |
| **Qual_Sec_Postsec** | 0.674*** | 0.776** | 1.180 | 0.984 |
| | (-6.929) | (-2.145) | (0.691) | (-0.170) |
| **PrevExp_FTE_yrs** | 1.022*** | 1.023*** | 1.009 | 1.021*** |
| | (5.088) | (2.633) | (0.551) | (3.142) |
| **PrevExp_PTE_yrs** | 0.974 | 1.141*** | 0.979 | 0.995 |
| | (-1.341) | (7.358) | (-0.231) | (-0.221) |
| **PrevExp_SE_yrs** | 0.966 | 1.028 | 1.220*** | 1.081** |
| | (-1.081) | (0.376) | (4.490) | (2.315) |
| **Ind_Tert** | 0.866*** | 1.134 | 0.671** | 1.152* |
| | (-3.013) | (1.245) | (-2.286) | (1.912) |
| **Ind_PubEduHealth** | 0.770*** | 1.390** | 0.412*** | 1.376*** |
| | (-3.248) | (2.445) | (-2.639) | (3.236) |
| **Ind_Others** | 0.979 | 1.380** | 1.322 | 1.487*** |
| | (-0.279) | (2.202) | (1.170) | (3.753) |
| **ln_UE_rate** | 1.319*** | 1.143 | 2.698*** | 0.856 |
| | (3.137) | (0.775) | (2.997) | (-1.257) |
| **Elaps_Dur_yrs** | 0.599*** | 0.622*** | 1.083 | 0.838*** |
| | (-16.816) | (-7.729) | (0.566) | (-4.292) |
| **Elaps_Dur_yrs_Sq** | 1.026*** | 1.040*** | 0.984 | 1.008** |
| | (9.303) | (6.361) | (-1.114) | (2.337) |
| **Age_25to34** | 0.731*** | 0.598*** | 1.068 | 0.711*** |

| | | | | |
|---|---|---|---|---|
| | (-5.288) | (-4.301) | (0.307) | (-4.096) |
| **Age_35to44** | 0.683*** | 0.495*** | 1.106 | 0.509*** |
| | (-4.914) | (-4.585) | (0.368) | (-5.968) |
| **Age_45to54** | 0.748*** | 0.550*** | 1.107 | 0.489*** |
| | (-3.065) | (-3.137) | (0.310) | (-5.034) |
| **Age_over54** | 0.522*** | 0.649 | 0.397 | 0.878 |
| | (-3.919) | (-1.475) | (-1.207) | (-0.679) |
| | | | | |
| **Failures (exits)** | 2,271 | 610 | 173 | 1,152 |
| **FTE spells** | 7,988 | 7,988 | 7,988 | 7,988 |
| **Person-months** | 228,997 | 228,997 | 228,997 | 228,997 |
| **Log-likelihood** | -16,752 | -4413.3 | -1248.0 | -8445.0 |

Control group: MS_Married, Age_16to24, R_England_S,
Qual_Primary, Ind_Sec,
z-statistics in parentheses: *** p<0.01, ** p<0.05, * p<0.1

**Table 6.11: Hazard ratios from competing risks Cox model on exiting from full-time employment (males sample)**

| | FTE spell ending with: | | | |
|---|---|---|---|---|
| **Regressors** | **UE** | **PTE** | **SE** | **Inact** |
| **MS_Single** | 1.639*** | 2.079*** | 1.485 | 1.816*** |
| | (6.174) | (3.155) | (1.555) | (4.035) |
| **MS_SepDivWid** | 1.416** | 2.565*** | 1.253 | 1.622* |
| | (2.401) | (2.580) | (0.464) | (1.900) |
| **Health_problems** | 1.217** | 1.642** | 1.323 | 1.814*** |
| | (2.145) | (2.258) | (0.873) | (4.104) |
| **#KidsAged_0to4** | 1.018 | 1.085 | 1.330 | 0.863 |
| | (0.286) | (0.474) | (1.528) | (-1.156) |
| **#KidsAged_5to11** | 1.125*** | 1.158 | 0.800 | 1.009 |
| | (2.698) | (1.167) | (-1.256) | (0.103) |
| **#KidsAged_12to15** | 0.939 | 0.873 | 1.232 | 0.912 |
| | (-1.029) | (-0.768) | (1.129) | (-0.803) |
| **UnearnedY_per1000** | 0.892*** | 0.896** | 0.989 | 0.895*** |
| | (-5.887) | (-2.176) | (-0.195) | (-3.261) |
| **R_England_M** | 1.165** | 0.893 | 0.582** | 0.902 |
| | (2.022) | (-0.550) | (-2.125) | (-0.777) |
| **R_England_N** | 1.035 | 1.137 | 0.514*** | 0.721** |
| | (0.469) | (0.701) | (-2.648) | (-2.433) |
| **R_nonEng** | 1.125 | 0.705* | 0.615* | 0.722** |
| | (1.532) | (-1.646) | (-1.920) | (-2.408) |
| **Qual_Degree** | 0.483*** | 0.505** | 1.031 | 0.903 |
| | (-7.019) | (-2.230) | (0.089) | (-0.549) |
| **Qual_Sec_Postsec** | 0.689*** | 1.012 | 1.167 | 1.082 |
| | (-5.551) | (0.059) | (0.589) | (0.564) |
| **PrevExp_FTE_yrs** | 1.024*** | 1.028** | 1.003 | 1.026*** |
| | (4.745) | (2.073) | (0.154) | (3.230) |
| **PrevExp_PTE_yrs** | 1.007 | 1.230*** | 1.065 | 1.035 |
| | (0.216) | (4.655) | (0.474) | (0.635) |
| **PrevExp_SE_yrs** | 0.945 | 0.972 | 1.225*** | 1.061 |
| | (-1.574) | (-0.250) | (4.206) | (1.358) |
| **Ind_Tert** | 0.906* | 1.302* | 0.583*** | 1.087 |
| | (-1.719) | (1.653) | (-2.680) | (0.765) |
| **Ind_PubEduHealth** | 0.837 | 1.770** | 0.404** | 1.641*** |
| | (-1.611) | (2.243) | (-2.071) | (2.924) |
| **Ind_Others** | 0.946 | 1.492 | 1.494 | 1.553*** |
| | (-0.586) | (1.628) | (1.551) | (2.785) |
| **ln_UE_rate** | 1.367*** | 0.730 | 2.630** | 0.707* |
| | (2.820) | (-1.058) | (2.510) | (-1.731) |
| **Elaps_Dur_yrs** | 0.565*** | 0.664*** | 1.156 | 0.847** |
| | (-15.101) | (-4.014) | (0.893) | (-2.425) |
| **Elaps_Dur_yrs_Sq** | 1.028*** | 1.030*** | 0.995 | 1.011** |
| | (7.729) | (2.936) | (-0.344) | (2.039) |
| **Age_25to34** | 0.726*** | 0.590*** | 1.004 | 0.628*** |
| | (-4.429) | (-2.637) | (0.014) | (-3.427) |
| **Age_35to44** | 0.696*** | 0.508** | 1.237 | 0.691** |
| | (-3.783) | (-2.433) | (0.680) | (-2.138) |

| | | | | |
|---|---|---|---|---|
| **Age_45to54** | 0.669*** | 0.494* | 1.149 | 0.826 |
| | (-3.350) | (-1.953) | (0.370) | (-0.913) |
| **Age_over54** | 0.574*** | 1.198 | 0.472 | 1.362 |
| | (-2.961) | (0.444) | (-0.967) | (1.162) |
| | | | | |
| **Failures (exits)** | 1,494 | 208 | 132 | 454 |
| **FTE spells** | 4,497 | 4,497 | 4,497 | 4,497 |
| **Person-months** | 132,651 | 132,651 | 132,651 | 132,651 |
| **Log-likelihood** | -10171 | -1384.5 | -879.64 | -3061.3 |

Control group: MS_Married, Age_16to24, R_England_S, Qual_Primary, Ind_Sec

z-statistics in parentheses: *** p<0.01, ** p<0.05, * p<0.1

**Table 6.12: Hazard ratios from competing risks Cox model on exiting from full-time employment (females sample)**

| | FTE spell ending with: | | | |
|---|---|---|---|---|
| **Regressors** | **UE** | **PTE** | **SE** | **Inact** |
| **MS_Single** | 1.776*** | 0.990 | 1.044 | 0.712*** |
| | (4.833) | (-0.067) | (0.097) | (-3.050) |
| **MS_SepDivWid** | 1.101 | 0.954 | 0.932 | 0.871 |
| | (0.559) | (-0.228) | (-0.102) | (-0.789) |
| **Health_problems** | 1.562*** | 1.079 | 1.881 | 1.322** |
| | (3.697) | (0.424) | (1.298) | (2.170) |
| **#KidsAged_0to4** | 0.559*** | 1.344** | 0.758 | 1.183* |
| | (-3.823) | (2.472) | (-0.502) | (1.765) |
| **#KidsAged_5to11** | 1.002 | 1.419*** | 1.108 | 1.010 |
| | (0.027) | (4.663) | (0.333) | (0.144) |
| **#KidsAged_12to15** | 0.951 | 0.938 | 1.165 | 1.140 |
| | (-0.642) | (-0.599) | (0.441) | (1.623) |
| **UnearnedY_per1000** | 0.946** | 0.896*** | 1.001 | 0.971 |
| | (-2.387) | (-3.080) | (0.006) | (-1.221) |
| **R_England_M** | 1.015 | 1.234 | 1.237 | 0.863 |
| | (0.147) | (1.432) | (0.452) | (-1.254) |
| **R_England_N** | 0.828* | 1.107 | 1.472 | 0.932 |
| | (-1.793) | (0.704) | (0.931) | (-0.653) |
| **R_nonEng** | 0.784** | 1.094 | 0.825 | 0.881 |
| | (-2.480) | (0.639) | (-0.422) | (-1.227) |
| **Qual_Degree** | 0.438*** | 0.513*** | 3.868** | 1.064 |
| | (-5.275) | (-3.166) | (1.993) | (0.384) |
| **Qual_Sec_Postsec** | 0.672*** | 0.660*** | 1.560 | 0.883 |
| | (-3.555) | (-2.801) | (0.742) | (-0.909) |
| **PrevExp_FTE_yrs** | 1.020** | 1.018 | 1.037 | 1.008 |
| | (2.201) | (1.499) | (0.977) | (0.728) |
| **PrevExp_PTE_yrs** | 0.992 | 1.133*** | 0.946 | 0.976 |
| | (-0.303) | (6.118) | (-0.390) | (-0.887) |
| **PrevExp_SE_yrs** | 1.042 | 1.142 | 1.373 | 1.141** |
| | (0.524) | (1.143) | (1.271) | (2.336) |
| **Ind_Tert** | 0.797*** | 1.043 | 0.972 | 1.194* |
| | (-2.620) | (0.319) | (-0.071) | (1.704) |
| **Ind_PubEduHealth** | 0.659*** | 1.204 | 0.380 | 1.293** |
| | (-3.419) | (1.137) | (-1.628) | (2.022) |
| **Ind_Others** | 0.992 | 1.315 | 0.908 | 1.492*** |
| | (-0.066) | (1.488) | (-0.158) | (2.770) |
| **ln_UE_rate** | 1.248 | 1.328 | 3.278* | 0.944 |
| | (1.502) | (1.335) | (1.772) | (-0.364) |
| **Elaps_Dur_yrs** | 0.678*** | 0.613*** | 2.582** | 0.857*** |
| | (-7.312) | (-6.320) | (1.968) | (-2.926) |
| **Elaps_Dur_yrs_Sq** | 1.021*** | 1.046*** | 0.888** | 1.004 |
| | (4.661) | (5.662) | (-2.042) | (0.911) |
| **Age_25to34** | 0.724*** | 0.601*** | 1.182 | 0.746*** |
| | (-3.092) | (-3.430) | (0.391) | (-2.771) |
| **Age_35to44** | 0.630*** | 0.508*** | 0.818 | 0.414*** |
| | (-3.368) | (-3.607) | (-0.339) | (-5.858) |

| | | | | |
|---|---|---|---|---|
| **Age_45to54** | 0.868 | 0.605** | 1.295 | 0.356*** |
| | (-0.890) | (-2.195) | (0.389) | (-5.293) |
| **Age_over54** | 0.363*** | 0.390** | | 0.650 |
| | (-2.667) | (-2.046) | | (-1.479) |
| | | | | |
| **Failures (exits)** | 777 | 402 | 41 | 698 |
| **FTE spells** | 3,491 | 3,491 | 3,491 | 3,491 |
| **Person-months** | 96,346 | 96,346 | 96,346 | 96,346 |
| **Log-likelihood** | -5087.8 | -2605.6 | -261.40 | -4562.2 |

