UNEMPLOYED AND SCARRED FOR LIFE?

Longitudinal Analyses of How Unemployment and Policy Changes Affect Re-employment Careers and Wages in the Netherlands, 1980-2000

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1.1 Introduction

Unemployment is an important determinant of socio-economic inequalities in modern societies. At the individual level, its experience not only damages individuals' employment careers, but may also inflict significant risks of downward earnings spirals over time. These negative effects may cumulate over time and act separately or jointly to undermine and 'scar' the social and economic lives of individuals. At the societal level, unemployment not only leads to economic slowdowns, but may also place a heavy burden on governments to maintain the welfare of its citizens. It is for these reasons that unemployment has become an urgent issue in modern societies and one of the most widely studied topics in labor market research. Since the marked rise in unemployment levels during the early 1970s, different models and theories have been put forward to specify determinants and explain sources of unemployment.[1] Initially, the literature concentrated on the role of economic slowdowns in the evolution of unemployment (Blanchard 2005). However, when unemployment levels remained high in the 1980s, the unemployment literature shifted its focus to the role of overgenerous systems of unemployment insurance (UI) benefits on the evolution of unemployment (Blanchard 2005). The generosity of UI benefits was seen as the main culprit for the 'European unemployment disease', whereas cut-offs in the level and duration of UI benefits were considered as the cure for the unemployment problem (Blanchard and Katz 1997; Freeman 2005).

Research on the link between UI benefits and persisting unemployment levels is divided along two theoretical positions. The first position attributes rising unemployment levels to generous UI benefit systems that reduce labor market flexibility and lower workers' incentives to find a job. Here the underlying assumption is that generous UI benefits lead to a lower job search intensity, which in turn increase workers' unemployment durations and the unemployment levels in a country (Narendranathan et al. 1985; Johnson and Layard 1986; Devine and Kiefer 1991; Holmlund 1998; Nickell 1997; Abbring Van den Berg and Van Ours

[1] See Appendix A for a brief historical review on the unemployment debate

2005). The second and growing position argues the contrary, by putting forward the positive role of UI benefits to shelter workers from the socio-economic implications of unemployment. Here the underlying assumption is that UI benefits operate as a search subsidy that improves job-matching, increases the employment stability and therefore leads to positive labor market prospects after unemployment (Burgess and Kingston 1976; Belzil 1995; DiPrete and McManus 1996; DiPrete 2002; Gangl 2004; Pollman-Schult and Büchel 2005).

Although important progress has been made to investigate the link between UI benefits and unemployment duration important theoretical and methodological challenges remain in this field. First, it is striking to witness that within existing research the disincentive and shielding effects of UI benefits have been studied in virtual isolation from each other. Thus, there is a dominant literature on the negative effects of UI benefits and a meager but growing literature on the positive effects of UI benefits. So far, there has been less interest to integrate the findings of both research positions to understand what mechanisms make UI benefits such a fundamental element during the unemployment and post-unemployment periods. As a result, the tradeoff between lower search intensities in the short-term and positive labor market outcomes in long-term has remained irreconcilable in existing literature. This tradeoff is important because it not only provides a more balanced view on UI benefit effects, but also creates a framework from which existing theory can be advanced and developed further.

Job search theory provides a theoretical explanation for the UI benefit effects with a supply-side model, which assumes that unemployed job seekers require time to find a job that matches their skills and money to cover these search costs (Mortensen 1977; Devine and Kiefer 1991). However, while the theory expects the *duration* and *level* of UI benefits to determine workers' incentives to work, the majority of research has summarized the impact of UI benefits mostly in terms of the benefit level. In reality, the institutional structure of UI benefits consists of three main dimensions, notably – the level, duration and eligibility conditions – that not only vary across individuals, but has also been object of constant changes in many European countries. Yet, how changes in these dimensions of UI benefits affect workers' incentives to work depending on one's social group (e.g., gender, age and groups with different employment histories), or across economic cycles remains unclear in existing literature.

Finally, the measurement of UI benefit effects remains challenging. Over the past years, the UI benefits literature has had difficulty in separating the effects of UI benefits from the effects of the past labor market history and economic cycles that determine the conditions for benefit entitlement (see for a review Meyer 1994; Besley and Case 1994). To overcome this concern, many studies have adopted a 'quasi-experimental' approach that uses institutional changes (such as UI reforms) as a source to separate these effects. In this approach, the 'treatment' variable is central and distinguishes between a group of unemployed workers affected by the policy change (treatment group) versus a group of unemployed workers unaffected (control group). To construct the treatment variable, researchers have relied on workers' past employment and earnings history. However, since attributes related to workers' previous employment history are difficult to measure, many studies have used age as a proxy for an individual's work duration (e.g., Katz and Meyer 1990; Roed and Zhang 2002; Lalievé et al. 2004; Van Ours and Vodopivec 2005; 2007). Such a proxy misses the important dimensions of workers' employment histories, including the continuous or fragmented features of their careers. Therefore, this proxy may lead to an inappropriate classification of the treatment and control group, thereby underestimating UI benefit effects.

The aim of this thesis is to build upon and extend existing literature by focusing on the employment career and wage trajectories of unemployed workers, while emphasizing the changing character of UI benefit policies. More specifically, there are two main reasons underpinning the choice of this research topic. The first is theoretical, with the aim to build a conceptual framework that adds a sociological perspective on the overwhelmingly economic approach used so far to explicate UI benefit effects. The sociological perspective in this thesis views (un)employment transitions as a series of pathways, embedded in a process of long-term stability and change, rather than a number of single and detached labor market transitions. Beyond this, the sociological perspective in this thesis takes the heterogeneity and diversity of social groups into account rather than the average development or trend. For example, policy reforms in UI benefits may not have a blanket effect on all social groups (e.g., women, low and high educated, workers with short and long employment histories), but may impose different effects on their employment careers and wages. More specifically, while policy reforms may improve the careers and wages of some individuals, they may unequally affect the re-

employment prospects and wages of others. A first key motivation of this research is, thus, to identify elements of unemployment and policy reforms that have the potential to create or even intensify inequalities in the employment careers and wages of workers. A second motivation is an empirical one, which is to understand to what extent early life course conditions (i.e., unemployment) or restrictions (i.e., UI reforms) shape the later employment careers and wages of workers. The timing of certain life course events can set up a negative chain of experiences in the subsequent employment and wage perspectives of individuals. For example, an unemployment spell may lead to 'low-pay-no-pay' circles, whereas an UI reform may lead to a chain of negative occupational shifts. In other words, the past may significantly affect the later socioeconomic status of individuals.

This thesis is about the Netherlands and will therefore empirically test and illustrate the UI benefit effects in this country. The Netherlands is an exceptionally good country to test the impact of UI benefit effects because it not only reflects the general trends in unemployment figures in comparison with other European countries, but has also undergone deep reconstructions in the UI benefit system over the past decades. The considerable UI reforms during the 1980s and 1990s transformed the Netherlands from a country with greater solidaristic and generous benefit systems to one of the most tailored systems in the world (Van Oorschot 1998). The exogenous variations from these UI reforms, that changed respectively the level, duration and eligibility conditions, act as a 'natural experiment' and make the Netherlands an instructive case to understand both the negative and positive effects of UI benefits among different social groups and over time. Longitudinal data from the OSA[2] Labor Supply Panel will be used, which consists of detailed information on workers' individual careers and wages in the Netherlands from 1980-2000.

The innovative approach taken in this thesis is threefold. First, in theoretical terms it builds a conceptual framework that links the literature on the socio-economic implications of unemployment with the job search literature. The former includes scarring (e.g., Heckman and Borjas 1980), signaling (e.g., Phelps

[2] OSA stands for the Organization for Strategic Labor market research (*Organisatie voor Strategisch Arbeidsmarktonderzoek*) and was collected by the Institute for Labor Studies in Tilburg, the Netherlands. For more details see:
http://www.tilburguniversity.nl/osa/organization/hrm.html

1972; Lockwood 1991) and human capital theories (e.g., Becker and Tomes 1986; Becker 1962), which pin down the socio-economic and human capital implications of unemployment that may accumulate over time. The latter includes the literature on job search theory (e.g., Mortensen, 1977; Lippman and McCall, 1976) and evidence on the effects of UI reforms that delve into both individual variation in job search behavior and contextual factors. The blend of theories enables this thesis to test hypotheses of job search theory under different circumstances (e.g., changing dimensions of UI benefits and economic cycles) and across different social groups (e.g., women, low and high educated, workers with short and long employment histories) that have been rare in other studies. Second, in methodological terms, this thesis combines longitudinal panel data with detailed retrospective information on labor market histories to model the impact of UI reforms based on workers' employment histories rather than age. In doing so, this study sets up the conditions to create a measure that not only specifies 'whether' workers are influenced by a policy reform, but also provides a richer understanding of 'how much' this is the case. Finally, in empirical terms, this thesis provides a frame that evaluates the changes in the Dutch UI benefit system from the perspective of an individual worker. In addition, it provides a detailed picture of potential inequality in policy-reforms, but also evidence-based policy recommendations regarding which changes impact which types of individuals or circumstances.

1.2 Main Research Questions

Before summarizing the outline of this thesis, it is useful to provide an overall overview of the research questions, background literature, data, design, and statistical modeling that are used in the separate chapters. A brief overview is provided in Table 1.1

Table 1.1 An Overview of the Empirical Chapters

	Chapter 2	***Chapter 3***	***Chapter 4***
Research Questions	To what extent do the occurrence, duration, and the number of earlier unemployment influence: (a) the probability of individuals to return to unemployment and (b) their post-unemployment wages?	To what extent do restrictions in the UI benefit level, duration and eligibility criteria impact both the rate and type of exit out of unemployment (i.e., to employment or out of the labor force entirely) across different social groups and over time?	To what extent do restrictions in the UI benefit level, duration and eligibility conditions impact workers' wage trajectories across different social groups and over time?
Theoretical Background	Job search theory, Signaling theory and Human capital theory and the concept of Cumulative advantage/disadvantage.	A combination of the Job search theory and Human capital theory.	A combination of the Job search theory and Human capital theory.
Dependent Variable(s)	**(a)** The probability of re-experiencing unemployment **(b)** Post-unemployment wages.	The duration of unemployment before the transition to re-employment (and in some analyses also to non-participation).	Post-unemployment wages.
Data	OSA panel data with: **(a)** 3,653 unemployment observations spread over 2,585 workers. **(b)** 16,655 biannual wage observations over 3,602 workers.	OSA panel data with: 4,399 spells of unemployment from 1,788 respondents.	OSA panel data with: 2,887 biannual wage observations spread over 1,151 respondents.

Table 1.1 An Overview of the Empirical Chapters (Continued)

	Chapter 2	***Chapter 3***	***Chapter 4***
Design	Comparing workers once unemployed with those equivalent workers in continuous employment.	Comparing the exit rates of workers affected by the policy reforms with those unemployed workers not affected by the policy changes.	Comparing the subsequent earnings of those workers affected by the policy reforms with the subsequent earnings of those unemployed workers not affected by the policy changes.
Statistical Models	Lagged-time design including: *Fixed-effect models in combination with Heckman Selection procedure for estimation of wage effects *Random-effect (dynamic) probit models.	Event history designs including: * Fixed-effect proportional-hazards model (Cox) * Fixed-effects marginal-likelihood model (Weibull) Models * Fixed-effects marginal-likelihood model with Gamma Distribution.	Difference-in-Difference design including: * Fixed-effects models combined with Heckman Selection procedure to correct for selection bias * Triple-Difference Estimator.

1.2.1 General and Specific Research Questions

The General Research Question

Although, empirical research has taken significant strides to understand how UI benefits may drive unemployment rates, important questions have remained unexplored. In this thesis, theoretical arguments are developed that predict and illustrate the existence of a positive role of UI benefits on the labor market prospects of individuals. In doing so, the thesis draws attention on the essential functions of UI benefits as a social institution that attempts to insure, stabilize, and reduce the socio-economic inequalities during and after periods of unemployment. If this is the case, any restrictive change in the UI benefit level, duration and eligibility conditions is expected to imply an additional negative effect on individuals' employment careers and their wages, thereby widening the extremes of socio-economic inequalities in modern societies. To shed more light on the

dynamic processes between unemployment and changing UI benefit structures, this thesis will be guided by the following general research question:

How are individuals' subsequent employment careers and wage trajectories influenced by unemployment and by changing UI benefit policies over time?

This thesis answers this general research question through the discussion of three interrelated specific research questions that place the role of UI benefits at the center of theoretical discussion and empirical operationalization. Three separate empirical chapters will address the answers to these specific research questions, which are interrelated in two central ways. First, all the studies explore how processes of unemployment vary as a function of individual-level characteristics and labor market histories, with an additional focus on the changing UI benefit policies. In addition, unemployment reoccurrence, unemployment duration, re-employment transitions/outcomes and post-unemployment wages are examined in the chapters to assess related but different aspects of the unemployment process. This will enable this thesis to show different facets of the same unemployment problem. Second, the studies are related by the use of the OSA Labor Supply Panel from waves 1985-2000. The large amount of life-history information, including detailed retrospective information on transitions in and out unemployment together with up-to-date labor market history information, has made this dataset useful for all of the three chapters. Below, the specific research questions in each separate chapter will be highlighted briefly.

Specific Research Question of Study One

The first specific research question is concerned with the short and long-term effects of unemployment on re-employment and wage trajectories of individuals. Using the literature on scarring provides various hypotheses about the nature and persistence of the scarring effects that will be addressed in the following sub-question:

To what extent do the occurrence, duration, and the number of earlier unemployment influence: (a) the probability of individuals to return to unemployment and (b) their post-unemployment wages?

One important aspect of this research question is that it decomposes previous unemployment into three separate dimensions. These are the occurrence, duration, and incidence of unemployment, which are assumed to be pivotal in the extent to which individuals' employment careers and wages become scarred over time. This is necessary to estimate the combined effect of these dimensions, which may be much higher than assumed in existing research. Beyond the investigation of unemployment scarring, this research question will explore the variation by the level of unemployment insurance benefits and key individual-level characteristics such as workers' education level and age. Finally, the research question will specifically focus on the distinction between male and female post-unemployment outcomes, which has been rare in research on this topic.

Specific Research Question of Study Two

The second specific research question draws attention to the potential stratifying effects arising from policy reforms in UI benefits. Drawing from job search theory, a list of hypotheses will explore the following broader research question:

To what extent do restrictions in the UI benefit level, duration and eligibility criteria impact both the rate and type of exit out of unemployment (i.e., to employment or out of the labor force entirely) across different social groups and over time?

Central in this research question is the empirical examination of some drastic and diverse changes that took place in the Netherlands during the 1980s and 1990s. These UI reforms created different eligibility groups that were related to one's age, previous wages, and employment history. By putting central the differences among the eligibility groups, this research question examines the variation of UI reform effects across different social groups (e.g., by sex, diverse employment histories) and over time. This is necessary to test whether extensions of the UI potential benefit duration lead to longer unemployment spells and whether restrictions produce the opposite effect of shorter unemployment durations. Finally, by examining the type of exists out of unemployment, this research question tests whether restrictions in UI benefits go hand-in-hand with higher rates of withdrawals from the labor market.

Specific Research Question of Study Three

Finally, the last specific research question will focus on the effects of restrictive changes in the UI benefit level, duration and eligibility conditions on individuals' wage trajectories. Hypotheses about the wage trajectories of individuals will be central in the following research question:

To what extent do restrictions in the UI benefit level, duration and eligibility conditions impact workers' wage trajectories across different social groups and over time?

The wage trajectories between those affected versus unaffected individuals will play a key role in this specific research question. Especially, understanding how patterns of re-employment wage penalties vary between individuals and across time is key to unravel whether and how soon affected individuals recover from any wage penalty arising from policy reforms.

1.3 Background and Definitions

Before turning to issues pertaining to the data, design and statistical models used throughout this thesis, it is important to define some of the main concepts used in the overarching and specific sub-questions in order to understand the work that follows.