Control group: MS_Married, Age_16to24, R_England_S, Qual_Primary, Ind_Sec

A dash indicates that the variable has been dropped due to collinearity

z-statistics in parentheses: *** p<0.01, ** p<0.05, * p<0.1

**Table 6.13: Hazard ratios from competing risks Cox model on exiting from part-time employment (full sample)**

| | PTE spell ending with: | | | |
|---|---|---|---|---|
| **Regressors** | **UE** | **FTE** | **SE** | **Inact** |
| **Male** | 1.951*** | 1.949*** | 2.958*** | 0.678*** |
| | (7.306) | (8.089) | (3.781) | (-3.818) |
| **MS_Single** | 1.398*** | 1.563*** | 0.966 | 0.913 |
| | (2.848) | (4.002) | (-0.098) | (-0.989) |
| **MS_SepDivWid** | 1.012 | 1.295 | 0.937 | 0.873 |
| | (0.074) | (1.571) | (-0.117) | (-0.996) |
| **Health_problems** | 0.983 | 1.093 | 1.758 | 1.282*** |
| | (-0.137) | (0.767) | (1.583) | (2.608) |
| **#KidsAged_0to4** | 0.806** | 0.497*** | 0.875 | 1.123* |
| | (-2.421) | (-7.024) | (-0.504) | (1.916) |
| **#KidsAged_5to11** | 0.948 | 0.953 | 0.795 | 1.052 |
| | (-0.886) | (-0.869) | (-1.142) | (1.111) |
| **#KidsAged_12to15** | 0.976 | 0.937 | 0.468* | 1.031 |
| | (-0.293) | (-0.853) | (-1.851) | (0.442) |
| **UnearnedY_per1000** | 0.926*** | 0.994 | 0.928 | 0.942*** |
| | (-2.996) | (-0.317) | (-0.967) | (-2.969) |
| **Benef_UE_Ysupp** | 1.776*** | 0.998 | 0.824 | 0.895 |
| | (6.031) | (-0.015) | (-0.536) | (-1.113) |
| **R_England_M** | 1.173 | 1.016 | 0.696 | 0.838* |
| | (1.435) | (0.157) | (-1.047) | (-1.931) |
| **R_England_N** | 0.974 | 0.900 | 0.368*** | 0.921 |
| | (-0.239) | (-1.065) | (-2.614) | (-0.954) |
| **R_nonEng** | 0.992 | 0.839* | 0.533* | 0.738*** |
| | (-0.071) | (-1.726) | (-1.807) | (-3.338) |
| **Qual_Degree** | 0.897 | 1.151 | 2.701** | 1.014 |
| | (-0.697) | (0.919) | (2.326) | (0.112) |
| **Qual_Sec_Postsec** | 0.770** | 1.061 | 1.013 | 0.875 |
| | (-2.554) | (0.538) | (0.034) | (-1.556) |
| **PrevExp_FTE_yrs** | 1.012 | 1.073*** | 0.943 | 1.002 |
| | (1.113) | (9.328) | (-1.134) | (0.159) |
| **PrevExp_PTE_yrs** | 1.079*** | 1.026 | 1.044 | 1.032*** |
| | (5.703) | (1.389) | (0.878) | (2.625) |
| **PrevExp_SE_yrs** | 1.098 | 1.055 | 1.457*** | 1.012 |
| | (1.413) | (0.706) | (3.243) | (0.176) |
| **Ind_Tert** | 0.879 | 1.219** | 2.364** | 1.289*** |
| | (-1.306) | (2.110) | (2.024) | (2.879) |
| **Ind_PubEduHealth** | 0.916 | 0.960 | 1.736 | 1.289** |
| | (-0.686) | (-0.319) | (1.099) | (2.362) |
| **Ind_Others** | 1.085 | 1.138 | 5.342*** | 1.537*** |
| | (0.537) | (0.864) | (3.480) | (3.312) |
| **ln_UE_rate** | 1.210 | 1.094 | 1.085 | 0.795 |
| | (1.121) | (0.565) | (0.147) | (-1.625) |
| **Elaps_Dur_yrs** | 0.712*** | 0.750*** | 0.651*** | 0.850*** |
| | (-6.477) | (-5.829) | (-2.606) | (-3.567) |
| **Elaps_Dur_yrs_Sq** | 1.022*** | 1.019*** | 1.039** | 1.003 |
| | (4.337) | (3.759) | (2.324) | (0.681) |

| | | | | |
|---|---|---|---|---|
| **Age_25to34** | 0.665*** | 0.703*** | 0.898 | 0.627*** |
| | (-3.386) | (-3.243) | (-0.291) | (-4.747) |
| **Age_35to44** | 0.688*** | 0.552*** | 0.965 | 0.465*** |
| | (-2.614) | (-4.365) | (-0.078) | (-6.362) |
| **Age_45to54** | 0.571*** | 0.263*** | 0.545 | 0.492*** |
| | (-3.372) | (-7.284) | (-1.134) | (-5.152) |
| **Age_over54** | 0.239*** | 0.095*** | 0.209** | 0.375*** |
| | (-6.039) | (-7.759) | (-2.148) | (-5.638) |
| | | | | |
| **Failures (exits)** | 676 | 801 | 68 | 1,015 |
| **PTE spells** | 4,191 | 4,191 | 4,191 | 4,191 |
| **Person-months** | 101,088 | 101,088 | 101,088 | 101,088 |
| **Log-likelihood** | -4368.8 | -5044.8 | -406.09 | -6683.8 |

Control group: MS_Married, Age_16to24, R_England_S, Qual_Primary, Ind_Sec

z-statistics in parentheses: *** p<0.01, ** p<0.05, * p<0.1

**Table 6.14: Hazard ratios from competing risks Cox model on exiting from part-time employment (males sample)**

| | PTE spell ending with: | | | |
|---|---|---|---|---|
| **Regressors** | **UE** | **FTE** | **SE** | **Inact** |
| **MS_Single** | 0.960 | 1.154 | 1.166 | 1.707 |
| | (-0.165) | (0.618) | (0.195) | (1.344) |
| **MS_SepDivWid** | 1.525 | 0.894 | | 1.748 |
| | (1.034) | (-0.261) | | (0.988) |
| **Health_problems** | 1.433 | 1.444* | 1.242 | 0.975 |
| | (1.534) | (1.766) | (0.309) | (-0.071) |
| **#KidsAged_0to4** | 1.034 | 0.727* | 1.424 | 1.423 |
| | (0.190) | (-1.727) | (0.717) | (1.440) |
| **#KidsAged_5to11** | 1.212* | 1.109 | 0.697 | 0.679* |
| | (1.763) | (0.960) | (-0.762) | (-1.667) |
| **#KidsAged_12to15** | 0.972 | 0.806 | 0.844 | 0.707 |
| | (-0.219) | (-1.583) | (-0.367) | (-1.561) |
| **UnearnedY_per1000** | 0.963 | 0.997 | 0.870 | 1.056 |
| | (-0.859) | (-0.098) | (-0.952) | (1.218) |
| **Benef_UE_Ysupp** | 1.708*** | 0.913 | 1.554 | 0.790 |
| | (3.386) | (-0.582) | (0.901) | (-0.837) |
| **R_England_M** | 1.674*** | 1.367* | 0.769 | 0.558* |
| | (2.646) | (1.752) | (-0.419) | (-1.816) |
| **R_England_N** | 1.080 | 0.879 | 0.469 | 0.775 |
| | (0.385) | (-0.751) | (-1.299) | (-1.031) |
| **R_nonEng** | 1.163 | 0.901 | 0.292* | 0.560** |
| | (0.751) | (-0.583) | (-1.900) | (-2.236) |
| **Qual_Degree** | 0.728 | 1.035 | 2.256 | 0.979 |
| | (-1.173) | (0.125) | (1.000) | (-0.058) |
| **Qual_Sec_Postsec** | 0.706* | 1.403 | 1.249 | 0.781 |
| | (-1.828) | (1.595) | (0.308) | (-0.879) |
| **PrevExp_FTE_yrs** | 1.008 | 1.013 | 0.974 | 0.999 |
| | (0.462) | (0.737) | (-0.362) | (-0.025) |
| **PrevExp_PTE_yrs** | 1.091* | 1.072 | 1.041 | 0.883 |
| | (1.787) | (1.173) | (0.256) | (-0.715) |
| **PrevExp_SE_yrs** | 1.228*** | 1.006 | 1.630*** | 0.547 |
| | (2.727) | (0.044) | (2.832) | (-1.067) |
| **Ind_Tert** | 0.942 | 1.345* | 1.471 | 1.200 |
| | (-0.334) | (1.944) | (0.654) | (0.771) |
| **Ind_PubEduHealth** | 1.622** | 0.698 | 1.819 | 1.239 |
| | (2.144) | (-1.452) | (0.795) | (0.664) |
| **Ind_Others** | 1.399 | 1.399 | 4.565** | 1.638 |
| | (1.244) | (1.341) | (2.107) | (1.394) |
| **ln_UE_rate** | 2.691*** | 1.879** | 0.574 | 0.673 |
| | (3.198) | (2.302) | (-0.605) | (-0.924) |
| **Elaps_Dur_yrs** | 0.596*** | 0.743*** | 0.537* | 0.789 |
| | (-4.364) | (-3.265) | (-1.934) | (-1.200) |
| **Elaps_Dur_yrs_Sq** | 1.034** | 1.017 | 1.081** | 0.992 |
| | (2.271) | (1.540) | (1.991) | (-0.235) |
| **Age_25to34** | 0.523*** | 1.150 | 0.644 | 0.567* |
| | (-2.786) | (0.726) | (-0.677) | (-1.765) |

| | | | | |
|---|---|---|---|---|
| **Age_35to44** | 0.374*** | 0.810 | 0.918 | 0.553 |
| | (-3.210) | (-0.790) | (-0.101) | (-1.231) |
| **Age_45to54** | 0.427*** | 0.301*** | 0.248 | 0.438 |
| | (-2.646) | (-3.332) | (-1.113) | (-1.612) |
| **Age_over54** | 0.104*** | 0.091*** | 0.121 | 0.525 |
| | (-5.107) | (-5.067) | (-1.525) | (-1.278) |
| **Failures (exits)** | 219 | 279 | 25 | 124 |
| **PTE spells** | 978 | 978 | 978 | 978 |
| **Person-months** | 15,384 | 15,384 | 15,384 | 15,384 |
| **Log-likelihood** | -1027.0 | -1297.0 | -94.984 | -586.59 |

Control group: MS_Married, Age_16to24, R_England_S, Qual_Primary, Ind_Sec

A dash indicates that the variable has been dropped due to collinearity

z-statistics in parentheses: *** p<0.01, ** p<0.05, * p<0.1

**Table 6.15: Hazard ratios from competing risks Cox model on exiting from part-time employment (females sample)**

| | PTE spell ending with: | | | |
|---|---|---|---|---|
| **Regressors** | **UE** | **FTE** | **SE** | **Inact** |
| **MS_Single** | 1.574*** | 1.771*** | 0.854 | 0.864 |
| | (3.317) | (4.316) | (-0.380) | (-1.510) |
| **MS_SepDivWid** | 0.967 | 1.394* | 1.289 | 0.781* |
| | (-0.178) | (1.801) | (0.440) | (-1.740) |
| **Health_problems** | 0.799 | 0.933 | 1.889 | 1.341*** |
| | (-1.419) | (-0.483) | (1.430) | (2.951) |
| **#KidsAged_0to4** | 0.688*** | 0.451*** | 0.717 | 1.137** |
| | (-3.515) | (-6.742) | (-1.026) | (2.008) |
| **#KidsAged_5to11** | 0.834** | 0.920 | 0.800 | 1.086* |
| | (-2.408) | (-1.240) | (-0.960) | (1.725) |
| **#KidsAged_12to15** | 0.926 | 1.022 | 0.236** | 1.116 |
| | (-0.721) | (0.228) | (-1.998) | (1.458) |
| **UnearnedY_per1000** | 0.917*** | 1.004 | 0.947 | 0.912*** |
| | (-2.761) | (0.169) | (-0.606) | (-4.002) |
| **Benef_UE_Ysupp** | 1.675*** | 1.033 | 0.284* | 0.961 |
| | (4.106) | (0.241) | (-1.690) | (-0.365) |
| **R_England_M** | 1.006 | 0.853 | 0.697 | 0.871 |
| | (0.041) | (-1.241) | (-0.847) | (-1.423) |
| **R_England_N** | 0.979 | 0.893 | 0.263** | 0.936 |
| | (-0.158) | (-0.921) | (-2.397) | (-0.712) |
| **R_nonEng** | 0.947 | 0.768** | 0.697 | 0.765*** |
| | (-0.410) | (-2.093) | (-0.851) | (-2.721) |
| **Qual_Degree** | 0.945 | 1.209 | 3.274** | 1.054 |
| | (-0.283) | (1.008) | (2.240) | (0.375) |
| **Qual_Sec_Postsec** | 0.839 | 0.967 | 0.967 | 0.883 |
| | (-1.414) | (-0.259) | (-0.071) | (-1.378) |
| **PrevExp_FTE_yrs** | 1.004 | 1.097*** | 0.886 | 1.004 |
| | (0.289) | (10.634) | (-1.303) | (0.397) |
| **PrevExp_PTE_yrs** | 1.079*** | 1.024 | 1.037 | 1.032** |
| | (5.433) | (1.156) | (0.679) | (2.547) |
| **PrevExp_SE_yrs** | 0.868 | 1.078 | 1.395* | 1.049 |
| | (-0.991) | (0.831) | (1.657) | (0.737) |
| **Ind_Tert** | 0.853 | 1.230* | 4.910** | 1.284*** |
| | (-1.306) | (1.702) | (2.138) | (2.610) |
| **Ind_PubEduHealth** | 0.787 | 1.110 | 2.889 | 1.261** |
| | (-1.496) | (0.680) | (1.305) | (2.007) |
| **Ind_Others** | 0.998 | 1.104 | 10.355*** | 1.470*** |
| | (-0.010) | (0.518) | (2.913) | (2.736) |
| **ln_UE_rate** | 0.869 | 0.916 | 1.501 | 0.810 |
| | (-0.679) | (-0.441) | (0.565) | (-1.399) |
| **Elaps_Dur_yrs** | 0.768*** | 0.782*** | 0.668* | 0.861*** |
| | (-4.282) | (-4.063) | (-1.950) | (-3.067) |
| **Elaps_Dur_yrs_Sq** | 1.017*** | 1.017*** | 1.032 | 1.003 |
| | (3.064) | (2.888) | (1.608) | (0.554) |
| **Age_25to34** | 0.766* | 0.602*** | 1.044 | 0.613*** |
| | (-1.827) | (-3.769) | (0.084) | (-4.666) |

| | | | | |
|---|---|---|---|---|
| **Age_35to44** | 0.895 | 0.482*** | 1.036 | 0.452*** |
| | (-0.654) | (-4.406) | (0.059) | (-6.232) |
| **Age_45to54** | 0.603** | 0.244*** | 0.699 | 0.507*** |
| | (-2.508) | (-6.442) | (-0.551) | (-4.696) |
| **Age_over54** | 0.326*** | 0.107*** | 0.350 | 0.396*** |
| | (-3.731) | (-5.428) | (-1.150) | (-4.734) |
| | | | | |
| **Failures (exits)** | 457 | 522 | 43 | 891 |
| **PTE spells** | 3,213 | 3,213 | 3,213 | 3,213 |
| **Person-months** | 85,704 | 85,704 | 85,704 | 85,704 |
| **Log-likelihood** | -2886.2 | -3193.8 | -244.36 | -5700.9 |

Control group: MS_Married, Age_16to24, R_England_S, Qual_Primary, Ind_Sec

z-statistics in parentheses: *** p<0.01, ** p<0.05, * p<0.1

**Table 6.16: Hazard ratios from competing risks Cox model on exiting from self-employment (full sample)**

| | SE spell ending with: | | | |
|---|---|---|---|---|
| **Regressors** | **UE** | **FTE** | **PTE** | **Inact** |
| **Male** | 1.883*** | 2.257*** | 0.381*** | 0.564*** |
| | (2.924) | (4.152) | (-3.164) | (-2.812) |
| **MS_Single** | 1.027 | 0.849 | 1.155 | 1.008 |
| | (0.117) | (-0.809) | (0.431) | (0.036) |
| **MS_SepDivWid** | 1.790* | 1.385 | 0.934 | 1.081 |
| | (1.888) | (1.100) | (-0.122) | (0.217) |
| **Health_problems** | 1.153 | 0.909 | 1.107 | 1.085 |
| | (0.504) | (-0.361) | (0.271) | (0.310) |
| **#KidsAged_0to4** | 0.943 | 0.837 | 1.472 | 1.496** |
| | (-0.324) | (-1.092) | (1.548) | (2.302) |
| **#KidsAged_5to11** | 0.932 | 0.954 | 1.055 | 0.887 |
| | (-0.483) | (-0.377) | (0.257) | (-0.772) |
| **#KidsAged_12to15** | 1.138 | 1.358* | 0.984 | 1.077 |
| | (0.628) | (1.874) | (-0.048) | (0.325) |
| **UnearnedY_per1000** | 0.843** | 0.964 | 1.055 | 1.033 |
| | (-2.419) | (-0.710) | (0.711) | (0.625) |
| **Benef_UE_Ysupp** | 2.283*** | 1.352 | 1.271 | 1.238 |
| | (4.107) | (1.526) | (0.609) | (0.755) |
| **R_England_M** | 0.892 | 1.058 | 0.607 | 0.976 |
| | (-0.446) | (0.257) | (-1.172) | (-0.091) |
| **R_England_N** | 1.030 | 1.110 | 1.259 | 0.849 |
| | (0.135) | (0.528) | (0.707) | (-0.608) |
| **R_nonEng** | 0.722 | 1.037 | 1.052 | 0.850 |
| | (-1.291) | (0.169) | (0.145) | (-0.651) |
| **Qual_Degree** | 1.151 | 0.746 | 1.207 | 1.101 |
| | (0.451) | (-1.067) | (0.414) | (0.292) |
| **Qual_Sec_Postsec** | 1.137 | 1.046 | 1.097 | 1.225 |
| | (0.528) | (0.219) | (0.256) | (0.746) |
| **PrevExp_FTE_yrs** | 1.012 | 1.053*** | 1.027 | 1.007 |
| | (0.614) | (3.931) | (0.800) | (0.283) |
| **PrevExp_PTE_yrs** | 1.076 | 0.915 | 1.169*** | 1.067 |
| | (1.202) | (-0.944) | (3.004) | (1.217) |
| **PrevExp_SE_yrs** | 1.024 | 1.016 | 1.062 | 1.115* |
| | (0.357) | (0.258) | (0.456) | (1.824) |
| **Ind_Tert** | 1.020 | 1.379* | 1.111 | 1.211 |
| | (0.096) | (1.836) | (0.290) | (0.773) |
| **Ind_PubEduHealth** | 1.085 | 0.537 | 2.233** | 1.201 |
| | (0.247) | (-1.606) | (2.077) | (0.564) |
| **Ind_Others** | 1.065 | 1.371 | 1.337 | 2.137*** |
| | (0.242) | (1.423) | (0.663) | (2.759) |
| **ln_UE_rate** | 0.795 | 0.705 | 1.108 | 0.215*** |
| | (-0.598) | (-1.005) | (0.173) | (-3.779) |
| **Elaps_Dur_yrs** | 0.693*** | 0.762*** | 0.920 | 0.862 |
| | (-3.123) | (-3.019) | (-0.441) | (-1.189) |
| **Elaps_Dur_yrs_Sq** | 1.024** | 1.018** | 1.005 | 1.017 |
| | (2.006) | (2.173) | (0.218) | (1.371) |

| | | | | |
|---|---|---|---|---|
| **Age_25to34** | 0.853 | 0.820 | 0.580 | 0.913 |
| | (-0.606) | (-0.874) | (-1.422) | (-0.286) |
| **Age_35to44** | 0.679 | 0.402*** | 0.486 | 0.831 |
| | (-1.250) | (-3.230) | (-1.600) | (-0.526) |
| **Age_45to54** | 0.446** | 0.370*** | 0.873 | 1.189 |
| | (-2.224) | (-3.203) | (-0.291) | (0.482) |
| **Age_over54** | 0.199*** | 0.167*** | 0.397 | 0.701 |
| | (-2.919) | (-3.742) | (-1.250) | (-0.735) |
| | | | | |
| **Failures (exits)** | 146 | 197 | 68 | 131 |
| **SE spells** | 889 | 889 | 889 | 889 |
| **Person-months** | 22,153 | 22,153 | 22,153 | 22,153 |
| **Log-likelihood** | -703.90 | -939.76 | -319.92 | -634.44 |

Control group: MS_Married, Age_16to24, R_England_S, Qual_Primary, Ind_Sec

z-statistics in parentheses: *** p<0.01, ** p<0.05, * p<0.1

**Table 6.17: Hazard ratios from competing risks Cox model on exiting from self-employment (males sample)**

| | SE spell ending with: | | | |
|---|---|---|---|---|
| **Regressors** | **UE** | **FTE** | **PTE** | **Inact** |
| **MS_Single** | 0.859 | 0.682 | 0.469 | 0.884 |
| | (-0.557) | (-1.639) | (-1.056) | (-0.280) |
| **MS_SepDivWid** | 1.602 | 1.447 | 0.447 | 0.740 |
| | (1.149) | (1.089) | (-0.698) | (-0.450) |
| **Health_problems** | 1.532 | 1.079 | 0.534 | 1.691 |
| | (1.373) | (0.263) | (-0.575) | (1.335) |
| **#KidsAged_0to4** | 1.072 | 0.939 | 0.778 | 1.012 |
| | (0.356) | (-0.360) | (-0.384) | (0.033) |
| **#KidsAged_5to11** | 0.996 | 0.937 | 1.265 | 0.601 |
| | (-0.024) | (-0.452) | (0.528) | (-1.451) |
| **#KidsAged_12to15** | 1.039 | 1.290 | 0.452 | 1.559 |
| | (0.148) | (1.333) | (-1.001) | (1.449) |
| **UnearnedY_per1000** | 0.698*** | 1.035 | 1.018 | 0.993 |
| | (-3.521) | (0.595) | (0.099) | (-0.065) |
| **Benef_UE_Ysupp** | 2.410*** | 1.386 | 1.269 | 1.527 |
| | (3.910) | (1.476) | (0.383) | (1.163) |
| **R_England_M** | 0.690 | 1.079 | 0.089* | 1.274 |
| | (-1.202) | (0.312) | (-1.866) | (0.636) |
| **R_England_N** | 0.938 | 1.145 | 0.795 | 0.596 |
| | (-0.244) | (0.613) | (-0.343) | (-1.152) |
| **R_nonEng** | 0.632 | 0.913 | 1.311 | 0.930 |
| | (-1.538) | (-0.365) | (0.450) | (-0.192) |
| **Qual_Degree** | 0.928 | 0.647 | 0.926 | 1.056 |
| | (-0.182) | (-1.348) | (-0.092) | (0.108) |
| **Qual_Sec_Postsec** | 1.247 | 1.006 | 0.674 | 1.078 |
| | (0.782) | (0.028) | (-0.588) | (0.194) |
| **PrevExp_FTE_yrs** | 1.014 | 1.046*** | 0.967 | 1.001 |
| | (0.671) | (3.192) | (-0.432) | (0.047) |
| **PrevExp_PTE_yrs** | 1.180* | 0.981 | 1.374* | 1.255*** |
| | (1.811) | (-0.177) | (1.957) | (2.948) |
| **PrevExp_SE_yrs** | 0.922 | 1.007 | 0.976 | 1.010 |
| | (-0.895) | (0.114) | (-0.085) | (0.102) |
| **Ind_Tert** | 1.010 | 1.372 | 1.666 | 0.898 |
| | (0.040) | (1.641) | (0.814) | (-0.318) |
| **Ind_PubEduHealth** | 1.222 | 0.290* | 8.525*** | 0.508 |
| | (0.407) | (-1.699) | (3.180) | (-0.882) |
| **Ind_Others** | 1.374 | 1.533* | 0.456 | 1.357 |
| | (1.090) | (1.752) | (-0.701) | (0.759) |
| **ln_UE_rate** | 1.057 | 0.776 | 0.834 | 0.269** |
| | (0.121) | (-0.649) | (-0.166) | (-2.020) |
| **Elaps_Dur_yrs** | 0.659*** | 0.757*** | 0.663 | 0.925 |
| | (-2.945) | (-2.716) | (-1.099) | (-0.388) |
| **Elaps_Dur_yrs_Sq** | 1.025 | 1.017* | 1.030 | 1.012 |
| | (1.612) | (1.782) | (0.658) | (0.527) |
| **Age_25to34** | 0.860 | 0.768 | 0.303* | 0.420* |
| | (-0.494) | (-0.999) | (-1.664) | (-1.781) |