1.3.1 The Terminology and Practice of 'Unemployment'

Periods of joblessness have been a common phenomenon in the life course of individuals and have been documented since ancient history[3]. Although unemployment has often been an inevitable part in the life and thoughts of many workers, the terminology of 'unemployment' and its meaning has evolved over time. During the 17th and 18th century, terms such as 'out of work', 'idle' or 'involuntary idle' were used as substitutes for the unemployed. However, it was not earlier than the 1850s and 1870s, that the word 'unemployed' became common and widespread in the US (Keyssar 1986:3). During this period the concept emphasized those not at work and it was nearly two decades later when the shift was made from a verb to a noun. In Europe, the concept went through a similar evolution and was

[3] Documentation referring to periods of joblessness have been found in texts as early as the Holy Bible (Matt. 20: 6-7)

first used in Oxford's English dictionary around the mid 1890s in England (Garraty 1978). In the Netherlands, it was around the same period when 'unemployment' was used as a term for those involuntary out of work and in around 1895 the first attempt was made to count the unemployed (Rodenburg 2001). During the depression of the 1870s unemployment started to become a prominent event in the lives of many workers, but it became a dominant economic issue within academic research and public policy during the beginning of the twentieth century (Vedder and Gallaway 1993). By 1930, there was an explosion of academic papers dealing with issues of measurements and determinants of unemployment (Vedder and Gallaway 1993).

1.3.2 Unemployment and Socioeconomic Inequalities

Contemporary economic literature distinguishes between different forms of unemployment such as frictional, seasonal, structural, or cyclical unemployment and many definitions, which relate to *causes* of unemployment (e.g., voluntary versus involuntary unemployment) and the *cures* of unemployment (e.g., preventive measures) (Hughes and Perlman 1984). This thesis is concerned with the structural component of unemployment and considers unemployment as an involuntary state of nonparticipation that often lies beyond one's control. One of the central issues in this thesis is its concern with the socio-economic inequalities that arise from unemployment. Unemployment is an important mechanism that creates inequalities in the employment careers and wages of individuals in modern societies. There are various explanations to understand why unemployment has such an inequality-enhancing impact. First, the risks of unemployment are unequally higher among the low-skilled, immigrants, women and older workers (Gangl 2007; DiPrete 1981), which make these groups more prone to patterns of poverty and social exclusion. The exclusion applies not only to economic opportunities such as the buildup of pensions and unemployment insurance benefits, but also to social activities such as participation in the life of a community (Sen 1997). In this way, unemployment not only creates patterns of inequality by disadvantaging vulnerable social groups in the labor market, but also leads to discouraged inactivity that may end with expressions of frustration such as possible violent protests (Schmid 2002).

Second, unemployment experiences often lead to the depreciation of skills attained during education and work experiences, which altogether are referred to in the literature as human capital (Gregg 2001; Heckman and Borjas 1980). This loss of human capital decreases the chances of future employability and pushes individuals to accept jobs of a poorer quality, making them more vulnerable to recurrent spells of unemployment. Such recurrent spells of unemployment govern workers' future readiness to work and may in turn cause future unemployment spells that lead to downward occupational spirals. The causal relationship between past unemployment history and the current occurrence of unemployment is often referred to in the literature as 'unemployment state dependence'.

Finally, unemployment not only damages workers' labor prospects by discouraging workers to find new employment and by stigmatizing unemployed workers, but also leaves a 'scar' in their wages, which may grow larger over time. As a result, inequalities in the social (e.g., occupational status) and economic (e.g., earnings) status between those who have and those who have not experienced unemployment widen with the passage of time. The downward effects of unemployment on both an individual's employment career and their wages are referred to in the literature as the 'scarring' effects of unemployment. As such, this terminology will be also used in this thesis. This study is especially concerned with the social inequalities that arise from distinct labor market transitions. A transition into unemployment or non-participation (e.g., out of the labor market) is expected to negatively affect occupational status and thereby the social position of individuals. Throughout the chapters that follow, this thesis distinguishes between: (1) single and multiple transitions from unemployment-to-employment; and, (2) transitions from unemployment-to-non-participation. Economic inequalities on the other hand refer to the disparities in wages between those once unemployed and those who remained in continuous employment. The term 'wage penalty' is used as an indication for how much income individuals lose in their wages as a result of unemployment or changing structures in UI benefits compared to otherwise equivalent workers not affected by unemployment or by policy changes.

1.3.3 Unemployed and Non-employed

Although unemployed seems to be a straightforward concept, there is a fine distinction between the 'unemployed' and 'non-employed'. The interpretation of

the first group applies to those with a strong labor market attachment who are actively looking for a job, whereas the second group applies to those not participating in the labor market and not looking for a job. To provide a more appropriate definition for the unemployed and to make unemployment figures comparable across countries, the International Labor Organization (ILO) has developed standard guidelines to categorize individuals as unemployed (ILO 1982)[4]. According to the ILO guidelines, the 'unemployed' comprise all persons that are: (a) without work, i.e., not in paid employment or self-employment; (b) currently available for work, i.e., available for paid employment or self-employment during the reference period; and (c) seeking work, i.e., take specific steps in a specified reference period to seek paid employment or self-employment.

In this thesis the definition of the term 'unemployed' is determined by the data or in other words, the way in which the unemployment status has been asked to the respondents during the data collection. A series of questions allow us to come closer to the definition of unemployed as used by the ILO. One important question is: *What is your labor market situation at the time of interview?*[5] Among others, respondents may choose among the categories 'unemployed and searching for a job' and 'unemployed and not looking for a job'. In doing so, the unemployed are easy to separate from the non-employed. Another question used to sort out the unemployed from the non-employed is: *Are you registered in the employment office?*[6] Identifying those registered in the employment office helps to distinguish between those taking specific steps to seek paid-employment from those non-employed not seeking actively a job.

Unlike a classic situation with a strict division between unemployed and non-employed, this thesis will also consider groups of individuals that as result of policy changes experience a shift in their status from unemployed to non-employed. These are mostly groups that become ineligible for UI benefits due to benefits based on previous work history often young workers, immigrants, the

[4] For the definition of unemployment adopted by the 13th International Conference of Labor Statisticians (ICLS), see the relevant section of the resolution (Resolution concerning statistics of the economically active population, employment, unemployment and underemployment, 13th International Conference of Labor Statisticians, Geneva, 1982); website: http://www.ilo.org/public/english/bureau/stat/download/res/ecacpop.pdf.
[5] This is variable ca001_ in the original OSA dataset
[6] This is variable fb001_ in the original OSA dataset

long-term unemployed and women with fragmented work careers. These groups become discouraged to re-enter the labor market, withdraw from the labor market and often form a so-called 'hidden unemployment' group that flows into disability schemes or other welfare state programs such as social assistance in a country (Koning and Van Vuren 2006). It is beyond the scope of this thesis to investigate the effects of 'hidden unemployment' on individuals' employment careers. However, in chapter 3, of this thesis we will attempt to uncover whether and to what extent individuals are at risk of experiencing periods of non-employment as result of policy reforms.

1.3.4 Unemployment Insurance Benefits

UI benefits emerged during the beginning of the twentieth century in most Western European countries and aimed at shielding workers from the financial consequences of unemployment (Holmlund 1998). In this thesis, UI benefits are defined as a social institution that operates as income volatility smoother in periods of unemployment, and provides time and money to finance the job search process. In the Netherlands, but also in other Western countries, the right to receive an UI benefit is not as straightforward as it might seem. An important condition for the claim of UI benefits is involuntary unemployment. If individuals enter unemployment voluntary or as result of bad behavior UI benefits will be refused. Another condition is the individuals' work history with a certain number of previous weeks or years of employment required. If an unemployed worker has worked for a limited time, UI benefits may be denied. This can be a huge disadvantage for women, younger workers, and immigrants with interrupted careers or short employment histories who fail to satisfy the eligibility conditions related to the employment length. In contrast to some theoretical models that assume that UI benefits are paid for an infinite period of time (see Johnson and Layard 1986), in practice, the level and duration of UI benefits are determined on an individual basis, which depend on an individuals' employment history and their last earned incomes (WRR 1985). Once in receipt of UI benefits, unemployed workers are under strict monitoring from employment agencies that constantly verify whether they make efforts to find new employment. Moreover, they have to cooperate with training and schooling activities and accept suitable jobs. Taken together the institutional structure of UI benefits consists of three dimensions,

notably: the eligibility conditions, which depend on the combination between one's employment history and last earned wages; the level of UI benefits that depends on one's last earned wages and finally the duration of UI benefits that depends on one's previous employment history. It is not surprising to note that only a fraction of the unemployed receive UI benefits. The other group of the unemployed that does not receive UI benefits consists of those (a) who have voluntarily quit their job, and (b) workers that have been disqualified because of failure to carry out search activities.

1.3.5 The Dutch UI Benefit System and the UI Benefit Reforms

In the Netherlands, the Unemployment Insurance Act (Werkloosheidsverzekerings Wet) dates back to 1949. After the Second World War, a high labor demand, swift economic growth and low unemployment levels characterized the Dutch labor market. It was around the 1970s when unemployment started to become a problem and when the UI benefit system, like in many other Western countries, started to receive a critical attention. The reason for this negative attention was related to the high number of UI benefit claimants, an increase in unemployment rates and a low economic growth (Van Ours 2003).

Before the 1980s, eligibility conditions were relatively simple. To become eligible for UI benefits, individuals should have worked at least 13 weeks prior to their involuntary job interruption. If this condition was satisfied, individuals were entitled to UI benefits that amounted to 80% of their last earned incomes for a period of a maximum of six months (WRR 1985). However, as result of the oil crises and poor economic situation, the Dutch government implemented deep reconstructions in the benefit system that started in the mid 1980s (see Table 1.2 for a summary of the policy reforms). The first reconstruction was directed towards the level of the UI benefit. In 1985, the level of UI benefits was brought back from 80% to 70% of the last earned income. This cutback is often referred to as the 'price' policy-cut because it was meant to keep the welfare system affordable (Van Oorschot 1998).

Table 1.2. Summary of Unemployment Insurance (UI) Benefit Changes by Type of Change, 1985-2000, The Netherlands

UI Policy Change	*Level of Benefit*	*Duration of Benefit*	*Eligibility / Qualifying Period*
1985 reform	70% replacement rate	Max. 6 months	*Week requirement:* Worked 13 weeks of last 52 weeks before unemployment
		After 6 months:	
	70% replacement of last salary	1) follow-up benefit for 2 years	Worked 13 weeks of last 52 weeks before unemployment
	100% statutory minimum wage	2) no follow-up benefit	Worked < 13 weeks
1987 reform	Salary-related benefit:		
	70% replacement of last salary	Dependent on work history: min. 6 months to max. 2 years.	*Week requirement:* Worked >26 weeks of last 52 weeks before unemployment *Year requirement:* Extension if wages received 52 days or more in at least 3 of 5 years before unemployment
	Short-term benefit:		
	70% replacement of statutory minimum wage	Max. 6 months	Worked > 13 & < 26 weeks before unemployment
1995 reform	Salary-related benefit:		
	70% replacement of last salary [a]	Dependent on work history: min. 6 months to max. 5 years.	*Week requirement:* Worked >26 weeks of last 39 weeks before unemployment *Year requirement:* Extension if wages received 52 days or more in at least 4 of 5 years before unemployment
	Short-term benefit:		
	70% replacement of statutory minimum wage	Max. 6 months	Worked > 26 & < 39 weeks before unemployment

NOTES: [a] To a gross maximum daily wage of 167.70 Euros

Two years later, in 1987, a second major change was directed towards reductions in the numbers of the UI benefit claimants and was therefore referred to as the 'volume' policy-cut (SZW 1998). This time the qualifying conditions for UI benefits were restricted for those who had worked at least 26 of the previous 52 weeks (as opposed to 13 weeks) immediately prior to unemployment (Abbring Van den Berg and Van Ours 2005). This condition was referred to as the 'week' condition. Under the new system, to become entitled to salary-related benefits a 'year' condition was added, namely individuals should have received incomes from employment in at least 3 out of the last 5 employment years. If this condition was satisfied, individuals were entitled to UI benefits, which amounted to 70% of their last earned income which dependent on one's employment history lasted for a minimum of 6 months and a maximum of 5 years. For those not satisfying this last condition, the short-term UI benefits with a maximum duration of six months was introduced which amounted to 70% of the statutory minimum wage.

A third reform was implemented in 1995 when the eligibility criteria was tightened once again. This time a major change was enacted in the base condition, with entitlement for those who had worked at least 26 of the previous 39 weeks (as opposed to 52 weeks) immediately prior to unemployment. The 'year requirement' also became more stringent with extensions of long-term salary-related benefits for those who had worked over 52 weeks in at least 4 of the 5 years before unemployment (as opposed to 3 of 5 years in the 1987 reform) (MISEP 2003).

1.4 Data, Design and Statistical Modeling

In the previous sections, we have briefly discussed the research questions and the background of the most important concepts. The data, design, and statistical modeling are assessed in more detail in this paragraph.

1.4.1 Data

In this thesis, longitudinal survey data from the Organisatie voor Strategisch Arbeidsmarktonderzoek (OSA) will be used, which consists of labor market information over the period 1980-2000. The panel is a face-to-face biannual panel survey among a random sample of about 2000 households in each wave. These are sampled from the total number of households in the Netherlands. Household members between 16 and 65 years old are asked a series of detailed demographic,

labor market and income-related questions. This has led to a dataset with rich information about a respondent's family characteristics, their attained education, job characteristics, earnings, and information about respondents not attached to the labor market. Besides information on a range of labor market issues at the date of interview, the dataset also includes retrospective data about maximum eight labor force changes of respondents between the last and current interview. In addition, respondents from the first two waves (i.e., in 1985 and 1986) are asked to provide detailed retrospective information on the start and end dates of their labor force changes, starting from January 1980. Although this retrospective approach may involve some recall errors, it makes this dataset exceptional as it provides detailed information on the start and end dates of unemployment and employment periods, which make it easier to trace back the status of the workers in a particular period.

The panel character of this dataset is particularly helpful to predict long-term patterns of stability or change within an individual worker, which cannot be investigated in cross-sectional datasets. In particular, the sequential observations on the same individual contain information about the labor force participation in different subintervals of one's life course that would be not possible in a cross-sectional study (Hsiao 2005). Beyond this motivation, panel data has the advantage that it may simultaneously observe what happens to the same individual before and after a policy reform or before and after an unemployment event (Lee 2005). In addition, the panel character of the OSA data is enriched with detailed retrospective information regarding individuals' working histories. This rich retrospective information coupled with the information on respondents' wages at the time of interview, enables us to reconstruct workers' labor market careers and trace back their wages, which are a key element in the construction of the treatment variable as discussed earlier.

Using the panel character of the OSA data, in chapter 2, we have drawn two separate sub-samples to study the scarring effects of unemployment. These sub-samples, thus, use the biannual labor market information as provided at the time of interview. The first sample, which studies the probability of re-experiencing unemployment, is restricted to workers between 21-64 years old who were unemployed at least once by the time of interview. This selection contains 3,653 unemployment observations spread over 2,585 workers. The second sub-sample, which is used to study post-unemployment wages, is restricted to workers

between 21-64 years old who are employed at the time of interview and have at least two wage observations. These conditions limit this second sub-sample to 16,655 biannual wage observations spread over 3,602 workers.

In chapter 3 and chapter 4, we make use of the retrospective information in the OSA data to reconstruct workers' employment careers and trace back their eligibility status for UI benefits. In chapter 3, our sample is restricted to those who were unemployed at the moment of interview and were actively searching for a job. The data was reconstructed into monthly (un)employment histories over the 20 year observation period starting from April 1980 to September 2000. The sub-sample only includes unemployment spells that occurred during the observation period and therefore excludes left-censored spells (i.e., unemployment episodes that started prior to interview). Unemployment spells that continued by the time of interview are recorded as right censored, whereas spells interrupted because of a withdrawal from the sample are recorded as truncated. These restrictions leave us with a total of 4,399 unemployment spells from 1,788 respondents.

In chapter 4, the retrospective information in the data is used only to trace back the eligibility status of the workers in a particular period. To study the effects of UI benefits on the re-employment wage dynamics, we use the wage information as provided at the time of interview. The initial sample counted 3,408 person-biannual wage observations spread over 1,799 respondents that were employed at the time of interview. As we are interested in following the wage development of an individual over time, at least two wage observations per worker are required. This selection criterion limits the sample size to 2,887 biannual wage observations spread over 1,151 respondents.

One disadvantage of the panel character of this dataset is the attrition rate. Attrition refers to the rate of respondents disappearing from the panel because of death, migration, or loss of contact for different reasons. Table 1.3 provides an overview of the number of respondents that participate in the survey and the percentage of individuals that disappear from wave to wave.