| | | | | |
|---|---|---|---|---|
| **Age_35to44** | 0.721 | 0.414*** | 0.237* | 0.633 |
| | (-0.898) | (-2.707) | (-1.765) | (-0.853) |
| **Age_45to54** | 0.420** | 0.309*** | 0.198* | 0.638 |
| | (-2.027) | (-3.202) | (-1.785) | (-0.776) |
| **Age_over54** | 0.189** | 0.165*** | 0.219 | 0.470 |
| | (-2.570) | (-3.525) | (-1.383) | (-1.054) |
| **Failures (exits)** | 110 | 158 | 20 | 58 |
| **SE spells** | 563 | 563 | 563 | 563 |
| **Person-months** | 13,109 | 13,109 | 13,109 | 13,109 |
| **Log-likelihood** | -471.34 | -689.15 | -74.545 | -245.61 |

Control group: MS_Married, Age_16to24, R_England_S, Qual_Primary, Ind_Sec

z-statistics in parentheses: *** p<0.01, ** p<0.05, * p<0.1

**Table 6.18: Hazard ratios from competing risks Cox model on exiting from self-employment (females sample)**

| | SE spell ending with: | | | |
|---|---|---|---|---|
| **Regressors** | **UE** | **FTE** | **PTE** | **Inact** |
| **MS_Single** | 1.383 | 2.238* | 1.586 | 0.945 |
| | (0.686) | (1.697) | (1.162) | (-0.183) |
| **MS_SepDivWid** | 2.653 | 1.016 | 1.076 | 1.066 |
| | (1.421) | (0.022) | (0.107) | (0.125) |
| **Health_problems** | 0.457 | 0.330 | 1.345 | 0.656 |
| | (-1.046) | (-1.472) | (0.695) | (-1.016) |
| **#KidsAged_0to4** | 0.192** | 0.343* | 2.322*** | 1.728** |
| | (-2.182) | (-1.907) | (2.825) | (2.319) |
| **#KidsAged_5to11** | 0.779 | 0.990 | 1.028 | 1.015 |
| | (-0.831) | (-0.036) | (0.107) | (0.079) |
| **#KidsAged_12to15** | 1.084 | 3.206*** | 1.262 | 0.823 |
| | (0.188) | (3.007) | (0.568) | (-0.507) |
| **UnearnedY_per1000** | 1.036 | 0.768** | 0.986 | 1.103 |
| | (0.333) | (-2.206) | (-0.161) | (1.424) |
| **Benef_UE_Ysupp** | 1.259 | 1.443 | 0.792 | 0.895 |
| | (0.385) | (0.651) | (-0.387) | (-0.217) |
| **R_England_M** | 1.388 | 1.355 | 1.051 | 0.540 |
| | (0.505) | (0.518) | (0.101) | (-1.276) |
| **R_England_N** | 1.674 | 0.829 | 1.689 | 1.191 |
| | (0.994) | (-0.357) | (1.304) | (0.469) |
| **R_nonEng** | 1.247 | 1.843 | 0.596 | 0.928 |
| | (0.388) | (1.166) | (-0.981) | (-0.215) |
| **Qual_Degree** | 1.068 | 1.241 | 1.524 | 1.068 |
| | (0.100) | (0.296) | (0.695) | (0.128) |
| **Qual_Sec_Postsec** | 0.761 | 1.558 | 1.350 | 1.398 |
| | (-0.502) | (0.752) | (0.636) | (0.765) |
| **PrevExp_FTE_yrs** | 0.993 | 1.151** | 1.118** | 0.950 |
| | (-0.094) | (2.382) | (2.128) | (-0.715) |
| **PrevExp_PTE_yrs** | 1.049 | 0.818 | 1.228*** | 0.932 |
| | (0.465) | (-1.027) | (3.114) | (-0.799) |
| **PrevExp_SE_yrs** | 1.221 | 1.217 | 1.100 | 1.499** |
| | (0.943) | (0.675) | (0.419) | (2.571) |
| **Ind_Tert** | 0.719 | 2.990** | 0.927 | 1.923 |
| | (-0.657) | (1.966) | (-0.155) | (1.383) |
| **Ind_PubEduHealth** | 0.825 | 1.247 | 1.465 | 2.051 |
| | (-0.330) | (0.324) | (0.778) | (1.435) |
| **Ind_Others** | 0.512 | 1.301 | 1.901 | 3.978*** |
| | (-1.014) | (0.395) | (1.191) | (2.778) |
| **ln_UE_rate** | 0.530 | 0.858 | 0.722 | 0.185*** |
| | (-0.722) | (-0.168) | (-0.428) | (-2.986) |
| **Elaps_Dur_yrs** | 0.817 | 0.905 | 1.093 | 0.764 |
| | (-0.609) | (-0.463) | (0.369) | (-1.310) |
| **Elaps_Dur_yrs_Sq** | 1.017 | 1.026 | 0.999 | 1.010 |
| | (0.446) | (1.195) | (-0.033) | (0.388) |
| **Age_25to34** | 1.273 | 1.373 | 0.813 | 2.420 |

| | | | | |
|---|---|---|---|---|
| | (0.412) | (0.595) | (-0.405) | (1.587) |
| **Age_35to44** | 0.708 | 0.256* | 0.681 | 2.026 |
| | (-0.513) | (-1.882) | (-0.634) | (1.193) |
| **Age_45to54** | 0.409 | 0.827 | 1.795 | 2.297 |
| | (-1.199) | (-0.296) | (0.949) | (1.360) |
| **Age_over54** | 0.262 | | 0.350 | 1.168 |
| | (-1.086) | | (-0.882) | (0.174) |
| | | | | |
| **Failures (exits)** | 36 | 39 | 48 | 73 |
| **SE spells** | 326 | 326 | 326 | 326 |
| **Person-months** | 9,044 | 9,044 | 9,044 | 9,044 |
| **Log-likelihood** | -126.73 | -133.57 | -185.51 | -272.31 |

Control group: MS_Married, Age_16to24, R_England_S, Qual_Primary, Ind_Sec

A dash indicates that the variable has been dropped due to collinearity

z-statistics in parentheses: *** p<0.01, ** p<0.05, * p<0.1

**Table 6.19: Hazard ratios from competing risks Cox model on exiting into various states with retirement age dummy (male sample)**

| | Spell ending with: | | | | |
|---|---|---|---|---|---|
| **Regressors** | **UE** | **FTE** | **PTE** | **SE** | **Inact** |
| **MS_Single** | 2.057*** | 1.531*** | 1.552*** | 0.933 | 1.916*** |
| | (13.735) | (8.727) | (4.485) | (-0.568) | (8.286) |
| **MS_SepDivWid** | 1.528*** | 0.870 | 0.815 | 1.620** | 1.256 |
| | (3.687) | (-1.258) | (-0.851) | (2.203) | (1.400) |
| **Health_problems** | 1.073 | 0.782*** | 1.319** | 1.096 | 1.504*** |
| | (1.005) | (-3.767) | (2.396) | (0.550) | (4.386) |
| **#KidsAged_0to4** | 1.026 | 1.018 | 1.019 | 1.276** | 0.898 |
| | (0.530) | (0.387) | (0.200) | (2.345) | (-1.367) |
| **#KidsAged_5to11** | 1.172*** | 0.983 | 1.027 | 0.927 | 0.946 |
| | (4.732) | (-0.522) | (0.395) | (-0.824) | (-0.971) |
| **#KidsAged_12to15** | 0.982 | 0.975 | 0.955 | 0.979 | 0.969 |
| | (-0.384) | (-0.589) | (-0.519) | (-0.184) | (-0.444) |
| **UnearnedY_per1000** | 0.908*** | 1.014 | 0.973 | 1.014 | 0.941*** |
| | (-6.675) | (1.237) | (-1.113) | (0.420) | (-2.883) |
| **R_England_M** | 1.149** | 1.064 | 0.973 | 0.586*** | 0.771*** |
| | (2.266) | (1.097) | (-0.246) | (-3.456) | (-2.757) |
| **R_England_N** | 1.079 | 1.028 | 0.942 | 0.645*** | 0.843** |
| | (1.287) | (0.503) | (-0.554) | (-3.090) | (-1.976) |
| **R_nonEng** | 1.113* | 1.036 | 0.686*** | 0.589*** | 0.764*** |
| | (1.768) | (0.622) | (-3.235) | (-3.380) | (-3.005) |
| **Qual_Degree** | 0.566*** | 0.937 | 0.891 | 1.208 | 0.988 |
| | (-7.006) | (-0.845) | (-0.756) | (0.992) | (-0.100) |
| **Qual_Sec_Postsec** | 0.718*** | 1.181*** | 1.026 | 1.161 | 1.096 |
| | (-6.186) | (3.108) | (0.242) | (1.034) | (1.058) |
| **PrevExp_FTE_yrs** | 1.018*** | 1.022*** | 1.006 | 1.003 | 1.011* |
| | (4.292) | (5.989) | (0.731) | (0.250) | (1.652) |
| **PrevExp_PTE_yrs** | 1.038 | 0.963* | 1.139*** | 1.028 | 1.003 |
| | (1.618) | (-1.694) | (5.749) | (0.581) | (0.101) |
| **PrevExp_SE_yrs** | 0.953* | 0.964 | 0.915 | 1.179*** | 1.020 |
| | (-1.699) | (-1.400) | (-1.242) | (6.386) | (0.545) |
| **ln_UE_rate** | 1.438*** | 1.105 | 0.676** | 1.811*** | 0.653*** |
| | (4.141) | (1.207) | (-2.378) | (2.586) | (-3.209) |
| **Elaps_Dur_yrs** | 0.601*** | 0.636*** | 0.663*** | 0.824** | 0.825*** |
| | (-16.762) | (-15.996) | (-6.765) | (-2.364) | (-4.359) |
| **Elaps_Dur_yrs_Sq** | 1.026*** | 1.028*** | 1.033*** | 1.010 | 1.011*** |
| | (8.713) | (9.588) | (5.012) | (1.108) | (2.840) |
| **UE** | 0.000 | 2.959*** | 1.626*** | 2.338*** | 1.122e+10*** |
| | (.) | (21.258) | (4.627) | (5.357) | (161.987) |
| **FTE** | 1.199*** | 0.000 | 0.508*** | 0.725** | 4.828e+09*** |
| | (3.319) | (.) | (-6.174) | (-1.987) | (157.175) |
| **PTE** | 1.114 | 1.269*** | 0.000 | 1.078 | 9.089e+09*** |
| | (1.295) | (3.185) | (.) | (0.311) | (142.028) |
| **SE** | 0.744*** | 0.969 | 0.456*** | 0.000 | 6.008e+09 |
| | (-2.739) | (-0.342) | (-3.263) | (.) | (.) |
| **Age_over64** | 0.152*** | 0.197*** | 3.794*** | 0.727 | 1.699 |

| | | | | | |
|---|---|---|---|---|---|
| | (-3.246) | (-3.232) | (4.355) | (-0.444) | (1.612) |
| **Failures (exits)** | 2,289 | 2,638 | 641 | 363 | 1,018 |
| **Spells** | 11,592 | 11,592 | 11,592 | 11,592 | 11,592 |
| **Person-months** | 239,730 | 239,730 | 239,730 | 239,730 | 239,730 |
| **Log-likelihood** | -16766 | -17684 | -4743.2 | -2664.8 | -7412.6 |

Control group: MS_Married, R_England_S, Qual_Primary, Inact
z-statistics in parentheses: *** p<0.01, ** p<0.05, * p<0.1

**Table 6.20: Hazard ratios from competing risks Cox model on exiting into various states with retirement age dummy (female sample)**

| | Spell ending with: | | | | |
|---|---|---|---|---|---|
| **Regressors** | **UE** | **FTE** | **PTE** | **SE** | **Inact** |
| **MS_Single** | 2.149*** | 2.128*** | 0.779*** | 0.850 | 1.130** |
| | (12.312) | (13.040) | (-4.940) | (-0.969) | (2.328) |
| **MS_SepDivWid** | 1.276** | 1.034 | 0.667*** | 1.320 | 0.839* |
| | (2.355) | (0.334) | (-4.607) | (1.103) | (-1.925) |
| **Health_problems** | 1.103 | 0.837** | 1.038 | 1.443* | 1.284*** |
| | (1.242) | (-2.385) | (0.555) | (1.818) | (3.637) |
| **#KidsAged_0to4** | 0.683*** | 0.500*** | 1.267*** | 0.987 | 1.244*** |
| | (-5.809) | (-10.521) | (5.728) | (-0.092) | (4.953) |
| **#KidsAged_5to11** | 0.929* | 0.924** | 1.372*** | 1.059 | 1.029 |
| | (-1.781) | (-2.057) | (10.449) | (0.494) | (0.858) |
| **#KidsAged_12to15** | 1.030 | 1.052 | 0.968 | 0.549*** | 1.069 |
| | (0.597) | (1.075) | (-0.691) | (-2.755) | (1.423) |
| **UnearnedY_per1000** | 0.945*** | 1.026** | 0.945*** | 1.042 | 0.945*** |
| | (-3.759) | (2.319) | (-3.911) | (1.253) | (-3.970) |
| **R_England_M** | 1.017 | 1.071 | 1.125* | 0.648** | 0.937 |
| | (0.238) | (1.082) | (1.839) | (-2.070) | (-0.981) |
| **R_England_N** | 0.873* | 0.899* | 1.036 | 0.591*** | 0.945 |
| | (-1.941) | (-1.670) | (0.571) | (-2.633) | (-0.910) |
| **R_nonEng** | 0.903 | 0.792*** | 0.864** | 0.490*** | 0.817*** |
| | (-1.540) | (-3.733) | (-2.316) | (-3.496) | (-3.211) |
| **Qual_Degree** | 0.726*** | 1.264** | 0.769*** | 2.803*** | 1.309*** |
| | (-3.312) | (2.576) | (-2.903) | (4.126) | (3.162) |
| **Qual_Sec_Postsec** | 0.830*** | 1.297*** | 0.942 | 1.114 | 1.135* |
| | (-2.728) | (3.754) | (-1.014) | (0.486) | (1.946) |
| **PrevExp_FTE_yrs** | 1.010 | 1.077*** | 1.009 | 0.997 | 0.998 |
| | (1.422) | (14.449) | (1.370) | (-0.130) | (-0.349) |
| **PrevExp_PTE_yrs** | 1.038*** | 0.984 | 1.070*** | 0.971 | 1.021** |
| | (3.425) | (-1.348) | (9.183) | (-0.717) | (2.148) |
| **PrevExp_SE_yrs** | 1.052 | 1.049 | 1.020 | 1.498*** | 1.125*** |
| | (1.025) | (0.998) | (0.453) | (5.948) | (3.335) |
| **ln_UE_rate** | 1.005 | 0.962 | 1.110 | 1.608 | 0.875 |
| | (0.053) | (-0.411) | (1.102) | (1.558) | (-1.417) |
| **Elaps_Dur_yrs** | 0.726*** | 0.648*** | 0.758*** | 0.818* | 0.853*** |
| | (-9.445) | (-13.679) | (-9.076) | (-1.844) | (-5.095) |
| **Elaps_Dur_yrs_Sq** | 1.020*** | 1.034*** | 1.018*** | 1.013 | 1.007** |
| | (6.412) | (10.698) | (6.145) | (1.067) | (2.326) |
| **UE** | 0.000 | 3.176*** | 1.894*** | 1.709*** | 2.512e+10*** |
| | (.) | (20.975) | (11.454) | (2.626) | (182.146) |
| **FTE** | 1.583*** | 0.000 | 0.422*** | 0.519*** | 1.533e+10*** |
| | (7.380) | (.) | (-14.191) | (-3.251) | (186.875) |
| **PTE** | 1.343*** | 1.026 | 0.000 | 0.649** | 2.163e+10*** |
| | (4.289) | (0.424) | (.) | (-2.198) | (194.034) |
| **SE** | 1.028 | 0.695** | 0.408*** | 0.000 | 1.650e+10 |
| | (0.160) | (-2.186) | (-6.027) | (.) | (.) |
| **Age_over59** | 0.215*** | 0.367*** | 1.297 | 0.716 | 0.652* |

| | | | | | |
|---|---|---|---|---|---|
| | (-3.408) | (-2.623) | (1.300) | (-0.454) | (-1.675) |
| **Failures (exits)** | 1,693 | 2,011 | 2,060 | 199 | 1,999 |
| **Spells** | 13,242 | 13,242 | 13,242 | 13,242 | 13,242 |
| **Person-months** | 305,221 | 305,221 | 305,221 | 305,221 | 305,221 |
| **Log-likelihood** | -12920 | -14200 | -14855 | -1479.6 | -14769 |

Control group: MS_Married, R_England_S, Qual_Primary, Inact
z-statistics in parentheses: *** p<0.01, ** p<0.05, * p<0.1

## REFERENCES


Adams, S.J. (2004). Age discrimination legislation and the employment of older workers. *Labour Economics, 11 (2)*, pp. 219-241.

Adams, G. and Rau, B. (2004). Job Seeking among Retirees Seeking Bridge Employment. *Personnel Psychology, 57 (3)*, pp. 719-744.

Adams, S.J. and Neumark, D. (2006). Age discrimination in US labor markets: a review of the evidence. In W.M. Rodgers (Ed.), *Handbook on the Economics of Discrimination* (pp. 187-214). Cheltenham ; Northampton, Mass.: Elgar.

Ajayi-Obe, O. and Parker, S.C. (2005). The Changing Nature of Work among the Self-Employed in the 1990s: Evidence from Britain. *Journal of Labor Research, 26 (3)*, pp. 501-517.

Alba-Ramirez, A. (1994). How temporary is temporary employment in Spain? *Journal of Labor Research, 19 (4)*, pp. 695-710.

Amuedo-Dorantes, C. (2000). Work Transitions Into and Out of Involuntary Temporary Employment in a Segmented Market: Evidence from Spain. *Industrial and Labor Relations Review, 53 (2)*, pp. 309-325.

An, M.Y., Christensen, B.J. and Datta Gupta, N. (2004). Multivariate Mixed Proportional Hazard Modelling of the Joint Retirement of Married Couples. *Journal of Applied Econometrics, 19 (6)*, pp. 687-704.

Aronson, R.L. (1991). *Self-employment*. ILR Press, Ithaca, NY.

Arrow, J.O. (1996). Estimating the influence of health as a risk factor on unemployment: a survival analysis of employment duration for workers surveyed in the German Socio-Economic Panel (1984-1990). *Social Science & Medicine, 42 (12)*, pp. 1651-1659.

Arulampalam, W., Booth A.L. and Bryan, M.L. (2004). Training and the new minimum wage. *Economic Journal, 114 (494)*, pp. C87-C94.

Atkinson, J. (1984). Manpower Strategies for Flexible Organization. *Personnel Management, 16 (8)*, pp. 28-31.

Blanchflower, D.G. (2000). Self-employment in OECD countries. *Labour Economics, 7 (5)*, pp. 471-505.

Benito, A. (2011). Understanding labour force participation in the United Kingdom. Bank of England. *Quarterly Bulletin, 51 (1)*, pp. 36-42.

Berndt, E.R. (1990). *The Practice of Econometrics: Classic and Contemporary*. Reading, Mass.: Addison-Wesley Pub. Co.

Berton, F., Devicienti, F. and Pacelli, L. (2011). Are temporary jobs a port of entry into permanent employment? *International Journal of Manpower, 32 (8)*, pp. 879-899.

Blanchflower, D.G. (2000). Self-employment in OECD countries. *Labour Economics, 7 (5)*, pp. 471-505.

Blau, D.M. (1994). Labor Force Dynamics of Older Men. *Econometrica, 62 (1)*, pp. 117-156.

Blinder, A.S. (1973). Wage Discrimination: Reduced Form and Structural Estimates. *Journal of Human Resources, Vol. 8, No. 4*, pp.436-455.

Block, J. and Sandner, P. (2009). Necessity and opportunity entrepreneurs and their duration in self-employment: Evidence from German Micro Data. *Journal of Industry, Competition and Trade, 9 (2)*, pp.117-137.

Blundell, R., Meghir, C. and Smith, S. (2002). Pension Incentives and the Pattern of Early Retirement. *The Economic Journal, 112 (478)*, pp. 153-170.

Blundell, R., Brewer, M. and Francesconi, M. (2004). *Job Changes, Hours Changes and Labour Market Flexibility: Panel Data Evidence for Britain.* The Institute for Fiscal Studies. Accessed 15/01/2013. Retrieved from http://www.ifs.org.uk/wps/wp0512.pdf

Boheim, R. and Taylor, M.P. (2000). Unemployment duration and exit states in Britain. *ISER Working Paper Series: 2000-01*. Accessed 29/06/2012. Retrieved from https://www.iser.essex.ac.uk/publications/working-papers/iser/2000-01.pdf

Booth, A.L., Francesconi, M. and Frank, J. (2002). Temporary Jobs: Stepping Stones or Dead Ends? *The Economic Journal, 112 (480)*, pp. 189-213.

Boudarbat, B. & Lemieux, T. (2007). Why are the Relative Wages of Immigrants Declining? A Distributional Approach. *CLSRN Working Paper No: 27*, DRAFT. Accessed 05/01/2011. Retrieved from http://www.econ.ubc.ca/clsrn/publications/workingpapers/Boudarbat%20Lemieux_Full%20Draft.pdf

Bregger, J.E. (1996). Measuring self-employment in the United States. *Monthly Labor Review, 119 (1/2)*, pp. 3-9.

Bruce, D. and Schuetze, H.J. (2004). The labor market consequences of experience in self-employment. *Labor Economics, 11 (5)*, pp. 575-598.

Bruce, D., Holtz-Eakin, D. and Quinn, J. (2000). *Self-employment and Labor Market Transitions at Older Ages*. Accessed 13/06/2012. Retrieved from http://fmwww.bc.edu/ec-p/wp490.pdf

Butcher, T. and Hutchinson, G. (1996). The changing pattern of labour market activity in Great Britain: Evidence from Labour Force Surveys 1984 and 1992. *International Journal of Manpower, 17 (6)*, pp. 66-80.

Butrica, B., Schaner, S. and Zedlewski, S. (2006). Enjoying the golden work years. *Perspect Product Aging, 6 (May)*, pp. 1-6.

Campbell, N. (1999). The Decline of Employment Among Older People in Britain. *LSE Sticerd Research Paper No. Case 019*, pp. 1-75.

Carrasco, R. (1999). Transitions To and From Self-employment in Spain: An Empirical Analysis. *Oxford Bulletin of Economics and Statistics, 61 (3)*, pp. 315-341.

Chan, S. and Stevens, A.H. (1999). Employment and Retirement Following a Late-Career Job Loss. *The American Economic Review, 89 (2)*, pp. 211-216.