Table 1.3. Number of Respondents in the OSA Labor Supply Panel and the Percentage Lost from Wave to Wave, Wave 1 – 9 (1985-2000)

Wave	*1985*	*1986*	*1988*	*1990*	*1992*	*1994*	*1996*	*1998*	*2000*	*Avg % Lost*
First in:										
1985	4020	2622	1927	1430	1097	858	678	518	298	*0.27*
		(0.35)	*(0.26)*	*(0.26)*	*(0.23)*	*(0.22)*	*(0.21)*	*(0.24)*	*(0.42)*	
1986		1493	1012	713	581	472	349	266	127	*0.28*
			(0.32)	*(0.29)*	*(0.18)*	*(0.19)*	*(0.26)*	*(0.24)*	*(0.52)*	
1988			1525	1042	723	569	451	337	189	
				(0.32)	*(0.31)*	*(0.21)*	*(0.21)*	*(0.25)*	(0.44)	*0.28*
1990				1253	882	668	481	336	170	
					(0.30)	*(0.24)*	*(0.28)*	*(0.30)*	*(0.49)*	*0.32*
1992					1253	834	564	383	200	
						(0.33)	*(0.32)*	*(0.32)*	*(0.48)*	*0.36*
1994						1136	736	492	225	
							(0.35)	*(0.33)*	*(0.54)*	*0.41*
1996							1310	864	411	
								(0.34)	*(0.52)*	*0.43*
1998								1584	770	
									(0.51)	*0.51*
2000									1795	
Total avg % Lost										*0.35*
N	4020	4115	4464	4438	4536	4538	4563	4780	4185	

SOURCE: - Author's calculations using data from the OSA Supply Panels, 1985-2000[7].
NOTE: - Percentage lost from wave to wave are in parentheses.

Estimations in Table 1.3 show that the percentage lost from wave to wave is about 35 percent. This rate is higher when compared to the US Panel Study of Income Dynamics (PSID) that had lost 25 percent of its original sample after seven years (Fitzgerald, Gottschalk and Moffitt, 1998), or the British Household Panel Survey (BHPS), that had lost 39 per cent of its original sample after seven years (Arulampalam 2002). Attrition can lead to declining sample sizes and gradually

[7] http://www.tilburguniversity.nl/osa/datasets/labour_supply_panel.html

reduce the efficiency of panel data estimates. To overcome the problem of declining sample sizes, the OSA panel has employed a strategy where the sample is constantly augmented by new sample members who share characteristics similar to those who drop out. This makes the structure of the OSA panel unbalanced as some respondents are present throughout the panel, possibly with gaps, others start part way through, and others again are in for a limited period and then drop out. However, recruiting new panel members does not solve the problem of attrition that is non-random. If respondents that drop out from the panel have characteristics that are systematically different from those who remain, then analyses of these data will most likely lead to biased estimates (Fitzgerald, Gottschalk and Moffitt, 1998). Instead, statistical models such as the Heckman two-step procedure can help to correct for any bias that is related to this type of attrition. This procedure will be used as an estimate to correct for attrition in our sample. Additional details regarding this procedure will be provided within the sub-section on statistical models, but also in the specific chapters to come.

1.4.2 Design

To answer the general research question, which is concerned with the causal effects of unemployment and UI benefits on individuals' employment careers and wages, it is essential to control for systematic differences of observable and unobservable characteristics groups that are under study. Recall that we attempt to answer this question by first mapping out the dimensions of unemployment that have the potential to create patterns of inequality in the employment careers and wages of individuals. To address this, chapter 2, will use the variation in the re-employment wages and employment careers of two equivalent groups of workers that differ only with respect to their route to employment. In particular, those who once experienced unemployment will be compared to those workers who never experienced unemployment. Since both groups of workers share equivalent demographic and background characteristics but differ only with respect to their route to employment, any traceable difference should be the result of unemployment incidence.

Chapter 3 and chapter 4 will employ the exogenous variation of three UI reforms in the UI benefit level, duration, and eligibility conditions to examine the

effect of UI benefits on workers' careers and wages. The UI reforms have the advantage of creating a non-random but two-tiered sample of workers, namely one sample of workers affected by the policy change (treatment group) and one sample of unaffected workers (control group). This approach makes it possible to compare the re-employment wages or employment careers of the treatment and control groups in the periods before and after the policy changes. This allows us to disentangle the causal effect of UI benefits on the re-employment wages from effects caused by other factors related to workers' potential unemployment duration. Although comparison of control and treatment groups in chapter 3 and 4 might seem straightforward, its proper definition is crucial for the modeling and analyses of UI benefits. For the construction of the treatment variable, many previous studies have used age as a proxy for individuals' employment history. As argued earlier, this is an inappropriate way to measure employment history as it may under- or over qualify individuals to UI benefits. To overcome this concern, these chapters combine workers' exact employment and unemployment histories to classify them more accurately to their treatment status. In addition, workers' last earned wages and the valid eligibility criteria at each specific policy change will be used as complementary conditions for the definition of the treatment status.

1.4.3 Statistical Modeling

To examine the specific research questions, different models will be estimated. Although used for different purposes, these models will have one central concern in common, namely: how to disentangle effects arising from unemployment or changing policies (i.e., causal relationships) from effects arising due to unobserved differences in workers' characteristics (i.e., spurious relationships)? One way to strengthen causal inferences is to find the starting-point of causality: causes must come before their effects (Greene 2000). Charting variations between unemployment and labor market transitions or wages over time brings us closer to determining whether unemployment causes the disparities in employment careers and wages or other factors.

One design that is appropriate to chart across-time variations is the lagged-time design, which is used in chapter 2 of this thesis. In this design, the model looks several periods back (e.g., up to four years) to examine how earlier spells of unemployment influence an individual's current employment and wages. To obtain

empirical evidence on the causal relationship between workers' past unemployment and the likelihood of re-experiencing unemployment, in chapter 2, we make use of dynamic panel models that include lagged dependent variables in their right-hand side. According to Chamberlain (1980), panel data estimators such as fixed-effects probit or logit models are often not appropriate when data counts few time periods *T (<10)*. According to Maddala (1987) this is because fixed-effects models with lagged dependent variables produce a linear regression model with serially correlated standard errors. Random-effect probit models are therefore offered as an alternative for data with fewer time-periods like in our case (Maddala 1987). Unlike the fixed-effects models, the estimates from the random-effect probit models are based on the multivariate normal distribution, which is much more flexible than the multivariate logistic distribution. We therefore address the scarring effects in terms of the probability to return to unemployment by specifying a random-effect probit model.

To follow individual wage developments over time, in chapter 2, we use fixed-effects models that are coupled with a lagged-time design, to address the scarring in terms of wage penalties. These models eliminate the bias that occurs by the failure to include controls for unmeasured but constant personal characteristics such as motivation to work or ability to keep a job (Greene 2000). In other words, if the reason that individuals become unemployed depends on these unmeasured but fixed characteristics, than fixed-effects models will capture these differences and produce consistent estimates. In fixed-effects models, comparisons within individuals are conducted by averaging at least two of individuals wage observations and by averaging these differences across individuals in the sample (Wooldridge 2001). However, the robustness of this model comes at a price, namely: time-constant variables such as gender or ethnicity cannot be included because it is not possible to distinguish between the effects of time-constant observables from the time-constant unobservables (Wooldridge 2001). This can become a problem when time-constant variables are of a direct interest for our estimations. As our research question is especially concerned with the long-term development of wages within individuals over time, omitting time-constant variables from the models does not necessarily form a drawback in our estimations. In chapter 3 and chapter 4 of this thesis, the causal effects arising from the UI benefit reforms are central. To measure the causal effects of changing UI benefits

on labor market transitions and wage dynamics, 'difference-in-difference' (DD) methods will be applied. These methods are useful to examine the effect of a policy change by comparing groups of affected workers with those unaffected, before and, after a policy change (Blundell and McCurdy 1999; Blundell and Dias 2000). For this method, the change in outcomes, such as unemployment durations or re-employment wages, between the pre- and post- implementation period will be obtained for the control and treatment groups. The difference between groups shows how long unemployment durations (chapter 3) or how high re-employment wages (chapter 4) would have been if such policy changes had not occurred. The DD-methods can also be considered as two-way fixed-effect models, by controlling for both a fixed pre-post time effect and the fixed group effect (treatment versus control). The advantage of this method is that each groups' outcomes serve as the groups' own control to account for unmeasured time effects (Fu et al. 2007). In addition to the difference-in-difference estimator, in chapter 4, a triple difference estimator is added. This is a three-way interaction, which is referred to in the literature as the triple difference estimator (Meyer 1995). The advantage of this estimator is that it corrects for the unobserved heterogeneity related to shocks that are specific to particular groups (i.e., gender, low/high education, short/long employment histories) that although related with the treatment are not directly attributable to the UI reforms but to the heterogeneity of individuals.

Two criteria are important when using the DD approach. First, individual-level unobserved heterogeneity should be constant over time. Second, the time effects such as changes in the labor markets need to be common for the control and treatment group. This is called the parallel trend assumption, which assumes that in the absence of the policy change, both treatment and control groups should have experienced changes of the same magnitude. To address the first requirement we will put fixed-effects modeling central in chapter 3 and chapter 4, which eliminate the influence of time-invariant unobserved heterogeneity. More specifically, in chapter 3, we use a fixed-effect proportional hazards model (Cox model), which assumes the term of unobserved heterogeneity to be person-specific and to be a constant function between repeated observations of an individual. A more efficient fixed-effects marginal-likelihood Weibull model with distributional assumptions towards the distribution of the unobserved heterogeneity then follows this model. In chapter 4, we use fixed-effects models to assess the wage change within

individuals over time and restrict the analyses to individuals that have been in continuous employment in at least two consecutive waves. As explained earlier, unobserved heterogeneity in fixed-effects models is assumed to be time constant, thus, any difference with its mean would equal to zero and as a result drop from the model. In choosing for this analytical approach in both of the chapters, we attempt to satisfy the first key requirement of the DD-approach.

To assess the second requirement of the DD-approach we need to identify whether trends in the outflow from unemployment and re-employment wages are common among the control and treatment group in our sample. To do so, in chapter 3, we examine the proportion of outflow from unemployment for the control and treatment group, before the policy changes (see Figures C3 to C5 in Appendix C). We do the same in chapter 4, were we graphically examine the re-employment wage patterns before and after the UI reforms for the control and treatment groups. In both of the chapters, we do not observe a violation of the second DD-requirement. In addition, as a way to control for any periodical disparities in the outflows from unemployment or in the re-employment wages of individuals, we have constructed and included (monthly) period variables in our models. Including other macro-variables in the model, related to the unemployment rates or the gross domestic product (gdp) rates would have been another way to correct for differences in the labor market development across control and treatment groups. However, since we only have nine observation periods in our data, inclusion of such variables would not be appropriate because of the insufficient degrees of freedom that result in inaccurate estimates.

To control for another bias that occurs when the dependent variable is selectively observed only for a group of individuals that is attached to the labor market, analyses in chapter 4 use the two-step Heckman's Selection Procedure. This procedure uses residuals from a selection equation to create a measure, which reflects the effects of all unmeasured characteristics related to labor market attachment (Heckman 1979). Finally, chapter 4 will integrate fixed-effects models with Heckman's correction for sample selection within a difference-in-differences context.

1.5 Thesis Outline

This thesis is organized as follows. The next chapter investigates the effects of unemployment on individuals' re-employment patterns and their wage trajectories. After establishing the basic patterns of scarring arising from unemployment, the chapter continues to test whether these effects diminish over individuals' employment careers. The extent to which these effects become moderated by the receipt of UI benefits will be a central focus in this chapter. Chapter 3 shifts the attention to the additional scarring effects in individuals' re-employment patterns that arise from policy reforms in UI benefits. How policy reforms may lead to unequal patterns of re-employment transitions among different social groups and over time, will be the central question guiding this chapter. Chapter 4 continues to draw attention on the stratifying effects arising from policy reforms, only this time the effect of policy reforms on wage trajectories will be the focal point of attention. The thesis concludes with chapter 5, which provides a synthesis of the preceding chapters and recommendations for further research.

Chapter 2: The Scarring Effects of Unemployment and the Buffering Role of Resources on Re-employment Careers and Wages[8]

Abstract

This paper uses longitudinal data from the Dutch OSA Labor Supply Panel (1980-2000) to examine the phenomenon of unemployment scarring in the Netherlands. The study extends current research by not only asking if earlier unemployment damages subsequent employment careers and wages but also explores variation by the level of unemployment insurance benefits and key individual characteristics such as sex, workers' education level and age. Results from a series of dynamic panel models demonstrate that unemployment not only increases the probability of individuals to re-experience unemployment, but it also imposes a penalty upon their re-employment wages, which grows larger over time. In addition, we find that the level of unemployment scarring: (i) depends on multiple job loss, and recency of unemployment, (ii) is stronger and more persistent among women, and (iii) is mitigated by age, and receipt of UI benefits.

2.1 Introduction

How does past unemployment influence future employment? This question has been the subject of many public and academic debates for more than two decades. Existing literature leaves no doubt about the negative effects of unemployment on workers' future labor market prospects (Jacobson et al. 1993; Arulampalam 2000; Gregg and Tominey 2004; Gregory and Jukes 2004; Stevens 1997; Omori 1997; Stewart 2000). It suggests that unemployment not only deteriorates workers' employment prospects by limiting their job search behavior and by reducing the

[8] This chapter has been co-authored with Prof. dr. Harry Ganzeboom. Earlier versions of this paper have been presented at the Conference on Work, Poverty, and Inequality in the 21st Century at Stanford University, Comparative Social Research Seminar Series and the Conference on Globalization, Social Inequality and the Life Course, at Groningen University, The Netherlands.

likelihood to be hired, but negatively impacts their re-employment wages (Ruhm 1991; Jacobson et al. 2003; Gregg 2001; Arulampalam et al. 2001). These effects are referred to in the literature as the 'scarring' effects of unemployment (Heckman and Borjas 1980). Two main explanations have been put forth to interpret these effects.

The first explanation relates to unemployment itself and the way it decreases workers' future employability by depreciating their human capital and readiness to work. While a spell of unemployment generates a direct drop in workers' incomes, it also leads to a depreciation of human capital, which grows as the unemployment period lengthens (Gregg 2001; Heckman and Borjas 1980). The depreciation of human capital decreases the chances of future employability by urging individuals to accept jobs of a poorer quality, which in turn increase the risk of dismissal and make them more vulnerable to recurrent spells of unemployment. These repeated spells of unemployment govern workers' future readiness to work and may in turn cause future unemployment spells that lead to downward work and earnings spirals. This causal relationship between past unemployment history and the present occurrence of unemployment is often referred to in the literature as 'unemployment state dependence' (Narendranathan and Elias 1993; Flaig et al. 1993; Mühleisen and Zimmerman 1994; Omori 1997; Gregg 2001). The second explanation of unemployment scarring relates to unemployment stigma. A past unemployment spell stigmatizes workers and influences the hiring decision of an employer who judges workers' productivity and performance by their employment history. As a result, those who have experienced unemployment are offered less secure jobs that lead to 'low-pay-no-pay' cycles (Jacobson et al. 1993; Arulampalam 2000; Gregg and Tominey 2004; Gregory and Jukes 2004; Stevens 1997; Stewart 2000).

Although important progress has been made on this subject, theoretical and empirical challenges remain. While the literature is generally conclusive about the disadvantages that unemployment generates, the specific dimensions of unemployment that drive scarring remain unclear. According to some studies, the occurrence of unemployment leaves an irreversible mark on the employment career of an individual and is therefore the key element that drives scarring (Heckman and Borjas 1980; Corcoran and Hill 1985; Ellwood 1982; DiPrete and McManus 2000). Other studies contend that it is the number of earlier unemployment episodes that

alters the future probability of becoming employed thereby predicting higher scarring effects in the future (Jacobson et al. 1993; Stevenson 1997; Arulampalam 2000; Arulampalam et al. 2001; Gregory and Jukes 2001). Still others claim that unemployment duration influences workers' employment behavior monotonically, predicting higher scarring effects especially among the long-term unemployed (Becker and Tomes 1986; Gregg 2001; Gangl 2004; Gregg and Tominey 2004; Gangl 2007). The different explanations of unemployment scarring imply that unemployment may influence individuals' employment career and wages through more than one dimension. In particular, unemployment occurrence, the number of earlier unemployment events, and its duration, may influence workers' employment careers in separate ways. Yet, while the separate aspects of unemployment have been extensively examined, the combined effect of these dimensions has remained unexplored in the literature. This is important because it would provide evidence on the 'true' magnitude of scarring, but also provide a richer understanding of how different aspects of unemployment drive the scarring process.