Chan, S. and Stevens, A.H. (2001). Job Loss and Employment Patterns of Older Workers. *Journal of Labor Economics, 19 (2)*, pp. 484-521.

Chan, C.S., Sung, Y. W. & Zhang, J. (2001). Gender Wage Differentials and Occupational Segregation in Hong Kong, 1981-1986. *Pacific Economic Review, 6:3*, pp. 345-359.

Chen, G. and Hamori, S. (2008). Do Chinese employers discriminate against females when hiring employees? *Economics Bulletin, 10 (14)*, pp. 1-17.

Chen, G. and Hamori, S. (2010). Bivariate probit analysis of differences between male and female formal employment in urban China. *Journal of Asian Economics, 21 (5)*, pp. 494-501.

Chi W., Li B. & Yu Q. (2007). Decomposition of Changes in Earnings Inequality in China: A Distributional Approach. Unpublished. *Munich Personal RePEc Archive. Paper No. 3806*, pp.1-34.

Chiu, S. and Ngan, R. (1999). Employment of Chinese Older Workers in Hong Kong: Cultural Myths, Discrimination and Opportunities. *Ageing International, 25 (3)*, pp. 14-30.

Chiu, W.K., So, Y. and Tam, Y.M. (2008). Flexible Employment in Hong Kong: Trends and Patterns in Comparative Perspective. *Asian Survey, 48 (4)*, pp. 673-702.

Chou, K.L. and Chow, W.S. (2005). To Retire or Not to Retire: Is There an Option for Older Workers in Hong Kong? *Social Policy and Administration, Vol. 39, No. 3*, pp. 233-246.

Christensen, K.E. (1990). Bridges over Troubled Water: How Older Workers View the Labor Market. In P.B. Doeringer (Ed.), *Bridges to Retirement: Older Workers and a Changing Labor Market* (pp. 175-207). Ithaca, NY: ILR Press.

Chung, W., Lim, S. and Lee, S. (2010). Factors influencing gender differences in smoking and their separate contributions: Evidence from South Korea. Social *Science and Medicine, 70 (12)*, pp. 1966-1973.

Cleves, M., Gould, W., Gutierrez, R.G. and Marchenko, Y.V. (2010). *An Introduction to Survival Analysis Using Stata*. (3rd ed.), p. 7, 129, 366. A Stata Press Publication, StataCorp LP, College Station, Texas.

Cook, J. (1998). Flexible employment: Implications for gender citizenship in the European Union. *New Political Economy, 3 (2)*, pp. 261-277.

Cooke, R.M., Morales-Napoles, O. (2006). Competing risk and the Cox proportional hazard model. *Journal of Statistical Planning and Inference, 136 (5)*, pp. 1621-1637.

Corcoran, M. and Hill, M.S. (1985). Reoccurrence of Unemployment among Adult Men. *The Journal of Human Resources, 20 (2)*, pp. 165-183.

Cox, D.R. (1972). Regression models and life tables. *Journal of the Royal Statistical Society, 34 (2)*, pp. 187-220.

Crompton, R. (2002). Employment, flexible working and the family. *British Journal of Sociology, 53 (4)*, pp. 537-558.

D'Addio, A.C. and Rosholm, M. (2005). Exits from temporary jobs in Europe: A competing risks analysis. *Labour Economics, 12 (4*), pp. 449-468.

Danacica, D. and Babucea, A. (n.d.) *Using Survival analysis in economics*. Accessed 14/06/2012. Retrieved http://anale.feaa.uaic.ro/anale/resurse/sta2babucea.pdf

Daniel, K. and Heywood, J.S. (2007). The determinants of hiring older workers: UK evidence. *Labour Economics, 14*, pp. 35-51.

Davis-Blake, A. and Uzzi, B. (1993). Determinants of employment externalization: A study of temporary workers and independent contractors. *Administrative Science Quarterly, 38 (2)*, pp. 195-223.

De Grip, A., Hoevenberg, J. and Williams, Ed. (1997). Atypical employment in the European Union. *International Labour Review, 136 (1)*, pp. 49-71.

Delsen, L. and Reday-Mulvey, G. (1998). *Gradual Retirement in OECD Countries*. Aldershot: Ashgate.

Deutermann, Jr., W.V. and Brown, S.C. (1978). Voluntary part-time workers: a growing part of the labor force. *Monthly Labor Review, 101 (6)*, pp. 3-10.

Disney, R. and Hawkes, D. (2003). Why has employment recently risen among older workers in Britain? In R. Dickens, P. Gregg and J. Wadsworth (Eds.), *The Labour Market under New Labour: The State of Working Britain* (pp. 53-70). Palgrave Macmillan.

Duncan, C. and Loretto, W. (2004). Never the Right Age? Gender and Age-Based Discrimination in Employment. *Gender, Work and Organization, Vol. 11, No. 1*, pp. 95-115.

Dyer, S. (1998). Flexibility Models: A Critical Analysis. *International Journal of Manpower, 19 (4)*, pp. 223-233.

Dynarski, M. and Sheffrin, S.M. (1990). The Behavior of Unemployment Duration over the Cycle. *The Review of Economics and Statistics, 72 (2)*, pp. 350-356.

Ehrenberg, R.G. and Smith, R.S. (2006). *Modern labor economics: theory and public policy* (9th ed.). Boston: Pearson/Addison Wesley.

ESDS Government. (2011a). *Introduction to Stata using the UK Labour Survey*. Accessed 29/10/2010. Retrieved from http://www.esds.ac.uk/government/lfs/

ESDS Government. (2011b). *Labour Force Survey*. Accessed 29/10/2010. Retrieved from http://www.esds.ac.uk/government/lfs/

ESRC Research Centre on Micro-social Change. (2013). *British Household Panel Survey* [computer file] Colchester: The Data Archive [distributor]. Accessed 02/03/2013. Retrieved from http://www.data-archive.ac.uk/

Evans, D.S. and Leighton, L.S. (1989). Some Empirical Aspects of Entrepreneurship. *The American Economic Review, 79 (3),* pp. 519-535.

Falzone, J.S. (2000). Labor Market Decisions of Married Women: With Emphasis on Part-Time Employment. *International Advances in Economic Research, 6 (4),* pp. 662-671.

Fairlie, R.W. (1999). The Absence of the African-American Owned Business: An Analysis of the Dynamics of Self-Employment. *Journal of Labor Economics, 17 (1),* pp. 80-108.

Fairlie, R.W. (2005). An extension of the Blinder-Oaxaca decomposition technique to logit and probit models. *Journal of Economic and Social Merasurement, 30 (4),* pp. 305-316.

Falzone, J.S. (2000). Labor Market Decisions of Married Women: With Emphasis on Part-Time Employment. *International Advances in Economic Research, 6 (4),* pp. 662-671.

Farber, H.S. (1999). Alternative and Part-time Employment Arrangements as a Response to Job Loss. *NBER Working Paper 7002*. Accessed 29/05/2012. Retrieved from http://www.nber.org/papers/w7002

Fox, J. (2002). *Cox Proportional-Hazards Regression for Survival Data*. Accessed 25/10/2014. Retrieved from http://cran.r-project.org/doc/contrib/Fox-Companion/appendix-cox-regression.pdf

Frees, E.W. (2004). *Longitudinal and Panel Data: ANALYSIS AND APPLICATIONS IN THE SOCIAL SCIENCES*. Cambridge University Press.

Friedman, L. (1984). *Your Time Will Come: The Law of Age Discrimination and Mandatory Retirement*. New York: Russell Sage Foundation.

Fuchs, V.R. (1982). Self-employment and Labor Force Participation of Older Males. *The Journal of Human Resources, 17 (3),* pp. 339-357.

Gannon, B. and Roberts, J. (2011). Part-time work and health among older workers in Ireland and Britain. *Applied Economics, 43 (30),* pp. 4749-4757.

Garen, J., Berger, M. and Scott, F. (1996). Pensions, Non-Discrimination Policies, and the Employment of Older Workers. *The Quarterly Review of Economics and Finance, 36 (4),* pp. 417-429.

Gaster, L. (2002). *Past it at 40? A grassroots view of ageism and discrimination in employment*. Bristol : Policy Press.

Gendell, M. (2008). Older workers: increasing their labor force participation and hours of work. *Monthly Labor Review, 131 (1)*, pp. 41-54.

Georgellis, Y., Sessions, J. and Tsitsianis, N. (2007). Pecuniary and non-pecuniary aspects of self-employment survival. *The Quarterly Review of Economics and Finance, 47 (1)*, pp. 94-112.

Ghinetti, P. (n.d.). *Temporary Employment, Job Mobility and Wage Growth in Italy*. Accessed 12/06/2012. Retrieved from http://www.siecon.org/online/wp-content/uploads/2011/03/Ghinetti.pdf

Ginn, J. and Arber, S. (1996) Gender, age and attitudes to retirement in mid-life. *Ageing and Society, 16(1)*, pp.27-55.

Glocker, D. and Steiner, V. (2007). Self-Employment: A Way to End Unemployment? Empirical Evidence from German Pseudo-Panel Data. *IZA Discussion Paper No. 2561*. Accessed 29/10/2011. Retrieved from http://papers.ssrn.com/soL3/papers.cfm?abstract_id=960005

Gomulka, J. and Stern, N. (1990). The Employment of Married Women in the United Kingdom 1970-83. *Economica, 57 (226)*, pp. 171-99.

Gruber, J. and Wise, D.A. (2010). *Social Security Programs and Retirement around the World: The Relationship to Youth Employment*. University of Chicago Press.

Gunderson, M. (2003). Age Discrimination in Employment in Canada. Contemporary *Economic Policy, 21 (3)*, pp. 318-328.

Gustman, A. L. and Steinmeier, T. L. (1986). A structural retirement model. *Econometrica, 54 (3)*, pp. 555–584.

Haardt, D. (2006). Transitions out of and back to employment among older men and women in the UK. *ISER Working Paper 2006-20*. Accessed 10/05/2012. Retrieved https://www.iser.essex.ac.uk/files/iser_working_papers/2006-20.pdf

Hairault, J., Langot, F. and Sopraseuth, T. (2010). Distance to Retirement and Older Workers' Employment: The Case for Delaying the Retirement Age. *Journal of the European Economic Association, 8 (5)*, pp. 1034-1076.

Hakim, C. (1987). Trends in the Flexible Workforce. *Employment Gazette, 95 (11)*, p. 549-560.

Halpin, B. (1997). *Unified BHPS work-life histories: combining multiple sources into a user-friendly format*. ESRC Research Centre on Micro-social Change, University of Essex. Accessed 14/04/2013. Retrieved from http://www.esds.ac.uk/doc/3954/mrdoc/pdf/techpap.pdf

Ham, J. and Rea, S. (1987). Unemployment Insurance and Male Unemployment Duration in Canada. *Journal of Labor Economics, 5 (3)*, pp. 325-353.

Hamilton, B.H. (2000). Does entrepreneurship pay? An empirical analysis of the returns of self-employment. *The Journal of Political Economy, 108 (3)*, pp.604-631.

Handa, J. (1994). *Discrimination, retirement and pensions*. Aldershot : Avebury.

Haurin, D.R. and Sridhar, K.S. (2003). The impact of local unemployment rates on reservation wages and the duration of search for a job. *Applied Economics, 35 (13),* pp. 1469-1476.

Healey, J. F. (2005). *Statistics: a tool for social research* (7th ed.). Belmont, CA: Thomson/Wadsworth.

Hellerstein, J.K., Neumark, D. and Troske, K.R. (1996). Wages, Productivity, and Worker Characteristics: Evidence from Plant-Level Production Functions and Wage Equations. *National Bureau of Economic Research working paper no. 5626*. Cambridge, Mass.

Heywood, J.S., Ho, L.S. and Wei, X.D. (1999). The Determinants of Hiring Older Workers: Evidence from Hong Kong. *Industrial and Labor Relations Review, 52 (3),* pp. 444-459.

Heywood, J.S., Jirjahn, U. and Tsertsvardze, G. (2010). Hiring older workers and employing older workers: German evidence. *Journal of Population Economics, 23 (2),* pp. 595-615.

Hipple, S.F. (2010). Self-employment in the United States. *Monthly Labor Review, 133 (9),* pp. 17-32.

Hirsch, B.T., Macpherson, D.A. and Hardy, M.A. (2000). Occupational Age Structure and Access for Older Workers. *Industrial and Labor Relations Review, 53 (3),* pp. 401-418.

Ho, L.S., Voon, J.P., Wei, X.D. (2000). Are Older Workers Disadvantaged in the Hong Kong Labour Market? *Asian Economic Journal, Vol. 14, No. 3,* pp.283-300.

Hofacker, D. (2010). *Older workers in a globalizing world: an international comparison of retirement and late-career patterns in Western industrialized countries*. Cheltenham: Edward Elgar.

Hong Kong Census and Statistics Department. (1992). *HONG KONG 1991 POPULATION CENSUS FIVE PERCENT SAMPLE DATA SET – USER GUIDE* -. Hong Kong Census and Statistics Department.

Hong Kong Census and Statistics Department. (1997). *Hong Kong 1996 Population By-census 5% percent Sample Data Set - User Guide* -. Hong Kong Census and Statistics Department.

Hong Kong Census and Statistics Department. (2002). *2001 Population Census 5% Sample Data Set -User Guide* -. Hong Kong Census and Statistics Department.

Hong Kong Census and Statistics Department. (2007a). *2006 Population By-census 5% Sample Dataset -User Guide* -. Hong Kong Census and Statistics Department.

Hong Kong Census and Statistics Department. (2007b). *2006 Population*. Accessed 16/03/2011. Retrieved from www.bycensus2006.gov.hk/en/background/index.htm

Hong Kong Census and Statistics Department. (2011). *Hong Kong Annual Digest of Statistics 2011*. Accessed 12/12/2010. Retrieved from http://www.censtatd.gov.hk

Hong Kong Census and Statistics Department. (2012). *Unemployment Rate by Sex and Age*. Accessed 12/12/2010. Retrieved from http://www.censtatd.gov.hk

Hong Kong Census and Statistics Department. *Hong Kong 1991 Population Census 5% percent Sample Dataset*. Hong Kong Census and Statistics Department [distributor].

Hong Kong Census and Statistics Department. *Hong Kong 1996 Population By-census 5% percent Sample Dataset*. Hong Kong Census and Statistics Department [distributor].

Hong Kong Census and Statistics Department. *Hong Kong 2001 Population Census 5% percent Sample Dataset*. Hong Kong Census and Statistics Department [distributor].

Hong Kong Census and Statistics Department. *Hong Kong 2006 Population By-census 5% percent Sample Dataset*. Hong Kong Census and Statistics Department [distributor].

Hotchkiss, J. (2004). Growing part-time employment among workers with disabilities: Marginalization or opportunity. *Economic Review, 89 (3)*, pp. 25-40.

Houseman, S. and Osawa, M. (1995). Part-time and temporary employment in Japan. *Monthly Labor Review, 118 (10)*, pp. 10-18.

Hu, L. (2003). The Hiring Decisions and Compensation Structures of Large Firms. *Industrial and Labor Relations Review, 56 (4)*, pp.663-681.

Humphreys, P.C., Fleming, S. and O'Donnel, O. (2005). Balancing Work and Family Life: The Role of Flexible Working Arrangements. Accessed 19/10/2014. Retrieved from http://www.fsa.ie/publications

Hundley, G. (2001). Why and when are the self-employed more satisfied with their work? *Industrial Relations, 40 (2)*, pp. 293-316.

Hunt, J. (1999). Determinants of non-employment and unemployment duration in East Germany. *Working Paper 7128*. Accessed 09/08/2012. Retrieved http://www.nber.org/papers/w7128

Hutchens, R.M. (1986). Delayed Payment Contracts and a Firm's Propensity to Hire Older Workers. *Journal of Labor Economics, 4 (4)*, pp. 439-457.

Hutchens, R.M. (1988). Do Job Opportunities Decline With Age? *Industrial and Labor Relations Review, 42 (1)*, pp. 89-99.

Hyytinen, A. and Rouvinen, P. (2008). The labour market consequences of self-employment spells: European evidence. *Labour Economics, 15 (2)*, pp. 246-271.

ILO. (1997). Perspectives: Part-time Work – Solution or Trap? *International Labour Review, 136 (4)*, pp. 557-579.

International Labour Office, Department of Statistics. (2012). *Main statistics (monthly) – Unemployment*. Accessed 20/09/2012. Retrieved http://laborsta.ilo.org/applv8/data/c3e.html

Jann, B. (2008a). A STATA implementation of the Blinder-Oaxaca decomposition. *ETH Zurich Sociology Working paper No.5*. Accessed 20/03/2011. Retrieved from http://repec.ethz.ch/rsc/ets/wpaper/jann_oaxaca.pdf

Jann, B. (2008b). OAXACA: Stata module to compute the Blinder-Oaxaca decomposition. [STATA program package]. Accessed 20/03/2011. Retrieved from http://ideas.repec.org/c/boc/bocode/s456936.html

Johnson, A. (2002). *Researchers Guide to Using the British Household Panel Survey and Other International, Longitudinal Datasets*. The UK Department for Work and Pensions. Accessed 14/04/2013. Retrieved from http://www.opengrey.eu/item/display/10068/518300

Jenkins, S.P. (2005). *Survival Analysis*. Unpublished manuscript. Institute for Social and Economic Research, University of Essex, Colchester, UK. Accessed 15/05/2012. Retrieved from www.iser.essex.ac.uk/teaching/degree/stephenj/ec968/pdfs/ec968lnotesv6.pdf

Johnson, J.L. (1983). Sex Differentials in unemployment rates: a case for no concern. *Journal of Political Economy, 91 (2)*, pp. 293-303.

Johnson, R.W. and Neumark, D. (1997). Age Discrimination, Job Separations, and Employment Status of Older Workers: Evidence from Self-Reports. *Journal of Human Resources, 32 (4)*, pp. 779-811.

Johnson, P. and Zimmermann, K.F. (1993). *Labour Markets in an Ageing Europe*. Cambridge: Cambridge University Press.

Kaplan, E.L. and Meier, P. (1958). Nonparametric estimation from incomplete observations. *Journal of the American Statistical Association, 53 (282)*, pp. 487-481.

Karoly, L.A. and Zissimopoulos, J. (2004). Self-employment among older U.S. workers. *Monthly Labor Review, 127 (7)*, pp. 24-47.

Katz, L.F. and Meyer, B.D. (1990). The impact of the potential duration of unemployment benefits on the duration of unemployment. *Journal of Public Economics, 41 (1)*, pp. 45-72.

Keese, M. (2006). *Live Longer, Work Longer*. Paris: Organisation for Economic Co-operation and Development.

Khan, K. (2009). Employment of the older generation. *Economic and Labour Market Review, 3 (4)*, pp. 30-36.

Kim, H. and DeVaney, S.A. (2005). The Selection of Partial or Full Retirement by Older Workers. *Journal of Family and Economic Issues, 26 (3)*, pp.371-394.

Kjeldstad, R. and Nymoen, E.H. (2012). Part-time work and gender: Worker versus job explanations. *International Labour Review, 151 (1-2)*, pp. 85-107.

Kruppe, T., Oschmainsky, H. and Schomamm, K. (1998). Self-employment: Employment Dynamics in the European Union. *Employment Observatory: MISEP Policies, 64*, pp. 33-43.

Kupets, O. (2006). Determinants of unemployment duration in Ukraine. *Journal of Comparative Economics, 34 (2)*, pp. 228-247.

Laczko, F. and Phillipson, C. (1991). *Changing Work and Retirement: Social Policy and the Older Worker*. Milton Keynes : Open University Press.

Lancaster, A. (1985). Generalized Residuals and Heterogeneous Duration Models: With Applications to the Weibull Model. *Journal of Econometrics, 28 (1)*, pp.155-169.

Lancaster, T. (1990). *The Econometric Analysis of Transition Data*. Cambridge : Cambridge University Press.

Levitt,S, D. (2004). TESTING THEORIES OF DISCRIMINATION: EVIDENCE FROM WEAKEST LINK. *Journal of Law and Economics, 47 (2)*, pp. 431-452.

Lissenburgh, S. and Smeaton, D. (2003). *Employment transitions of older workers: The role of flexible employment in maintaining labour market participation and promoting job quality*. Bristol: Policy Press.

Livanos, I., Yalkin, C. and Nunez, I. (2009). Gender employment discrimination: Greece and the United Kingdom. *International Journal of Manpower, 30 (8)*, pp. 815-834.

Lluberas, R. (2007). Labour supply of older workers in the UK: Is there a link with pension provision?. *Pensions: An International Journal, 12 (3)*, pp. 154-163.

Loretto, W. and Vickerstaff, S. (2011). The Relationship between Gender and Age. In E. Parry and S. Tyson (Eds.), *Managing an Age Diverse Workforce* (pp. 59-79). Basingstoke: Palgrave Macmillan.

Loretto, W., Vickerstaff, S. and White, P. (2009). Flexible work and older workers. In W. Loretto, S. Vickerstaff and P. White (Eds.), *The future for older workers: New perspectives* (pp. 139-160). Bristol: Policy.

Loutfi, M.F. (1991). Self-employment Patterns and Policy Issues in Europe. *International Labour Review, 130 (1)*, p. 1-19.

Lui, H.K. (2008). *The Widening Income Dispersion in Hong Kong: 1986- 2006*. Paper presented at the Conference on Social Inequality and Social Mobility in Hong Kong, Hong Kong Chinese University.

Lui, H.K. & Suen, W. (1998). Does School Quality Matter? Evidence from the Hong Kong Experience. *Asian Economic Journal, 12(2)*, pp. 153-170.

MacVaugh, J. and Evans, J. (2012). A re-examination of flexible employment practices in Japan. *The International Journal of Human Resource Management, 23 (6)*, pp. 1245-1258.

Mare, D.C. (2006). Constructing Consistent Work-life Histories: A guide for users of the British Household Panel Survey. *ISER Working Paper 2006-39*. Accessed

14/04/2013. Retrieved from https://www.iser.essex.ac.uk/files/iser_working_papers/2006-39.pdf

Martinez-Granado, M. (2002). Self-employment and Labour Market Transitions: A Multiple State Model. *CEPR Discussion Papers: 3661*, pp. 1-29.

Meghir, C. and Whitehouse, E. (1997). Labour market transitions and retirement of men in the UK. *Journal of Econometrics, 79 (2)*, pp. 327-354.

McCall, J.J. (1970). Economics of Information and job search. *Quarterly Journal of Economics, 84 (1)*, pp. 113-126.

McFall, S.L. (2012). *Understanding Society – UK Household Longitudinal Study: Wave 1-2, 2009-2011, User Manual* (ed.). Colchester: University of Essex. Accessed 14/04/2013. Retrieved from https://www.understandingsociety.ac.uk/system/uploads/assets/000/000/004/original/User__manual_Understanding_Society_Waves__1_2.pdf?1359115559

McGregor, J. and Gray, L. (2002). Stereotypes and older workers: The New Zealand experience. *Social Policy Journal of New Zealand, 18*, pp. 163-177.

McKay, S. and Middleton, S. (1998). Characteristics of Older Workers. Centre for Research in Social Policy. *Research Report No. 45*. Loughborough University. DfEE: London: Retirement Income Inquiry.

McQuaid, R.W., Greig, M. and Adams, J. (2004). Are new deal employment initiatives on target? Evidence from job search success in local labour markets. *International Journal of Manpower, 25 (5)*, pp. 392-410.

Meghir, C. and Whitehouse, E. (1997). Labour market transitions and retirement of men in the UK. *Journal of Econometrics, 79 (2)*, pp. 327-354.

Meyer, B.D. (1990). Unemployment insurance and unemployment spells. *Econometrica, 58 (4)*, pp. 757-782.

Millan, J.M., Congregado, E. and Roman, C. (2012). Determinants of self-employment survival in Europe. *Small Business Economics, 38 (2)*, pp. 231-258.

Miller, C.F. (1997). Structural Change in the Probability of Part-time Participation by Married Women. *Bulletin of Economic Research, 49 (4)*, pp. 257-273.