What is also striking in existing literature on unemployment scarring is that it provides an answer as to 'whether' there is a scarring effect of unemployment but rarely on how the nature (i.e., temporary or persistent) and structure (i.e., from high to low) of unemployment scarring transforms over time. Being unemployed may generate a 'double scar' of not only less favorable careers in the post-unemployment period, but also persisting differences in wages that could make it difficult for those once unemployed to catch up. Yet, it remains an open question as to whether 'scarring' effects of unemployment persist during an individuals' entire working career or diminish, as well as under which conditions this would be the case. This is important to detect potential elements that may help circumvent the double scarring of unemployment.

The goal of this study is to build upon and contribute to existing literature on scarring by examining whether and how earlier unemployment may affect the present employment and wages of workers. The central research question asks: To what extent does the occurrence, duration, and the number of earlier unemployment influence: (a) the probability of individuals to return to unemployment and (b) their post-unemployment wages? In addition, we investigate how key individual-level characteristics (i.e., education, age) and level of

institutional support (i.e., unemployment insurance (UI) benefits) buffer the scarring effects of unemployment. We specifically focus on the distinction between male and female post-unemployment outcomes, which has been examined less frequently in previous studies.

Besides theoretical challenges to extend existing literature on unemployment scarring, this study meets the statistical challenge to disentangle unemployment as result of earlier unemployment and unemployment due to unobserved differences in workers' characteristics. If certain workers are more prone to unemployment due to unmeasured characteristics such as low motivation or inability to keep a job, then recurrent spells of unemployment and lower earnings prospects could be the product of these unobserved attributes and not causally linked to the past. This phenomenon is known in the literature as 'unobserved heterogeneity'. The analytical strategy in this study to separate the effects of state dependence from unobserved heterogeneity is to compare two equivalent groups of once unemployed workers who differ only with respect to their route to employment: one group came to employment via a spell of unemployment and the other group via employment. Comparing these groups and using (dynamic) panel models that correct for time-constant unobserved characteristics, this study attempts to separate the existing heterogeneity of individuals from true scarring. We use longitudinal data from the Dutch Labor Supply Panel (OSA) that was collected in nine waves over the period 1980-2000. This data is rich in information on workers' labor market history including information about job characteristics, which allows us to control for unobserved individual and labor market-specific characteristics.

This study aims to advance the current knowledge on scarring effects of unemployment on three ways. First, it extends existing frameworks on unemployment 'scarring' by addressing more detailed questions regarding the persistence of these effects as they interact with key individual-level characteristics and institutional support in the form of UI benefits during the life course. This is necessary to complement our understanding on how scarring and shielding factors act but also interact over time. Second, the study takes a long-term perspective to uncover the short but also long-term effects of scarring and provides a more balanced view on the patterns of socio-economic inequality arising from unemployment. Third, this paper provides evidence on unemployment scarring

separately for men and women. Evidence on the effects of unemployment on women's work and earnings prospects has remained remarkably scarce in the literature, which is mainly the result of the difficulty to define unemployment consistently for women (Arulampalam 2002). This study aims to solve this difficulty by applying a well-defined distinction between women who are 'out of work' and not participating the labor market and those women who are unemployed but actively searching for a job.

2.2 Labor Market Behavior under Conditions of Unemployment

To understand determinants of unemployment, we first summarize existing empirical evidence on scarring. We then integrate different labor market theories to develop some central theoretical expectations that help to explain the process of scarring in relation to individual-level characteristics and UI benefits.

2.2.1 Previous Empirical Evidence on Unemployment Scarring

Literature concerned with the consequences of unemployment has often considered unemployment as an "event that alters the future probability of becoming unemployed" (Heckman and Borjas 1980:252) and as an "event that has the potential to trigger a negative change in a households' future earnings" (DiPrete and McManus 2000:344). The empirical literature on unemployment state dependence dates back to the 1980s. Using data from the US on monthly labor market histories from the National Longitudinal Survey of Young Men 1969-1971, Heckman and Borjas (1980) point to the danger of misreporting effects of unemployment when unobserved heterogeneity is not taken into account[9]. Although their study did not find evidence on unemployment state dependence for young men at the start of their career, it suggested that unemployment might be a source of subsequent wage inequality. Other studies in the US followed this paper and showed that the most pronounced form of scarring occurs in the form of higher wage penalties rather than in the form of state dependence (Corcoran and Hill 1985; Ellwood 1982). Evidence on scarring in the form of wage penalties comes

[9] i.e., individuals differ in some unmeasured ways, which affect the probability of experiencing unemployment, but are on their own not influenced by unemployment itself

from the study of Ruhm (1991) who found significant and persistent negative effects on re-employment wages of displaced workers of 15-25 percent compared to what they would have earned in their old jobs without such an interruption. Additional support was found in the study of Jacobson, LaLonde, and Sullivan (1993), who demonstrated that unemployment leaves significant scars on re-employment wages even five years after the job loss. According to a later study by Stevens (1997), who used panel data from the Panel Study of Income and Dynamics 1968-1988, the key driving force behind these long lasting earnings scars is the number of earlier unemployment episodes.

Recent empirical evidence in the US comes from DiPrete and McManus (2000), who investigate the longer-term financial consequences of 'trigger events' such as unemployment. This study finds evidence that, in general, unemployment reduces earnings, but that these negative effects alleviate over time as result of counterbalancing effects arising from favorable events, such as subsequent employment episodes. This evidence is partly supported by the studies of Gangl (2004, 2006) who investigated scarring using US and German panel data. Both of Gangl's studies demonstrate that scarring effects in the form of wage penalties may vary among countries. For example, while workers experience mostly permanent wage losses in the US, they experience much lower and temporary losses in Germany. Gangl (2006) explains these findings by pointing to the institutional differences between these two countries with different eligibility levels for welfare and unemployment insurance programs during the period of unemployment.

Empirical evidence for other European countries remained limited until early 2000, when there was a minor eruption of studies on the scarring effects of unemployment. Using data from the British Household Panel Data (BHPS), Arulampalam (2000) found evidence on scarring in the form of re-employment wage penalties of about 6 percent among British workers over the period 1991-1997. Arulampalam, Booth and Taylor (2001) demonstrated that the first employment interruption caused the highest re-employment earnings penalties compared to later interruptions. Gregory and Jukes (2001) found additional evidence on scarring effects for the UK by showing that unemployment incidence has not only a short-term negative effect on re-employment wages, but results in a long-term effect of 10 percent lower wages. Further evidence of this study suggests that the magnitude of scarring is strongly conditioned by the level of skills and age.

In particular, lower paid and younger workers who experience unemployment encounter lower re-employment wage penalties than prime age and highly paid workers. Whether youth unemployment drives up unemployment in later ages, was studied for the UK by Gregg (2001) who found persistent negative effects from youth unemployment. The more recent study of Gregg and Tominey (2004) once again finds evidence of a causal relationship between youth unemployment and persistent negative effects on later re-employment wages.

There is less empirical evidence on the scarring effects of unemployment for the case of the Netherlands. Earlier work of Layte et al. (2000) who studied the effects of unemployment on occupational mobility, suggest that the negative effects may be weak in this country. The weak scarring effects found in the Netherlands and Germany may point to the existence of institutional structures that better shield the unemployed workers from the negative effects of unemployment. Following evidence from Hall and Soskice (2001) this is related to the fact that the Netherlands is characterized by a specific skill regime where occupational shifts occur less, but if they occur they may cause larger wage effects than in a country characterized by a general skills regime.

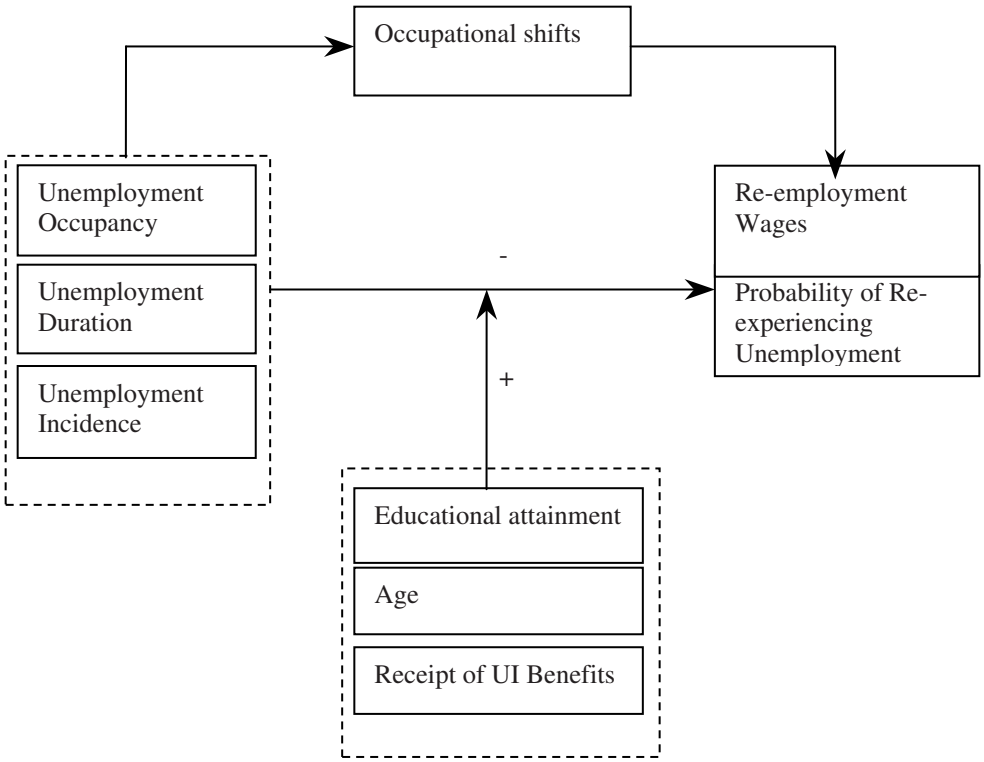
2.2.2 A Theoretical Framework on Unemployment Scarring

In this study, we portray unemployment as a life course condition that affects individuals' employment career and wages through multiple dimensions. We consider unemployment occurrence, duration, and the number of earlier unemployment incidence as three central dimensions of unemployment that may set up a chain of negative employment experiences and wage outcomes in the future. Building upon previous literature, we propose two underlying ways in which these three dimensions may affect workers' later employment and wage outcomes. First, unemployment may cause a behavioral change that leads workers to develop lower readiness to work and poor work habits. In addition, it may also influence an employers' readiness to hire by viewing those once unemployed as unproductive or unreliable workers. Second, over and above this behavioral effect, unemployment may cause widening income differentials between groups that have and groups that have not experienced unemployment. We assume that the combined effect of these dimensions may produce a 'double scarring' effect: the simple occurrence of a single unemployment episode may already lead workers

into a negative cycle, but this may then be accelerated when the episode lasts longer or is repeated.

Among the numerous factors that may condition the aftermath of unemployment, we propose three to be of particular importance. First, workers' education before an unemployment episode is expected to shield them from becoming unemployed again. Second, once unemployed, institutional support in the form of UI benefits is anticipated to act as a buffer by protecting workers from acute financial problems. Finally, age coupled with stable employment after unemployment is expected to buffer the effects from unemployment by providing workers with continuous opportunities to help them recover the loss of human capital during unemployment. The hypothesized effects of unemployment and the role of the buffering resources on workers' subsequent employment and wages are illustrated in Figure 2.1 and will be theoretically highlighted in more detail below.

Figure 2.1. Conceptual Model: Hypothesized Effects of Unemployment and the Buffering Mechanisms on Workers' Subsequent Employment and Wages



What Drives Unemployment Scarring?

Unemployment Occurrence. The potential negative effects stemming from unemployment occurrence, which we define as any unemployment in a previous labor market state, are best understood using human capital theory (Becker, 1964; Mincer 1974). This model relates re-employment wage inequalities to differences in workers' human capital. According to the theory, human capital consists of workers' general skills, which are acquired through education and are transferable across employers, and workers' specific skills, which are acquired through experience in a certain firm or sector and are non-transferable across employers (Becker 1993). This distinction in humans' capital explains why risks of becoming unemployed are higher among the lower skilled and why those higher skilled are the last to be laid off during economic downturns (Becker 1992). In a situation with unemployment, workers no longer experience on-the-job training and their specific human capital stops accumulating. This gap in workers' specific human capital leads to a loss of market-enhancing productivity that may explain the re-employment wage inequalities between those once unemployment and those who remained in continuous employment. It is for this reason that we anticipate that those who experienced unemployment once will have a higher likelihood to re-experience unemployment again and suffer higher wage penalties compared to those in continuous employment. This leads to the first hypothesis:

Unemployment occurrence hypothesis: Those who experienced unemployment once will have a higher probability to re-experience unemployment again and will experience higher wage penalties compared to those in continuous employment.

Unemployment duration. While unemployment may trigger wage inequalities through the gaps it creates in workers' specific human capital, it may also reinforce these inequalities by the duration of such inactivity periods. One explanation to the negative effects arising from spells in unemployment may be derived from job search theory, which assumes that unemployed workers have a forward-looking rational behavior that is sensitive to time and economic restrains (Mortensen 1977, 1988). According to job search theory, unemployed workers set up a reservation wage, which is a function of the perceived value of remaining unemployed and the observed wages in the market. As unemployment periods get

longer, workers adjust their reservation wages downwards and start accepting jobs with lower rewards that are coupled with higher risks of mismatch and dismissals but also with lower wages. It is not only the reservation wage that unemployed workers adjust during spells of unemployment. According to the unemployment literature, when workers are unemployed over longer periods they develop a lower readiness to work, which decreases chances of future employability (Heckman and Borjas 1980; Corcoran and Hill 1985). This behavior may be related to the fact that workers' general skills depreciate monotonically over the spell of unemployment leading to an increasingly discouraged behavior and jobs with lower returns. Following the arguments above, we anticipate that:

Unemployment duration hypothesis: The longer unemployment spells last, the higher the probability to re-experience unemployment and the larger the earnings gap will be with those in continuous employment.

Unemployment incidence. The potential negative effects from earlier unemployment incidence, which is defined as the number of all previous unemployment episodes, may arise partly from the fact that multiple job loss negatively affects the hiring decisions of employers. This effect is best explained by signaling models that explain scarring through stigmatization effects (Phelps 1972; Lockwood 1991). Stigma effects are based on the assumption that hiring decisions of employers are taken under uncertainty about workers' productive capabilities. Under this uncertainty employers rely on the observable characteristics of workers such as their past employment history, but also on variables such as their education, gender, and ethnicity, which serve as a screening device in the hiring process (Eliason 1995). Workers who have experienced unemployment are marked as 'losers' and may be offered less secure and more temporary jobs, which go hand-in-hand with lower earnings and a higher probability of experiencing repeated spells of unemployment in the future (Pissarides 1992; Blanchard and Diamond 1994). Consequently, the scarring effects of unemployment incidence are expected to have a long-term effect unless workers are able to convince employers of their personal qualities and can avoid repeated interruptions of their careers (Gangl 2006; DiPrete and Eirich 2006). This leads to the next hypothesis:

Unemployment incidence hypothesis: The more often an individual is unemployed in the past, the higher the probability of re-experiencing unemployment in the future and the higher the wage penalty compared with those in continuous employment.

The Buffering Role of Individual-level Characteristics and Receipt of UI Benefits on Re-employment Wages

Although from the unemployment scarring literature different theoretical explanations may be developed to predict the phenomenon of scarring, there is a further need to understand whether and how the magnitude of scarring depends on individual-level characteristics and UI benefits that at the end might buffer the full costs of unemployment.

Education. Individuals' education is an individual-level characteristic, which is supposed to have a substantial impact on later employment and wages (Merton 1973). In the literature, there are different explanations that relate workers' education level with later productivity and wages. One of them derives from the assumption that, from an employer's perspective, workers' education reflects their ability and potential productivity in a certain occupation (Thurow 1975). We anticipate that even after a period of unemployment, being better educated is an indication that a worker can be trained more easily on the job, which in turn makes a worker more productive but also more adaptive to changing labor markets. In other words, better education affects later employment by stimulating future productivity, which in turn leads to growing wages over time (Heckman and Borjas 1980; DiPrete and Eirich 2006). Previous studies that examined the effects of education on re-employment wages, have found that individuals who have attained a higher level of education earlier in their life have better outcomes than those who attain these levels later (Elman and O'Rand 2004). This evidence provides an additional explanation that in contemporary labor markets where jobs are lost more easily and where workers face unemployment more often, the level of education remains an important buffering resource that may lower the likelihood of re-experiencing unemployment in the future. Taken together, the higher the level of education attained before unemployment the swifter re-entry into the labor market is expected.

Although better education may predict faster re-employment, there is evidence that the better educated might experience higher initial wage losses after a period of unemployment compared to the lower educated (Jacobson et al. 1993; Gregory and Jukes 2001). This is related to the fact that better educated often receive wage premiums which are lost in subsequent jobs thereby leading to lower initial wages (Jacobson et al. 1993). However, as the higher educated are trained more easily on the job, their productivity is expected to re-accumulate faster relative to the lower educated. This assumption therefore suggests that any initial wage loss among better educated will be followed by an upward trend in wages as unemployment recedes further into the past. This argumentation brings us to the following hypothesis:

Education hypothesis: Education will shield workers from the negative effects of unemployment such that the higher educated, the lower the probability of re-experiencing unemployment and the lower wage penalties in the long-term will be, compared to the lower educated.

Age. Whether individuals experience unemployment at younger ages may be an important predictor of future employment. Previous studies that examined the causal relationship between youth unemployment and future scarring show that a spell of unemployment does not damage the future wages of the young, but continued unemployment spells do (Gregory and Jukes 2001; Gregg 2001; Borland et al. 2002). A study of Stevens (1997) suggests that a spell of unemployment during older ages increases the likelihood of re-experiencing unemployment in the future. These findings presume that young age may weaken the effects of unemployment when it is coupled with a stable employment career thereafter. One explanation for these findings may be that employers expect younger workers (i.e., younger than 25 years old) to show a more pronounced 'job-shopping' behavior that is often characterized by short periods of unemployment. Such early spells of unemployment are expected to produce less of a scar if younger workers succeed to find a job and maintain an uninterrupted work career thereafter. Conversely, if workers experience unemployment at older ages, they will not only be considered as less productive by employers, but will also have less time to recover from prior

spells of unemployment because of shorter employment periods thereafter. This argument brings us to the following hypothesis:

Age hypothesis: Age will buffer the negative effects of unemployment, such that the younger the age that workers experience unemployment, the lower their probability to re-experience unemployment and the lower their wage penalties.

Receipt of UI benefits. Welfare institutions in the form of UI benefits may also have important impacts on the (un)employment processes. In the literature, there are two competing theoretical hypotheses about the contribution of UI benefits on the (un)employment process. The first hypothesis argues that generous UI benefits lead to negative employment pathways by prolonging unemployment durations and by discouraging workers to find a job (Katz and Meyer 1990; Holmlund 1998; Nickell 1997; Narendranathan et al. 1985; Johnson and Layard 1986). The second hypothesis argues the opposite by viewing UI benefits as a search subsidy that, despite longer unemployment durations, encourages workers to seek higher productivity jobs (Acemoglu and Shimer 2000; Mooi-Reci and Mills 2006; DiPrete 2000; Gangl 2006; Belzil 2000). Following these two competing hypotheses, UI benefits may trigger longer job search processes but give workers the possibility to select jobs that match their prior education and occupation-specific skills better. This diverges from the underlying assumption that workers who receive UI benefits during an unemployment period will have a higher job match quality that makes individuals more productive and thereby leading to higher re-employment wages compared to those who did not receive UI benefits. Following these arguments, UI benefits are considered as resources that buffer the financial costs arising from unemployment and thereby lead to the following hypothesis:

UI benefit hypothesis: Receiving UI benefits during unemployment spells will lower the probability to re-experience unemployment and will lower the wage penalties compared to those who did not receive UI benefits.

Additional Factors Affecting Workers' Later Re-employment Careers and Wages

Job match. In our conceptual model depicted in Figure 1, we expect unemployment to influence downwardly individuals' job shifts that in turn lead to distinct patterns of wage losses. However, following existing literature, we have reason to believe that a good fit between workers' skills in their pre-unemployment occupation with skills needed in the post-unemployment occupation may lead to a faster recovery from the aftermath of unemployment. Earlier studies of Kletzer (1989) and Topel (1991) provide evidence that workers that possess skills or capabilities related to a specific occupation level are rewarded to a greater extent by firms. This evidence is supported by later studies of Jacobson et al. (1993) and Stevens (1997) that demonstrate that workers who change industries after a period of unemployment experience greater wage penalties relative to those who remain in the same industry. One explanation for this wage penalty may be that workers who find a job on another occupation level, cannot use their acquired skills, simply because they are suited to a specific occupation level. Conversely, finding a job at the same occupation level creates synergies that may lead to a faster recovery from unemployment. In other words, the extent to which a job fit may fasten the recovery from unemployment depends on whether occupation-specific knowledge is preserved by job shifts within the same occupational level. The abovementioned argumentations bring us to the following hypothesis:

Job match hypothesis: Workers who find employment at the same occupation level will have lower wage penalties relative to those who shift into different occupation levels.

Gender. As stated previously, due to the difficulty to define unemployment consistently for women, there has been a lack of attention examining scarring effects separately for men and women. In fact, we know very little about how unemployment impacts the work potential of men and women and as such generates patterns of wage inequality in the labor market. We know that men and women may behave differently in the labor market and may be guided in their job search behavior by different incentives that often depend on the cultural norms and constraints in a country (DiPrete and McManus 2000). According to the literature, individuals' labor market actions and behavior are shaped by the gender roles in a

society that impact the type of labor market opportunities available for men and women (Mason 1997; Morgan 2002; Gangl 2004, Gangl 2007). For example, in a country with a more pronounced male-breadwinner system, women may be pushed more often to accept a part-time job, because of the institutional constraints surrounding child-care arrangements. The Netherlands has had a strong male-breadwinner model until the 1970s (Evertsson et al. forthcoming). During the late 1980s, it experienced an increase in the female labor market participation that was coupled with a rise in temporary and part-time employment (Van Ours 2003, Mills et al. 2006). Dutch women's integration into the labor market has been described in the literature as a process that has replaced the previous male-breadwinner model into a 'one-and-a-half-earner' model (i.e., man full-time; woman part-times) where women's time has been restructured leaving men's time untouched (Daly 2000, Morgan 2006). A consequence of this shift is that because of the relatively shorter labor market attachment and childcare, women's work careers are less extensive than that of men and often more fragmented. The differences in employment histories and work experience among men and women may not only bring about differences in wages, but also imply that scarring effects may have different magnitude and nature between men and women as well. These arguments lead to the final hypothesis:

Gender hypothesis: Compared to men, women will have higher probabilities to re-experience unemployment and will experience higher wage penalties.

2.3 Data, Variables, and Statistical Modeling

2.3.1 Data Set

We use longitudinal data from the Dutch Labor Supply Panel OSA to analyze unemployment scarring in the form of state dependence and wage penalties. The OSA panel study is targeted at a representative sample of 4,000 to 5,000 respondents in each wave, first drawn in 1985 and then in 1986 with further biannual waves until 2000. The data is rich in information about respondents' family background, their education, and incomes. Moreover, the data provides detailed information about respondents' labor market situation with start and ending dates of unemployment episodes, making it possible to track and trace

transitions in a dynamic way. This study uses two separate samples to study the scarring effects of unemployment. The first sample, which studies the probability of re-experiencing unemployment, is restricted to workers between 21-64 years old who were unemployed at least once at the time of interview. This selection contains 3,653 unemployment observations spread over 2,585 workers. The second sample, which is used to study re-employment wages, is restricted to workers between 21-64 years old who were employed at the time of interview. The initial sample contains 20,836 biannual wage observations spread over 9,803 workers. However, for the purpose of fixed-effects estimations, which we will highlight in more detail in the following sub-section, at least two wage observations are required per worker, which limits the sample to 16,655 biannual wage observations spread over 3,602 workers (see Appendix B, Table B1). This implies that the effective sample contains on average 3.5 biannual wage observations per worker. A detailed description of the sample is provided in Appendix B, Table B2.

2.3.2 Definitions of Variables

Dependent Variables. Two dependent variables are examined. The first, *unemployment re-occurrence*, is specified as a binary variable, taking the value of 1 if a worker was unemployed at the time of the interview and 0 if otherwise. At the data collection, unemployment is consistently defined as 'currently out of work and actively searching for a job at each date of interview'. This variable is observed at nine interview dates separately for each individual. The second dependent variable is the *log hourly wages* at time *t* for individual *i*. This variable is constructed by dividing the monthly net wages by the hours of work and then taking the logarithm, which is a standard indicator also used in other studies that estimate scarring effects (Gregory and Jukes 2001; Arulampalam 2001).

Independent Variables. To test the theoretical expectations about the scarring effects of unemployment, the following variables are constructed. Earlier *unemployment occurrence* is measured by constructing two binary lagged unemployment variables, which take the value of 1 if the worker was unemployed in respectively one or two waves earlier and 0 if otherwise. *Unemployment duration* is measured as the difference in the months between the end and the start of the most recent unemployment spell. *Unemployment incidence* is measured by a variable that records the maximum number of previous unemployment episodes

(maximum 5 times) in a worker's career. To make results between the scarring variables comparable, we turn this variable into a binary variable where 1 refers to those unemployed more than one time and 0 if otherwise.

To capture the wage gains stemming from human capital resources, two variables are used. First, the variable *education*, refers to individuals' attained years of education. This variable distinguishes between three levels: (1) 9 years of education, if elementary school completed (BO); (2) 12 years of education, if lower and upper intermediate secondary school was completed (LBO-MAVO-VMBO-HAVO-VWO-MBO); (3) 18 years of education if college or university degree was completed (HBO-WO). Second, the variable *work experience* is constructed by subtracting: age – years in education – 6 – spells in unemployment and spells in non-employment, which gives the experience attained at work. The variable *work experience squared* is incorporated to control for a curvilinear relationship between accumulation of work experience and wages. To test the education hypothesis, an interaction term will be introduced between the variables education and the variable unemployment occurrence.

To assess the buffering effects of institutional support during an unemployment spell, the variable *UI benefits* is entered as a dummy variable where 1 refers to receipt of unemployment benefits during previous unemployment spell and 0 if otherwise. To test the UI benefits hypothesis and assess whether and how scarring effects alleviate as they interact with institutional support, an interaction term will be introduced between the variable UI benefits and unemployment duration. To assess the age hypothesis and observe how scarring effects in terms of wage penalties vary across younger and older ages, we first construct a dummy variable *age25* where 1 refers to those older than 25 years old and 0 if otherwise. We then introduce an interaction term between the variable age25 and the variable unemployment occurrence to assess the age hypothesis. To assess the job match hypothesis, we use the International Socio-Economic Index (ISEI) scale of Ganzeboom et al. (1992) to construct the variable *occupational job shifts*. This variable distinguishes between four categories: (0) No job shift and in continuous employment; (1) job shift without change in occupational status; (2) shift to job with lower status than in pre-unemployment period; (3) shift to job with higher status than in pre-unemployment period.

To assess the recovery process of workers from unemployment we construct the variable *employment duration after unemployment, which* is measured as the number of consecutive months between the start of employment after a period of unemployment and the end of that employment period. To control for any endogeneity of unemployment with respect to previous employment status, a lagged variable has been constructed for *employment occurrence* taking the value of 1 if the worker was in employment in the previous wave and 0 if otherwise. To control for differences in employment careers and wages related to the marital status of respondents, a dummy variable *marital status* is entered where 1 refers to those married/cohabiting workers and 0 otherwise. Because theoretically we expect men and women to differ in their labor market experience and to have different labor market behaviors, we have conducted the analyses for men and women separately. A detailed description of the construction of the variables used in the current analyses is presented on Table B3 of Appendix B.

2.3.3 Statistical Modeling

Unemployment re-occurrence. To obtain empirical evidence on the causal relationship between a worker's past unemployment and the likelihood of re-experiencing unemployment, it is important to make use of dynamic panel models that include lagged dependent variables in their right-hand side, as used in numerous empirical applications (see Maddala 1987 for a survey of these models). Following Chamberlain (1980), estimation of fixed-effects probit or logit models, is often not appropriate with large value of observations and few time periods T *(<10)*. According to Maddala (1987) this is because fixed-effects models with lagged dependent variables produce a linear regression model with serially correlated standard errors. Random-effect probit models are therefore offered as an alternative. Unlike the fixed-effects models, the estimates from the random-effect probit models are based on the multivariate normal distribution, which is much more flexible than the multivariate logistic distribution. We therefore address the scarring effects in terms of the probability to return to unemployment by specifying a random-effect probit model as used by Heckman and Willis (1976) and by Chamberlain (1980, 1985). Consider the following linear reduced form equation for the latent dependent variable in time periods t (where $t = 1,2,\ldots, T$) for worker i ($i = 1,\ldots, N$ workers in the sample):

$$y_{it}^{*} = \boldsymbol{\gamma}'\mathbf{y}_{i,t-j} + \boldsymbol{\beta}'\mathbf{x}_{it} + \alpha_i + e_{it} \quad (1)$$

where y_{it}^{*} denotes the latent individual propensity to be unemployed for worker *i* at time *t*. The value of y_{t-j} refers to the lagged dependent variable in the model, which can be lagged several periods back, whereas γ refers to the coefficient associated with the lagged dependent variable. $\mathbf{x}_{it}$ refers to a vector of explanatory variables that affect y_{it}^{*} such as receipt of UI benefits, number of times UI benefits were received, age, education, work experience, marital status and whether unemployed workers were employed one wave earlier. $\boldsymbol{\beta}$ refers to a transposed vector that accounts for coefficients associated with the observables characteristics whereas α_i is the unobserved time-invariant and individual-specific effect while e_{it} is the error term of the model.

This model assumes that the underlying latent dependent variable is continuous and that in a binary setting there exists a threshold value in the continuum of this variable (Gibbons and Bock 1987). In other words, an individual is observed to be unemployed when his propensity to be unemployed crosses a normalized threshold value (which is zero in this case), that is 1 if $y_{it}^{*} > 0$ and else 0. Since we are dealing with a binary response variable, we rewrite the original form equation (1) as the transition probability of worker *i* at time *t*, which is given by:

$$\Pr(y_{it} = 1 \mid y_{i,t-1}, \mathbf{x}_{it}) = \Phi\left(\boldsymbol{\gamma}'\mathbf{y}_{i,t-j} + \boldsymbol{\beta}'\mathbf{x}_{it} + \alpha_i + e_{it}\right) \quad (2)$$

where, the symbol Φ refers to the cumulative density function of a standard normal distribution.

To see how scarring relates to the specific dimensions of unemployment and how its persistence transforms as it interacts with individual-level characteristics and UI benefits, we extend equation (1) into a model that includes all three dimensions of unemployment and the interaction effects:

$$\Pr(y_{it} = 1 \mid y_{i,t-1}, \mathbf{x}_{it}) = \Phi\left(\boldsymbol{\gamma}'\mathbf{y}_{i,t-j} + \boldsymbol{\beta}'\mathbf{x}_{it} + \boldsymbol{\lambda}'(\mathbf{yx})_{i,t-j,t} + \alpha_i + e_{it}\right) \quad (3)$$

where, the value $\mathbf{y}_{i,t-j} = (y_{i,t-j}, y_{i,Dur}, y_{i,Inc})$ refers to the vector of (lagged) unemployment dimensions such as: $(y_{i,t-j})$ which indicates unemployment exposure one or more waves earlier; $(y_{i,Dur})$ which indicates the most recent unemployment duration and $(y_{i,Inc})$ which indicates the number of all previous unemployment episodes. In addition $(\mathbf{yx})_{i,t-j,t}$ refers to the vector of interactions between individual characteristics and unemployment aspects with $\boldsymbol{\lambda}$ as the pertaining vector of coefficients.