Miniaci, R. (1998). Microeconometric Analysis of the Retirement Decision: Italy. *OECD Economics Department Working Papers, No. 205*, OECD Publishing. Accessed 04/03/2013. Retrieved from http://dx.doi.org/10.1787/514187844751

Mirkin, B. and Weinberger, M.B. (2000). *The Demography of Population Ageing. Population Division, Department of Economic and Social Affairs, United Nations*. Accessed 08/01/2013. Retrieved from http://www.un.org/en/development/desa/population/events/pdf/expert/1/weinbergermirkin.pdf

Mohanty, M.S. (1998). Do US employers discriminate against females when hiring their employees? *Applied Economics, 30 (11)*, pp. 1471-1482.

Morris, D. and Mallier, T. (2003). Employment of Older People in the European Union. *Labour, 17 (4)*, pp. 623-648.

Mortensen, D.T. (1977). Unemployment insurance and job search outcomes. *Industrial and Labor Relations Review, 30 (4)*, pp. 595-612.

Mosisa, A. and Hipple, S. (2006). Trends in Labor Force Participation in the United States. *Monthly Labor Review, 129 (10)*, pp. 35-57.

Muhleisen, M. and Zimmermann, K.F. (1994). New Patterns of Labour Mobility: A panel analysis of job changes and unemployment. *European Economic Review, 38 (3-4)*, pp. 793-801.

Nardone, T. (1995). Part-time Employment: Reasons, Demographics, and Trends. *Journal of Labor Research, 16 (3)*, pp. 275-291.

Narendranathan, W. and Stewart, M. (1993). Modelling the probability of leaving unemployment: competing risks models with flexible baseline hazards. *Journal of the Royal Statistical Society. Series C* (*Applied Statistics), 42 (1)*, pp. 63-83.

National Bureau of Economic Research. (2012). *Current Population Survey (CPS) Data at the NBER*. Accessed 02/03/2011. Retrieved from http://www.nber.org/cps/

Neuman, S. & Oaxaca, R.L. (1998). Estimating Labour Market Discrimination with selectivity corrected wage equations: methodological considerations and an illustration from Israel. *Discussion Paper Series no. 1915*. London : Centre for Economic Policy Research.

Neumark, D. and Stock, W.A. (1999). Age Discrimination Laws and Labor Market Efficiency. *Journal of Political Economy, 107 (5)*, pp. 1081-1124.

Ng, Y.C. (2001). Overeducation and undereducation and their effect on earnings: evidence from Hong Kong, 1986-1996. *Pacific Economic Review, 6:3*, pp. 401-418.

Nielsen, H.S. (1998). Discrimination and detailed decomposition in a logit model. *Economics Letters, 61 (1)*, pp. 115-120.

NOP Social and Political. (2001). *Evaluation of the Code of Practice on Age Diversity in Employment: Report of Research Findings*. Department for Work and Pensions. Accessed 19/02/2011. Retrieved from http://research.dwp.gov.uk/asd/asd5/rports2005-2006/agepos14.pdf

Oaxaca, R.L. (1973). Male-Female Wage Differentials in Urban labor markets. *International Economic Review, Vol. 14, no. 3*, pp. 693-709.

OECD. (1998). *Employment Outlook 1998: Chapter 4 Work-force Ageing in OECD Countries*. Accessed 09/02/2013. Retrieved from www.oecd.org/els/employmentpoliciesanddata/2080254.pdf

Office for National Statistics, Social and Vital Statistics Division and Northern Ireland Statistics and Research Agency, Central Survey Unit. *Labour Force Survey 2001 — 2010*. Colchester, Essex: UK Data Archive [distributor].

Osberg, L. (1993). Is it retirement or unemployment? Induced 'retirement' and constrained labour supply among older workers. *Applied Economics, 25*, pp. 505-519.

Pagan, R. (2009). Part-time work among older workers with disabilities in Europe. *Public Health, 123 (5)*, pp. 378-383.

Pagan, R. (2012). Transitions to part-time work at older ages: the case of people with disabilities in Europe. *Disability and Society, 27 (1)*, pp. 95-115.

Parker, S.C. (2004). *The Economics of Self-employment and Entrepreneurship*. Cambridge: Cambridge University Press.

Parker, S.C. and Rougier, J.C. (2007). The retirement behaviour of the self-employed in Britain. *Applied Economics, 39 (6)*, pp. 697-713.

Paull, G. (2003). *BHPS Employment Histories: User Guide. Institute for Fiscal Studies*. Accessed 14/04/2013. Retrieved from http://www.esds.ac.uk/doc/4705/mrdoc/pdf/4705userguide.pdf

Pedersen, P.J. and Westergard-Nielsen, N. (1993). UNEMPLOYMENT: A REVIEW OF THE EVIDENCE FROM PANEL DATA. *OECD Economic Studies No.20*. Accessed 16/05/2012. Retrieved from http://www.oecd.org/eco/growth/33948388.pdf

Peracchi, F. and Welch, F. (1994). Trends in Labor Force Transitions of Older Men and Women. *Journal of Labor Economics, 12 (2)*, pp. 210-242.

Raghuram, S., London M. and Larsen H.H. (2001). Flexible employment practices in Europe: country versus culture. *The International Journal of Human Resource Management*, 12 (5), pp.738-753

Reday-Mulvey, G. (2005). *Working beyond 60: key policies and practices in Europe*. Basingstoke: Palgrave Macmillan.

Reilly, P. (2000). *Flexibility at Work: Balancing the Interests of Employer and Employee*. Aldershot, Hampshire, England.

Reize, F. (2000). Leaving Unemployment for Self-employment: A Discrete Duration Analysis of Determinants and Stability of Self-employment among Former Unemployed. *ZEW Discussion Paper No. 00-26*. Accessed 27/05/2012. Retrieved from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=461522

Reynolds, J. (2003). You Can't Always Get the Hours You Want: Mismatches between Actual and Preferred Work Hours in the United States. *Social Forces, 81 (4)*, pp. 1171-1199.

Richard, S. (2007). Wage Determination and Gender Discrimination in Uganda. Economic Policy Research Centre (EPRC), *Research Series No. 50*. Accessed 29/11/2010. Retrieved from www.eprc.or.ug/pdf_files/researchseries/series50.pdf

Rones, P.L. (1983). The Labor Market Problems of Older Workers. *Monthly Labor Review, 106 (5)*, pp.3-12.

Ruhm, C.J. (1990). Bridge Jobs and Partial Retirement. *Journal of Labor Economics, 8 (4)*, pp. 482-501.

Schur, L. (2002). Dead end jobs or a path to economic well being? The consequences of non-standard work among people with disabilities. *Behavioral Sciences and the Law, 20 (6)*, pp. 601-620.

Scott, F.A., Berger, M.C. and Garen, J.E. (1995). Do Health Insurance and Pension Costs Reduce the Job Opportunities of Older Workers? *Industrial and Labor Relations Review, 48 (4)*, pp. 775-791.

Smith, T. and Smith, B. (2004). *Kaplan Meier And Cox Proportional Hazards Modeling: Hands On Survival Analysis*. Accessed 25/10/2014. Retrieved from http://www.lexjansen.com/wuss/2004/hands_on_workshops/i_how_kaplan_meier_and_cox_p.pdf

Sok, E. (2010). Record unemployment among older workers does not keep them out of the job market. *Issues in Labor Statistics, Summary 10-04*. U.S. Bureau of Labor Statistics. Accessed 29/11/2010. Retrieved from http://www.bls.gov/opub/ils/summary_10_04/older_workers.htm

StataCorp. (2005). *Stata base reference manual volume 2 K-Q: release 9*. College Station, TX: StataCorp LP.

Stewart, M.B. (2004). The Impact of the Introduction of the U.K. Minimum Wage on the Employment Probabilities of Low-wage Workers. *Journal of the European Economic Association, 2 (1)*, pp. 67-97.

Stewart, J.M. (2001). The impact of health status on the duration of unemployment spells and the implications for studies of the impact of unemployment on health status. *Journal of Health Economics, 20 (5)*, pp. 781-796.

Tatsiramos, K. (2010). Job displacement and the transitions to re-employment and early retirement for non-employer older workers. *European Economic Review, 54 (4)*, pp. 517-535.

Taylor, M. (2011). Employment and Unemployment at a Time of Recession. In S.L. McFall and C. Garrington (Eds.). *Early findings from the first wave of the UK's household longitudinal study* (pp. 44-53). Colchester: Institute for Social and Economic Research, University of Essex.

Taylor, M.P. (1996). Earnings, Independence or Unemployment: Why Become Self-employed? *Oxford Bulletin of Economics and Statistics, 58 (2)*, pp. 253-266.

Taylor, M.P. (1999). Survival of the fittest? An analysis of self-employment duration in Britain. *The Economic Journal, 109 (454)*, pp. 140-155.

Taylor, P. and Walker, A. (1992). What are employers doing to diffuse the "demographic time bomb"? *Skills and Enterprise Briefing, Document 21/92*, HMSO.

Taylor, M.F., Brice, J., Buck, N. and Prentice-Lane, E. (2010). *British Household Panel Survey User Manual Volume A: Introduction, Technical Report and Appendices* (ed.).

Colchester: University of Essex. Accessed 08/04/2013. Retrieved from https://www.iser.essex.ac.uk/bhps/documentation/pdf_versions/index.html

Theeuwes, J., Kerkhofs, M. and Lindeboom, M. (1990). Transition intensities in the Dutch labour market 1980-85. *Applied Economics, 22 (8)*, pp. 1043-1061.

The Bureau of the Census for the Bureau of Labour Statistics. *Annual Social and Economic Supplements to the Current Population Survey 2003-2010*. New York: NBER [distributor].

The Department for Work and Pensions. (2014). Fuller Working Lives: A Framework for Action. Accessed 20/06/2014. Retrieved from www.gov.uk/government/uploads/system/uploads/attachment_data/file/319872/fuller-working-lives.pdf

The United Nations. (2000). *World Population Monitoring 1999: population growth, structure and distribution*. United Nations: Department of Economic and Social Affairs.

Thurman, J.E. and Trah, G. (1990). Part-time work in international perspective. *International Labour Review, 129 (1)*, pp. 23-40.

Tilly, C. (1991). Reasons for the continuing growth of part-time employment. *Monthly Labor Review, 114 (3)*, pp. 10-18.

Toossi, M. (2009). Employment outlook: 2008-18, Labor force projections to 2018: older workers staying more active. *Monthly Labor Review, 132 (11)*, pp. 82-123.

UK Data Archive Study Group. (2009). *Labour Force Survey User Guide—Volume 1: Background and Methodology*. Accessed 11/03/2011. Retrieved from http://www.esds.ac.uk/

UK Data Archive Study Group. (2011). *Labour Force Survey User Guide—Volume 2: 2011 Questionaire*. Accessed 29/10/2010. Retrieved from http://www.esds.ac.uk/

U.S. Bureau of Labour Statistics. (n.d.). *Labour Force Statistics from the Current Population Survey*. Accessed 18/03/2011. Retrieved from http://stats.bls.gov/cps/home.htm

U.S. Census Bureau. (n.d.). *Current Population Survey*. Accessed 18/03/2011. Retrieved from http://www.census.gov/cps/

U.S. Department of Labor, Bureau of Labor Statistics. (1999). *Employment and earnings*. Washington DC: U.S. Government Printing Office.

Wenger, J.B. and Reynolds, J. (2009). Older Married Workers and Nonstandard Jobs: The Effects of Health and Health Insurance. *Industrial Relations, 48 (3)*, pp.411-431.

Wooldridge, J.M. (2006). *Introductory Econometrics: A Modern Approach* (3rd ed.). Cincinnati, OH: South-Western College.

Yoon, B.J. (1981). A Model of Unemployment Duration with Variable Search Intensity. *The Review of Economics and Statistics, 63 (4)*, pp. 599-609.

Zissimopoulos, J.M. and Karoly, L.A. (2007). Transitions to self-employment at older ages: The role of wealth, health, health insurance and other factors. *Labour Economics, 14 (2),* pp. 269-295.

Zissimopoulos, J.M. and Karoly, L.A. (2009). Labor-Force Dynamics at Older Ages: Movements Into Self-employment for Workers and Nonworkers. *Research on Aging, 31 (1),* pp. 89-111.