Using a random-effect probit, the model treats α_i as random and assumes the e_{it} to be normally distributed, with zero mean, a fixed variance ($e_{it} \sim$ IN $(0, \sigma^2_{\varepsilon})$ and independently distributed for all individuals across time periods. A danger occurs when this assumption is violated. To account for this problem, in this study we relax the assumption that α_i is independent of time-varying characteristics by using a model as proposed by Chamberlain (1984). In the Chamberlain's model, it is assumed that the regression function of α_i is linear in the *means* of all time-varying covariates. This implies that using the mean of time-varying variables in the model as additional regressors, allows the random-effects to depend on the current, future and past X's (Maddala 1987). In doing so, the correlation between two successive error terms for the same individual is constant over time, implying that the effect of one year's unemployment on the next year's unemployment does not change over time and is constant across individuals. Taking Chamberlain's relaxed assumption in consideration, we extend equation (2) into the following specification:

$$\Pr(y_{it} = 1 \mid y_{i,t-1}, \mathbf{x}_{it}) = \Phi\left(\boldsymbol{\gamma}'\mathbf{y}_{i,t-j} + \boldsymbol{\beta}'\mathbf{x}_{it} + \boldsymbol{\lambda}'(\mathbf{yx})_{i,t-j,t} + \boldsymbol{\eta}'\mathbf{a}_i + e_{it}\right) \qquad (4)$$

where, $\mathbf{a}_i$ refers to a vector of the additional time-varying regressors and $\boldsymbol{\eta}'$ refers to a transposed vector that accounts for coefficients associated with the time-varying regressors.

Log of hourly post-unemployment wages. To address scarring in terms of wage penalties, a log-linear regression model is fitted. One main problem when estimating models from a panel data is that the assumed independence of the error and the observable characteristics is likely to be violated and as a result incorrect standard errors are produced (Green, 2000). Panel data estimators such as random-effects models or fixed-effects models are used as common alternatives to solve this problem. To assess whether random-effects or fixed-effects models are more adequate to measure the research question, a Hausman test (1984) is conducted. In each case, the test indicated the use of fixed-effects as the most appropriate model. The fixed-effects models eliminate the bias that occurs by the failure to include controls for unmeasured personal characteristics such as motivation to work or ability to keep a job. In fixed-effects models, comparisons within individuals are conducted by averaging at least two workers' wage observations and by averaging these differences across individuals in the sample. Since the unobserved heterogeneity in fixed-effects models is assumed to be time constant, any difference with its mean would result in 0 and would as a result be dropped from the model. The model yields the following log-linear wage specification:

$$\ln w_{it} = \boldsymbol{\beta}'\mathbf{x}_{it} + \alpha_i + e_{it} \tag{5}$$

where, $\ln(w_{it})$ is the natural logarithm of hourly wage at time t for individual i. $\mathbf{x}_{it}$ refers to a vector of observable variables on individual characteristics, $\boldsymbol{\beta}$ refers to a transposed vector that accounts for coefficients associated with the observables characteristics. Finally, α_i refers to the time-invariant individual specific error that captures the unobserved heterogeneity and the e_{it} is the equation error term. To follow the persistence of wage penalties arising from the specific dimensions of unemployment, wage equation (3) is extended to the following specification:

$$\ln w_{it} = \boldsymbol{\beta}'\mathbf{x}_{it} + \boldsymbol{\gamma}'\mathbf{y}_{i,t-j} + \alpha_i + e_{it} \tag{6}$$

where $\mathbf{y}_{i,t-j}$ refers to the vector of (lagged) unemployment dimensions whereas $\boldsymbol{\gamma}'$ refers to a vector that captures the coefficients associated with each separate dimension of unemployment. Finally, to see whether negative effects from

unemployment are buffered by individual-level characteristics and receipt of UI benefits, the wage equation (4) is extended:

$$\ln w_{it} = \boldsymbol{\beta}'\mathbf{x}_{it} + \boldsymbol{\gamma}'\mathbf{y}_{i,t-j} + \boldsymbol{\lambda}'(\mathbf{yx})_{i,t-j,t} + \alpha_i + e_{it} \quad (7)$$

where, $(\mathbf{yx})_{i,t-j,t}$ refers to the vector of interactions between individual-level characteristics and unemployment aspects with $\boldsymbol{\lambda}$ as the pertaining vector of coefficients. We have not added a Heckman-selectivity correction term in our models. However, if unemployment scarring would be the highest among workers that withdraw the labor market (i.e., remain out of the labor force), than our models are likely to underestimate the magnitude of the scarring effects.

2.4 Empirical Results

2.4.1 Descriptive Results

We first descriptively assess how one's labor force status five years earlier relates to one's labor force status five years later. To give an example, in Table 2.1, we examine the proportion of individuals that moved from one labor market state to the other between 1985 and 1990. Results from Table 2.1 show some important aspects about the attachment of workers in the sample at each labor market state. First, those employed have a high probability to be in employment five years later, and if they leave employment, they are more likely to flow into the state of non-participation. Second, around one third of those unemployed have re-entered employment five years later, whereas more than half of this group withdrawals from the labor market five years later. It is striking that over 3.8% of workers become long-term unemployed and have a much higher probability to withdraw from the labor market some periods later. Third, those in non-participation have slightly higher chances to re-enter the labor market or to make other transitions than to remain in non-participation.

To see how labor market behavior and duration in each labor market state varies by gender, these frequencies are tabulated for men and women separately. Results show that the probability that a man unemployed in 1985 is unemployed again in 1990 is 2 times higher (= 2.6/1.1) in comparison to a man that was

employed in 1985. In addition, women show a slightly higher probability to have entered non-participation. More specifically, women that were unemployed in 1985 have one and half times higher chances (= 4/2.6) to experience non-participation in 1990. The unemployment duration is higher among women and their likelihood to re-enter employment is much lower compared to men. On the other hand, results show that non-participating women are more flexible in the labor market, whereas men who enter non-participation tend to remain in the same status. Apparently, women who enter non-participation are likely those who withdraw from the labor market to temporally engage in care giving. On the other hand, men who enter non-participation reflect the outflow of older workers into retirement who are less likely to re-enter the labor market. In sum, these first descriptive results make clear that duration in the states of employment and non-participation is much larger than in case of unemployment. It is, however, striking to see how such a small portion of the unemployed re-enter employment and how many withdraw from the labor market.

Table 2.1. Labor Market Transitions by Sex, The Netherlands 1980-2000

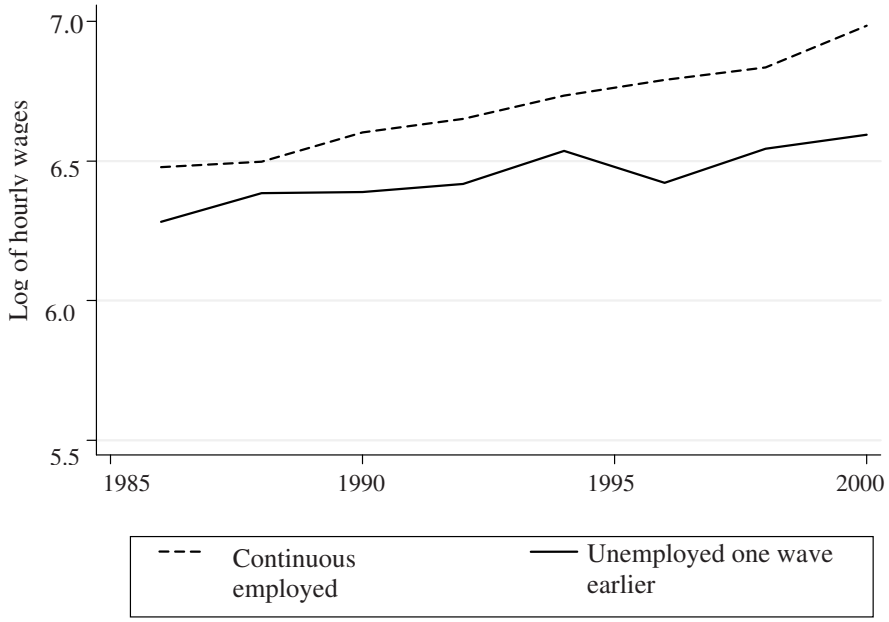
	Labor Market Status (LMS), 1990											
	Total				***Female***				***Male***			
LMS 1985	O	E	U	Non	O	E	U	Non	O	E	U	Non
O	0	100	0	0	0	100	0	0	0	100	0	0
E	3	80	2	15	4	72	4	20	2	84	1	12
U	1	36	4	60	1	35	4	60	1	41	3	55
Non	24	36	2	38	24	37	3	37	25	23	0	51

SOURCE: - Author's calculations using data from the OSA Supply Panels, 1985-2000.
NOTE: - O = Other State; E = Employed; U = Unemployed; Non = Non-active

How does earlier unemployment influence workers' subsequent wages? In Figure 2.2, results confirm the earlier predicted 'double scarring' effect, namely unemployed workers not only start with lower wages, but also the wage gap between these two groups increases over time. Different explanations can be used to interpret this 'double scarring' effect. First, in line with our theoretical predictions related to the unemployment occurrence hypothesis, it is obvious that workers' exposure to unemployment leads to an initial drawback in wages, which may be related to loss of their productivity thereby leading to lower subsequent

wages. Second, from a dynamic labor market perspective, the growing wage gap may reflect the changing structures of the labor market and the growing demand for skilled workers. In such a situation, those having experienced unemployment once may be marked as less skilled or unproductive whereas those who are skilled may be rewarded even more for their skills leading to persistently higher wages for this group.

Figure 2.2. Wage Development of those in Continuous Employment versus those who Experienced Unemployment One Wave Earlier



SOURCE: - Author's calculations using data from the OSA Supply Panels, 1985-2000.

Although these are some interesting first results, these scarring effects may disappear when accounting for observable and unobservable characteristics. It is therefore necessary to continue the analyses further by addressing whether scarring remains persistent even after controlling for confounding variables.

2.4.2 Does Unemployment Breed Unemployment?

As stated earlier in the theoretical section, we argued that unemployment influences individuals' subsequent employment through several dimensions. To explicitly analyze how each separate unemployment dimension influences subsequent employment, Table 2.2 summarizes estimations from four random-effect probit models. Model 1 and Model 2 estimate the baseline results for men and women separately, while Model 3 and Model 4 include a full specification of individual and employment history variables as well as additional variables that summarize the mean of time-varying variables.

Table 2.2. Unstandardized Coefficients for the Effect of Unemployment Dimensions on Unemployment Re-Occurrence, from Random-Effects Probit Estimates by Sex, The Netherlands, 1980-2000

	Female	***Male***	***Female***	***Male***
	Model 1	Model 2	Model 3	Model 4
Dimensions of Unemployment				
Unemployment occurrence one wave ago *(T-2 vs. T)*	2.408***	2.549***	1.788***	2.105***
	(0.283)	(0.340)	(0.151)	(0.355)
Unemployment occurrence two waves ago *(T-4 vs. T)*	0.825**	0.407	0.574*	0.085
	(0.350)	(0.291)	(0.341)	(0.274)
Unemployment duration *(in months)*	0.077***	0.025	0.023	0.079**
	(0.028)	(0.027)	(0.023)	(0.034)
Unemployment Incidence 1-5 times (ref: 0 times)	3.056***	3.606***	3.165***	2.861***
	(0.336)	(0.554)	(0.217)	(0.473)
Labor market and Individual-level Characteristics				
Education *(in years)*			-0.179	-1.030*
			(0.145)	(0.552)
Work experience *(in years)*			-0.056***	-0.075***
			(0.015)	(0.021)
Employment duration after unemployment *(in months)*			-0.044***	-0.045***
			(0.010)	(0.014)
Employed one wave earlier *(T-2 vs. T)*			-0.661***	-0.375
			(0.252)	(0.399)
Received UI benefits in previous unemployment spell			-0.477*	-0.735*
			(0.279)	(0.345)

Table 2.2. Unstandardized Coefficients for the Effect of Unemployment Dimensions on Unemployment Re-Occurrence, from Random-Effects Probit Estimates by Sex, The Netherlands, 1980-2000 *(Continued)*

	Female	***Male***	***Female***	***Male***
	Model 1	Model 2	Model 3	Model 4
Age			0.030**	0.709
			(0.014)	(0.525)
Married/Cohabiting *(ref: single)*			-0.255	-0.643
			(0.261)	(0.576)
Constant	-3.576***	-3.203***	-3.053***	-3.442***
	(0.252)	(0.405)	(0.812)	(1.004)
Log-likelihood	-121.07	-111.030	-86.875	-72.425
Number of observations	2044	3969	1716	3318
Number of respondents	838	1499	771	1381

SOURCE: - Author's calculations using data from the OSA Supply Panels, 1985-2000.
NOTE: - Model 2 and Model 4 include also controls for the mean of time-varying variables such as: age, years of education, employment duration after spell of unemployment, work experience, number of earlier UI benefits, and number of times married.
NOTE: - Standard errors in parentheses. *** p < .001; ** p < .05; * p < .1 (two-tailed tests).

Results from Model 1 and Model 2, demonstrate that the added combination of unemployment occurrence, duration and earlier unemployment incidence may lead to higher magnitudes of scarring than when these dimensions are partially estimated[10]. To give an illustration, Model 1 shows that the probability that a women unemployed in the last wave (2 years ago) is unemployed this year, increases by 2.408 points when compared to a women that was employed in the

[10] We have conducted the same analyses on a balanced panel (i.e., respondents where present in all the nine waves) and our results remained unchanged. Furthermore, to test the robustness of our estimates, we have conducted a series of additional analyses that correct for spurious relationships and the initial condition problems that may be present in our random-effects probit models. These analyses involve (1) Population-Averaged Probit Models with serially autocorrelated errors AR(1); (2) Random-effects Dynamic Probit Models and (3) Maximum Simulation Likelihood Models with serially autocorrelated errors (AR 1). We find that in our models, 4 percent of the composite error variance is attributed to that in the individual-specific effects. Furthermore, we find a positive but non-significant lambda, indicating that those respondents with wage observations earn about 4 percent more than those who do not. However, their difference is not significant. In addition, we find a positive, but non-significant AR 1 disturbance, implying that there is no successive realization of α_{it} in our model. Finally, in all of these models we find evidence of a strong scarring effect which points at the existence of unemployment state dependence rather than a spurious relationship.

last wave. In addition to this effect, for every increase with one month in the unemployment duration, the probability to re-experience unemployment increases by 0.077 points. Above and beyond this effect, the probability that a woman who experienced unemployment 1 until 5 times earlier is unemployed this year increases with 3.056 points when compared to those who never experienced unemployment. Adding up these separate effects shows that the probability of re-experiencing unemployment for a women unemployed one wave earlier with a recent spell of longer than ten months and earlier unemployment episodes, increases by 6.31 points (2.408+0.77+3.056= 6.306) when compared to a women in continuous employment. These effects, however, may be overestimated as they are estimated using a simple dynamic probit model without the inclusion of mean time-varying variables that correct for the violation of not independently distributed error terms over the individuals across time.

To account for this overestimation, we first control for individual-level characteristics and then include the mean of the time-varying variables in Model 3 and Model 4 of Table 2.2. Results from Model 3 and Model 4, hold a number of important implications. First, results demonstrate that the number of earlier unemployment episodes is the most important driving force of future unemployment. In other words, the more often workers experienced unemployment in the past the more likely they are to experience unemployment in the future. The results also indicate that the probability of re-experiencing unemployment in the future is persistent and highest among women. This result confirms earlier predictions from the signaling theory (Pissarides 1992; Blanchard and Diamond 1994) and is in line with our theoretical expectations from the unemployment incidence hypothesis. These results indicate that the positive relationship may be partly driven by the stigma involved with the hiring decision of employers. Apparently, the higher the number of earlier unemployment spells, the more temporary jobs are offered and the higher the probability of re-experiencing unemployment in the future. The higher effects among women may indicate the presence of employer discrimination, which may be based not only on individuals' employment history but also on other observable characteristics, such as gender, to judge one's level of productivity.

Second, in addition to the persisting scars related to the rate of earlier unemployment episodes, results from Model 3 and 4 show that a further increase in

the probability of re-experiencing unemployment arises from the recency of unemployment. More specific, the probability that a women unemployed in the last wave (2 years ago) is unemployed this year, increases by 1.788 points when compared with a women that was employed in the last wave. On the other hand, for a man this probability increases with 2.105 when compared with a working men that was employed in the last wave. This effect reduces if unemployment recedes further in the past, but remains significant for women. This result is in line with our unemployment occurrence hypothesis and confirms previous studies in the US that find the odds of becoming unemployed in the future to be around 7.1 to 12.1 times higher among those more recently unemployed (Chamberlain 1987; Corcoran and Hill 1985).

Third, consistent with the unemployment duration hypothesis, results in Models 3 and Model 4 demonstrate that, after controlling for labor market and individual-level characteristics, recent unemployment spells impact in particular men's probability of re-experiencing unemployment. It appears that for each additional month in unemployment, the probability to re-experience unemployment increase by 0.079 points when compared to men with no unemployment spells. This provides some evidence that the longer unemployment lasts the more likely men accept jobs with poorer qualities that increase the risks of dismissals thereby increasing the likelihood of future unemployment.

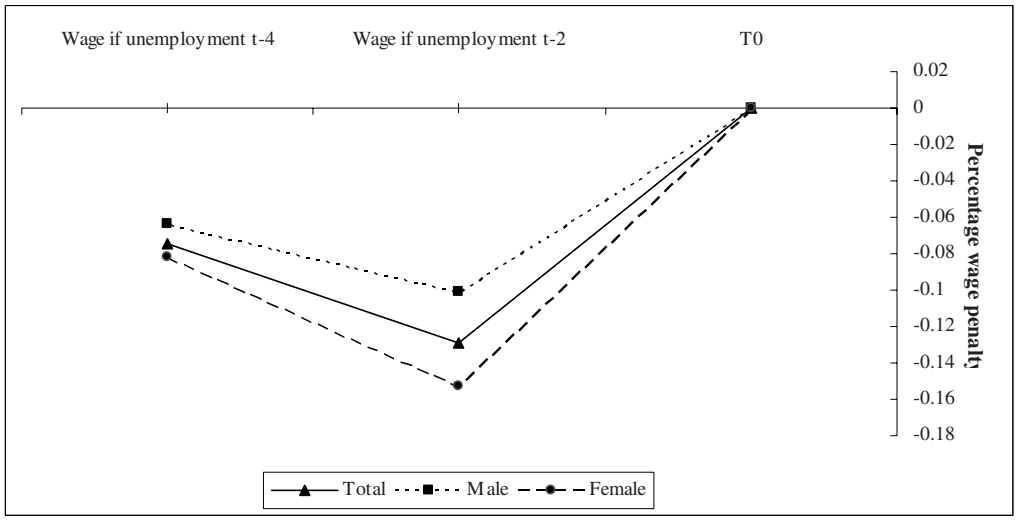
Do scarring effects remain persistent when controlling for individual-level characteristics and UI benefits? In line with earlier theoretical expectations, results in Models 3 and 4, show that individual-level characteristics and UI benefits maintain a negative and significant association with the current unemployment experience. As expected in the UI benefit hypothesis, results in Model 4 show a negative relationship between UI benefits and the probability of re-experiencing unemployment in the future. Results show that the probability that an individual who received UI benefits during the last wave is unemployed this wave decreases with -0.47 and -0.73 points for respectively women and men compared to those unemployed who did not receive UI benefits in the last wave. One explanation for this finding may be that UI benefits set up the conditions that are needed to find a proper job match. Apparently, those receiving UI benefits do well in finding a job that fits prior skills, which lowers the risks of job mismatching thereby leading to lower probabilities of falling into unemployment again. These findings may also

reflect the discouraged behavior of those not receiving UI benefits who are mostly those with insufficiently long work experience, or those who have voluntarily quit their jobs. It may be that those not receiving UI benefits develop poor work habits and have a lower readiness to work than those receiving UI benefits. In addition, results in Model 3 and Model 4 indicate that age is an important predictor of unemployment re-occurrence especially among women. This result shows that as women become older, unemployment affects more strongly their labor market choices and preferences and leads to a discouraged labor market behavior that increases the probability of labor market withdrawal.

2.4.3 The Wage Penalty for Unemployment

This part of the analyses turns to the scarring effects in terms of wage penalties. Table 2.3 summarizes estimation results from four fixed-effects regression models. The first two models represent baseline models for men and women and the other two models include workers' human capital, individual and institutional resources as explanatory variables. The unstandardized coefficients from the baseline estimations in Model 1 and 2 in Table 2.3 are illustrated in Figure 2.3, which capture wage losses associated with earlier unemployment exposures. In other words, Figure 2.3 portrays the partial effects of unemployment on the present wages of a worker that was unemployed two waves (four years) and one wave earlier (two years). When assessing the empirical evidence on Figure 2.3, there is a clear pattern of wage penalties among men and women that remains persistent even years after unemployment occurrence. This wage penalty reaches a peak during more recent unemployment occurrences and is about 5% higher for women than men. Whereas the wage penalty remains high and significant for women four years after their last unemployment occurrence, the wage losses for men become much lower and lose their significance.

Figure 2.3. Illustrated Coefficients for the Partial Effect of Past Unemployment (T-2 or T-4) in Current Observed Wages



SOURCE: - Author's calculations using data from the OSA Supply Panels, 1985-2000.

Results in Model 1 and Model 2, are in line with our unemployment occurrence hypothesis, and imply that unemployment occurrence is a key dimension of unemployment that affects the relationship between unemployment and workers' subsequent wages. The wage penalty arising from unemployment occurrence is larger and more persistent for women than men. These wage penalties may stem partly from the fact that women may be involved into jobs with a temporary and part-time nature that are easier to be lost and more likely to be interrupted. This leads women to a non-employment-employment circle where periods of joblessness dominate and bring about future negative earnings that widen with the passage of time. The number of earlier unemployment episodes on the other hand, shows a weak but negatively significant relationship with men's subsequent wages, which brings about lower wages if it was a worker's first time in unemployment and if it occurred more recently. This result is in line with previous studies in UK that find wage penalties to be the highest during the first unemployment episode (Arulampalam 2001; Gregory and Jukes 2001). Unemployment duration shows no effect on a worker's subsequent wages. This dimension of unemployment apparently determines to a larger extent the

probability of becoming unemployed rather than scarring in terms of wage penalties. This finding is, however, in contrast to the theoretical expectations that predicted unemployment duration to be an important determinant of both types of scarring.

Table 2.3. Unstandardized Coefficients for the Effect of Different Unemployment Dimensions on Subsequent Wages, from Fixed-effects Estimates by Sex, The Netherlands, 1980-2000

	Female	***Male***	***Female***	***Male***
	Model 1	Model 2	Model 3	Model 4
Dimensions of Unemployment				
Unemployment occurrence one wave ago *(T-2 vs. T)*	-0.153***	-0.101**	-0.131***	-0.083*
	(0.049)	(0.045)	(0.050)	(0.044)
Unemployment occurrence two waves ago *(T-4 vs. T)*	-0.082**	-0.064	-0.090**	-0.041
	(0.035)	(0.040)	(0.036)	(0.040)
Unemployment duration *(in months)*	0.005	-0.013	0.006	-0.013
	(0.013)	(0.010)	(0.013)	(0.010)
Unemployment Incidence 1-5 times *(ref: 0 times)*	-0.041	-0.087*	-0.034	0.009
	(0.071)	(0.050)	(0.103)	(0.068)
Labor market and Individual-level Characteristics				
Education *(in years)*			0.037***	0.038***
			(0.007)	(0.005)
Work Experience *(in years)*			0.053***	0.057***
			(0.007)	(0.005)
Work Experience squared			-0.000*	-0.000***
			(0.000)	(0.000)
Employment duration after unemployment *(in months)*			-0.004***	-0.005***
			(0.001)	(0.000)

Table 2.3. Unstandardized Coefficients for the Effect of Different Unemployment Dimensions on Subsequent Wages, from Fixed-effects Estimates by Sex, The Netherlands, 1980-2000 *(Continued)*

	Female	***Male***	***Female***	***Male***
	Model 1	Model 2	Model 3	Model 4
Employed one wave earlier *(T-2 vs. T)*			0.099	-0.257
			(0.512)	(0.251)
Received UI benefits during previous unemployment *(ref: no UI benefits)*			0.054	-0.031
			(0.065)	(0.071)
Δ Job position same level as pre-unemployment period *(ref: no job shift)*			0.013	-0.054
			(0.145)	(0.109)
Δ Job shift position lower than in pre-unemployment period *(ref: no job shift)*			-0.062***	-0.065***
			(0.017)	(0.011)
Δ Job shift position higher than in pre-unemployment period *(ref: no job shift)*			-0.060***	-0.053***
			(0.022)	(0.013)
Married/Cohabiting *(ref: single)*			-0.112**	-0.120***
			(0.053)	(0.036)
Constant	6.862***	6.679***	6.382***	6.602***
	(0.004)	(0.006)	(0.105)	(0.069)
Number of observations	2,448	4,174	2,446	4,165
Number of respondents	1,137	1,757	1,137	1,754
R-squared	0.004	0.010	0.197	0.269

SOURCE: - Author's calculations using data from the OSA Supply Panels, 1985-2000.
NOTE: - Standard errors in parentheses. *** p < .001; ** p < .05; * p < .1 (two-tailed tests).

To understand the role of workers' individual-level characteristics, UI benefits and job matching, Models 3 and 4 in Table 2.3, summarize estimations from a full specification separately for men and women. Consistent with the established literature and our education hypothesis, results in Model 3 and Model 4, confirm that early investment in education is an important determinant of higher future wages. On the other hand, work experience brings greater returns in terms of wages through acquisition of resources that accumulate over time. Further results from Model 3 and Model 4 are in line with our job match hypothesis that argued that job shifts into the same occupation level impose lower wage penalties compared to those who switch into a lower or even higher occupational level. This finding demonstrates that when skills related to a specific occupation are preserved,

they may lead to a rapid increase of workers productivity that in turn leads to a swifter wage recovery in the post-unemployment period. On the other hand, shifting into a job with lower or even higher occupation level leads to higher wage penalties as workers cannot use their previous acquired skills, and thereby lose their productivity-enhancing market experience.

In addition, results in Model 3 and Model 4 show that marital status leads to lower subsequent wages for both men and women. These results are better explained in the light of the partners' contribution into household incomes. More specifically, while the wage penalty of men may reflect how shared incomes in a household affect their wage outcomes, the wage penalty for women may reflect women's motherhood penalty. This latter explanation is in line with earlier findings of Budig and England (2001) who find that married women suffer much higher wage penalties compared to those single women in the US. One possible explanation for these differences related to the marital status may stem from the features of jobs taken by married versus single women. Especially, married women are more likely to have children and more likely to choose part-time jobs that pay less. On the other hand, this wage gap may also stem from firms treating women differently because of their motherhood status.

A striking result from Model 3 and Model 4 is related to the variable employment duration after unemployment. Results show that the wage gap between groups who have and those who have not experienced unemployment widens with about 4 to 5 percentage points for each additional ten months in continuous employment. This result is in line with earlier findings of Arulampalam (2001) who finds that even after working for four years with the same employer, British workers earned relative 10 percentage points lower wages than otherwise equivalent workers in continuous employment. This finding has important implications as it shows unemployment to leave persisting scars in wages that do not diminish even years after employment.

2.4.4 The Buffering Effects of Individual-level Characteristics and UI Benefits

How do key individual-level characteristics and UI benefits buffer the odds of re-experiencing unemployment? As stated earlier in the theoretical section, we expected the magnitude of unemployment scarring to alleviate as it interacts with several individual and institutional variables. To assess whether and how this happens, Table 2.4 summarizes estimation results from four random-effects probit models that include interaction effects. Model 1 and Model 2 in Table 2.4 present the baseline results that are discussed earlier. We will therefore focus on the results presented in Model 3 and Model 4 in Table 2.4. Focusing on the interaction effects in Model 3 and Model 4 results show that the probability that a better-educated men unemployed in the last wave (2 years ago) is unemployed this year is - 1.47 points smaller when compared to a lower educated men. This result is in line with the theoretical expectations from the education hypothesis and indicates that education has a higher shielding effect for men, while this is significantly not true for women. Apparently, better-educated men who often have a broader social network and thus more opportunities, find jobs that better fit their previous skills and therefore reduce the odds of future job interruptions.

Table 2.4. Unstandardized Coefficients for the Buffering Effects of Individual-level Characteristics and Receipt of UI benefits on Unemployment Re-Occurrence, from Random-Effects Probit Estimates by Sex, The Netherlands 1980-2000

	Female	***Male***	***Female***	***Male***
	Model 1	Model 2	Model 3	Model 4
Dimensions of Unemployment				
Unemployment occurrence one wave ago (T-2 vs. T)	2.408*** (0.283)	2.549*** (0.340)	1.841*** (0.154)	1.845*** (.321)
Unemployment occurrence two waves ago (T-4 vs. T)	0.825** (0.350)	0.407 (0.291)	0.562** (0.252)	1.199** (0.523)
Unemployment duration *(in months)*	0.077*** (0.028)	0.025 (0.027)	0.020 (0.045)	0.020 (0.045)
Unemployment Incidence 1-5 times (*ref: 0 times*)	3.056*** (0.336)	3.606*** (0.554)	3.094*** (0.907)	3.094*** (0.734)

Table 2.4. Unstandardized Coefficients for the Buffering Effects of Individual-level Characteristics and Receipt of UI benefits on Unemployment Re-Occurrence, from Random-Effects Probit Estimates by Sex, The Netherlands 1980-2000 *(Continued)*

	Female	***Male***	***Female***	***Male***
	Model 1	Model 2	Model 3	Model 4
Labor market and Individual-level Characteristics				
Education *(in years)*			-0.680	0.025
			(0.618)	(0.735)
Work experience *(in years)*			-0.550	-0.000
			(0.616)	(0.719)
Employment duration after unemployment *(in months)*			-0.005	0.008
			(0.015)	(0.032)
Employed one wave earlier *(T-2 vs. T)*			-0.117	0.099
			(0.214)	(0.512)
Received UI benefits during unemployment *(ref: no UI benefits)*			-0.563*	-1.510***
			(0.341)	(0.480)
Age			0.611	-0.058
			(0.615)	(0.724)
Married/Cohabiting *(ref: single)*			-0.159	-0.001
			(0.230)	(0.500)
Buffering Effects				
Unemployed at T-2* Education			-0.255	-1.467*
			(0.229)	(0.807)
Unemployed at T-2 * Age>25			0.321*	1.195*
			(0.178)	(0.611)
Unemployment Duration * UI benefits			0.456	-0.309
			(0.478)	(0.459)
Constant	-3.576***	-3.203***	-3.320***	-3.365***
	(0.252)	(0.405)	(0.703)	(0.568)
Log-likelihood	-121.07	-111.030	-60.586	-34.788
Number of observations	2,044	3,969	1,716	3,419
Number of respondents	838	1,499	771	1,383

SOURCE: - Author's calculations using data from the OSA Supply Panels, 1985-2000.
NOTE: - These models include also controls for the mean of time-varying variables such as: age, years of education, employment duration after spell of unemployment, work experience, number of earlier UI benefits, and number of times married.
NOTE: - Standard errors in parentheses. *** $p < .001$; ** $p < .05$; * $p < .1$ (two-tailed tests).

To test whether the timing of unemployment affects the probability of re-experiencing unemployment in the future, in Model 3 and Model 4 we interacted age at younger ages (age25) with the variable unemployment one wave earlier. Recall that we argued theoretically that if unemployment was experienced during older ages this would increase the likelihood of re-experiencing unemployment in the future. Results from Model 3 and Model 4 show that the probability of a worker who experienced unemployment after the age of 25, increases by 0.321 and 1.195 points for respectively women and men when compared to those who experienced unemployment during ages below the age of 25. These results support the expectations from the age hypothesis and imply that although the scarring effects do not disappear they can become lower with age. The lower likelihood in case of women may be related to the fact that employers expect women to show a more fragmented career after the age of 25, which is mostly related to their fertility decisions. It may be for this reason why unemployment occurrence among women above the age of 25 produces less of a scar compared to men of the same age. This result is in line with earlier results in the studies of Arulampalam (2001) and Gregory and Jukes (2001) who find same effects for the case of UK.

Finally, to test whether UI benefits buffer the scarring effects of unemployment in Model 3 and Model 4 we interacted the variable most recent unemployment duration with the variables UI benefits. Results in these two models show no significant differences in the likelihood of re-experiencing unemployment between those who have and those who have not received UI benefits. Looking back to earlier results shown in Table 2.2 it may be that UI benefits have a strong direct effect rather than a buffering effect on the probability of re-experiencing unemployment. On the other hand, it may be that UI benefits alleviate more strongly scarring in the form of wage penalties than in the form of state dependence.

How do individual-level characteristics and the receipt of UI benefits buffer wage penalties arising from unemployment? Table 2.5 summarizes four fixed-effects regression models. The first two models present the baseline results, which have been explained earlier, while the last two models include a full specification and interaction effects. In this part of our study, we will therefore highlight more deeply the results from the last two models. To test whether individuals' level of education buffers the wage penalties arising from

unemployment, Model 3 and Model 4 in Table 2.5 introduces an interaction term between the variable education and unemployment occurrence one wave earlier. Results in Model 3 find no significant differences in the wage penalties between lower and higher educated women. However, Model 4 finds that especially better-educated men lose about 2.5 percentage points of their wages from previous unemployment. Although in our education hypothesis we expected higher initial wage penalties among the better educated, we do not find support that better educated recover sooner from unemployment. Relating these results with earlier findings in Table 2.4 shows that while better education may serve as a shield to protect workers from falling into unemployment, it is not sufficient to buffer the scarring effects arising from unemployment. Similar results are also reported in the study of Gregory and Jukes (2001) for the British case. In their study, they demonstrate that especially better-educated men experience the highest wage penalties from unemployment with losses at least double of those lower educated.

Table 2.5. Unstandardized Coefficients for the Buffering Effects of Individual-level Characteristics and Receipt of UI benefits on Subsequent Wages, from Fixed-effects Models by Sex, The Netherlands 1980-2000

	Female	***Male***	***Female***	***Male***
	Model 1	Model 2	Model 3	Model 4
Dimensions of Unemployment				
Unemployment occupancy one wave ago *(T-2 vs. T)*	-0.153***	-0.101**	-0.025	-0.118
	(0.049)	(0.045)	(0.059)	(0.084)
Unemployment occupancy two waves ago *(T-4 vs. T)*	-0.082**	-0.064	-0.047	-0.034
	(0.035)	(0.040)	(0.036)	(0.040)
Unemployment duration *(in months)*	0.005	-0.013	0.001	-0.019*
	(0.013)	(0.010)	(0.014)	(0.010)
Unemployment Incidence 1-5 times *(ref: 0 times)*	-0.041	-0.087*	-0.057	0.016
	(0.071)	(0.050)	(0.103)	(0.068)
Labor market and Individual-level Characteristics				
Education *(in years)*			0.036***	0.034***
			(0.007)	(0.005)
Work Experience *(in years)*			0.050***	0.051***
			(0.007)	(0.005)
Work Experience squared			-0.000*	-0.000***
			(0.000)	(0.000)

Table 2.5. Unstandardized Coefficients for the Buffering Effects of Individual-level Characteristics and Receipt of UI benefits on Subsequent Wages, from Fixed-effects Models by Sex, The Netherlands 1980-2000 *(Continued)*

	Female	***Male***	***Female***	***Male***
	Model 1	Model 2	Model 3	Model 4
Employment duration after job loss *(in months)*			-0.003***	-0.005***
			(0.001)	(0.000)
Employed one wave earlier *(T-2 vs. T)*			-0.109	0.134
			(0.214)	(0.512)
Age			0.010***	0.009***
			(0.002)	(0.001)
Δ Job position same level as in the pre-unemployment period			0.004	-0.054
			(0.145)	(0.109)
Δ Job shift position lower than in pre-unemployment period			-0.066***	-0.067***
			(0.017)	(0.011)
Δ Job shift position higher than in pre-unemployment period			-0.065***	-0.056***
			(0.022)	(0.013)
Married/Cohabiting			-0.105**	-0.117***
			(0.052)	(0.036)
UI benefits during unemployment spell *(ref: no UI benefits)*			0.014	-0.035
			(0.068)	(0.071)
Buffering Effects				
Unemployed T-2 * Education			-0.001	-0.025*
			(0.015)	(0.015)
Unemployed T-2* Age>25			-0.171***	-0.213***
			(0.036)	(0.076)
Unemployment duration*UI Benefits			0.035*	0.062**
			(0.019)	(0.025)
Constant	6.862***	6.679***	6.428***	6.606***
	(0.004)	(0.006)	(0.105)	(0.069)
Number of observations	2,448	4,174	2,446	4,165
Number of respondents	1,137	1,757	1,137	1,754
R-squared	0.004	0.010	0.199	0.268

SOURCE: - Author's calculations using data from the OSA Supply Panels, 1985-2000.
NOTE: - Standard errors in parentheses. *** p < .001; ** p < .05; * p < .1 (two-tailed tests).

To test the age hypothesis of whether experience of unemployment during older ages 'scars' the subsequent wages of workers even further, an interaction term has been introduced between the variable unemployment occurrence one wave earlier and the variable age older than 25 years old. Results from Model 3 and 4 in Table 2.5 show that the older workers experience unemployment, the higher the wage penalty they suffer. This penalty is high for both men and women by respectively 21 and 17 percentage points and consistent with earlier expectations in our age hypothesis. This result can be taken as evidence for the existing view that younger workers are less scarred by unemployment as employers expect a more pronounced 'job shopping' behavior among them. Unemployment during later ages on the other hand restricts workers wages not only by raising doubts about their productivity but also by restricting the subsequent employment periods which are needed to compensate the effects from earlier unemployment spells.

To test the UI benefit hypothesis and assess how UI benefits buffer the scarring effect from unemployment, Model 3 and Model 4 introduce an interaction term between the variables unemployment duration and receipt of UI benefits. Results in both of the models show that women and men who received UI benefits during unemployment periods receive respectively 3.5 and 6.2 percentage higher wages when compared to those who did not receive UI benefits. This result is in line with our expectations of the UI benefit hypothesis and implies that UI benefits alleviate the negative effects stemming from unemployment persistence by inflicting higher subsequent wages for those who received unemployment benefits during their unemployment spell. Especially men experience the highest subsequent wages. This result is in line with earlier findings of Gangl (2004) and Blackburn (2000) who find UI benefits to raise subsequent wages of US and West German workers by respectively 5.3 and 9.3 percentage points. This result shows that, also in the Dutch case, UI benefits provide financial support that not only helps workers to find higher productivity jobs but also keeps them more active and ready to re-attach to the labor market.

2.5 Summary and Conclusions

Using longitudinal data from the Dutch Labor Supply Panel (1980-2000) this study attempted to answer how occurrence, duration, and number of earlier unemployment influence (a) the probability of individuals to return to unemployment and (b) their post unemployment wages. In addition, this study investigated whether and how key individual-level characteristics and UI benefits mitigate the scarring effects of unemployment.

Drawing from job search, human capital and signaling theories different hypotheses regarding unemployment scarring were developed. Empirical evidence in this study supports the scarring hypotheses and shows that the magnitude of unemployment scarring may be much higher when accounting for different dimensions of unemployment. Our results show that the number of earlier unemployment episodes influence future employment the most. In addition to this effect, the probability to re-experience unemployment increases as unemployment was experienced more recently and as unemployment spells prolong. We also find differences in the scarring effect among men and women. The results indicate that not only the probability of re-experiencing unemployment, but also wage penalties from unemployment is higher among women. The gender differences may reflect the vulnerability of women in the labor market as they are faced with jobs of temporary and part-time character that fragment their careers. In addition to these results, it is also important to note that a job shift in a different occupational level than in the pre-unemployment level also leads to significant higher wage penalties.

Hypotheses were also drawn regarding the buffering effects of individual-level characteristics and UI benefits on the probability to re-experience unemployment and post-unemployment wages. Results highlight that while workers' level of education protects them from re-experiencing unemployment it does not protect better-educated workers from wage penalties arising from unemployment. In addition, age shows an important buffering effect. Results highlight that workers who experienced unemployment during younger ages (<25 years old), account for much lower wage penalties than those who experienced unemployment at older ages. This finding implies that although scarring effects do not disappear they can become lower with age. We also find evidence that UI

benefits considerably limit workers' wage penalties arising from unemployment. Results demonstrate that any wage penalty arising from unemployment persistence decays considerably as it interacts with UI benefits. This finding supports suggestions of job search theory and institutional approaches that point to the importance of institutional support as a tool to lower patterns of wage inequality.

These findings lead to two important theoretical implications related to the literature on unemployment scarring. First, they show that when the different dimensions of unemployment are estimated separately they may underestimate the magnitude of unemployment scarring which in practice may be much higher. Second, results show that while earlier unemployment leaves persistent scars in the subsequent employment and wages of workers, its magnitude alleviates as it interacts with individual-level characteristics and UI benefits. In sum, although scarring effects may alleviate over time as they interact with positive resources, they always damage individuals' subsequent employment and wages.

These findings have additional implications for future research. First, there is more research required that reveals what other mechanisms undermine the costs of unemployment. Second, more research is needed to reveal how and to what extent processes of unemployment affect the behavior of unemployed workers. In this study, it was assumed that unemployment might lead workers to develop poor work habits, which in turn predict subsequent spells of unemployment. However, it remains a black box of what exactly changes (i.e., choices and preferences) during the period of unemployment and what individual attributes are damaged temporary or irreversibly.

These findings also provide directions for future policy initiatives. First, results of this study show that the best way to prevent unemployment is to avoid falling into unemployment and if so not to fall into it repeatedly. Individuals' level of education showed to be an important shield against unemployment. Skills upgrading during an individual's work career would be a first step to avoid future spells of unemployment. In addition, more attention should be addressed to policies that support wage subsidies for employers or measures that subsidy workers on-the-job training. Such measures would not only stimulate employers to hire sooner those once unemployed, but would also raise workers' self-esteem and confidence and make them more ready to accept a job. Once workers are exposed to unemployment, institutional supports in the form of 'tailor-made' UI benefits are

substantial to protect workers from the wage penalties of unemployment. At this stage, UI benefits are important not only to make a proper job match possible, but also to secure workers with a job match that predicts a durable and stable career. In other words, if institutional support is well organized, supervised and adapted to the needs of specific groups of workers, the risks of job mismatching will decrease. Women are also a group that deserves more attention in the labor market. Their vulnerable position in the labor market and the higher wage penalties during their work career call for gender specific policies that offer institutional support in the form of subsidies for childcare. Such institutional support not only facilitates a broader labor market attachment of women but also assures equal rewards for women in continuous employment and those who once experienced unemployment.

Chapter 3: Unemployment Insurance Benefits – Trap Or Bridge? Longitudinal Evidence From The Netherlands 1985-2000[11]

Abstract

The impact of unemployment insurance (UI) benefits on (dis)incentives to re-enter the labor market is a persistent and controversial issue in contemporary research. Yet, there is lack of explicit empirical research that estimates the effects of specific policy changes from a dynamic and longitudinal perspective. Drawing from job search theory and using the Netherlands as a case study, this study uses the OSA panel data (1980-2000) to examine the impact of three waves of UI reforms on the duration of unemployment and labor market outcomes of the unemployed. Estimating a series of Cox, Weibull and frailty models, results demonstrate that extensions of UI benefits do not always lead to longer unemployment spells and that job search incentives are related to contextual specific circumstances determined by gender, eligibility status in conjunction with existing labor market conditions. Results also highlighted the dynamic nature of incentives to leave unemployment, with exit rates higher near the exhaustion of the benefit period.

3.1 Introduction

Over the past decades, many industrialized countries have been confronted with soaring unemployment rates, long-term unemployment and unsustainable benefit payments. Research and public debates concerning UI benefits have largely focused on their disincentive function, with the duration and high levels of UI benefits viewed as the culprit of long unemployment durations and higher European unemployment (Layard, Nickell and Jackman 1991). The underlying assumption is that higher payouts and longer eligibility lead to a lower job search

[11] This chapter has been co-authored with Dr. Melinda Mills. Earlier versions of this chapter have been presented at Society of Labor Economists, Royal Economic Society, Tinbergen Institute, Policy Studies Institute, University of Oxford (Economics Department) and Warsaw School of Economics.

intensity (Devine and Kiefer 1991; Holmlund 1998; Nickell 1997; Narendranathan et al. 1985; Johnson and Layard 1986) ultimately negative productivity, a sluggish economy, and deprivation in human capital (Abbring, Van den Berg and Van Ours 2005; Arulampalam et al. 2000; Belzil 1995; Narendranathan and Elias 1993; Heckman and Borjas 1980). This is complemented by evidence that generous unemployment compensation results in longer unemployment spells (e.g., Atkinson and Micklewright 1991; Katz and Meyer 1990) and that the subsequent restriction in the duration of UI benefits translates into higher exit rates from unemployment (Van Ours and Vodopivec 2006). Another body of research points to the positive consequences of UI benefits as a search subsidy. More generous UI benefits have been found to accelerate economic recovery after unemployment, improve job matching and heighten earnings after reemployment for some workers (Belzil 1995; Burgess and Kingston 1976; DiPrete 2002; DiPrete and McManus 1996; Gangl 2004).

Job search theory provides a theoretical explanation for these effects with a supply-side model, which assumes that unemployed job seekers require time to find a job that matches their skills and money to cover these search costs (Mortensen 1977; Devine and Kiefer 1991). In an optimal search strategy, a job seeker forms a reservation wage. However, an exogenous shock such as UI benefit restriction may result in a decline in the reservation wage, depreciation in the search subsidy and a hastened job search. Individual human capital characteristics such as educational level and employment experience also play a crucial role. They afford different groups higher or lower reservation wage calculations and operate to shield or expose them during a job search. Human capital also serves as a signal to potential employers, likewise impacting job search behavior and unemployment transitions (Becker and Tomes 1986; Groot et al. 1990). Furthermore, certain groups of workers such as youth and women may possess lower levels of human capital, be eligible for different packages of UI benefits, and therefore have distinct search strategies and outcomes.

Empirical studies have produced results very much in line with these theoretical predictions, demonstrating that there is an association between constellations of UI benefits, human capital and the duration of and transitions out of unemployment (e.g., Katz and Meyer 1990; Moffitt and Nicholson 1982). Others have attempted to go beyond the study of ‘associations’ to identify whether

there is a 'causal relationship' between changes in UI benefits and unemployment transitions (e.g., Hunt 1995; Van Ours and Vodopivec 2006). These studies, however, often only focus on one single reform and generally examine the impact of potential benefit duration on unemployment duration. Although it remains difficult to separate the effect of policy reforms from labor demand and economic cycles, there is some direct evidence of causality such as 'spikes' in unemployment exit rates directly immediately before benefit exhaustion (for the US Katz and Meyer 1990; Card and Levine 2000; for Sweden Carling et al. 1996; for Norway Roed and Zhang 2003; for Austria Lalievé et al. 2004).

The goal of this study is to build upon and extend existing literature on the (dis)incentive effects of UI benefits by empirically examining the effect of drastic and diverse changes that took place in the Netherlands. Over a 20-year period, significant UI reforms were introduced in the Netherlands, moving it from being one of the most generous systems of social security to one characterized by deep and rapid cut-offs in unemployment insurance (UI) benefits (Luijkx et al. 2006). Three sets of reforms introduced in 1985, 1987 and 1995 were considered as highly effective, with the number of registered unemployed reduced by over three times from 11.7 percent in 1983 to 3.3 percent in 2000 (Van Oorschot 1998). The vigorous Dutch reforms in the potential benefit duration, level of payment and employment-related eligibility requirements, produce a unique 'natural experiment' of UI policy change and effect. Building on studies such as Card and Levine (2000) and Van Ours and Vodopivec (2006), we adopt a quasi-experimental approach. This is due the fact that one group of workers experienced no change (serving as a natural control group) who be contrasted with other groups of workers (treatment groups) who were impacted. The drastic reforms effectively created a two-tiered system that was divided along the lines of earlier human capital acquisition. The first was a group of 'long-term recipients,' who had higher replacement levels, longer potential benefit durations and stricter eligibility requirements based on work history, which made them more likely to be married mid-career men with higher education and lower unemployment spells. The second category of 'short-term recipients' had less stringent work history requirements but in return received reduced benefit levels and shorter potential benefit durations, meaning that the group was overrepresented by younger workers, women and others with longer and higher levels of unemployment experience.

Using this natural experiment setting, we are able to separate the effects of how different types of UI reforms (level, duration, and eligibility) impact those who were affected and unaffected by these changes. A core question of the analysis is whether extensions of the UI potential benefit duration lead to longer unemployment spells and whether restrictions produce the opposite effect of shorter unemployment durations. An interrelated question with these reforms is whether limiting the benefit level and linking benefits to previous employment history impact both the rate and type of exit out of unemployment (i.e., to employment or out of the labor force entirely).

The main contribution of this study is its focus to uncover how changes in UI benefits lead to distinct patterns of unemployment durations and labor market outcomes. In doing so, this study builds on and examines both sides of the debate and not only asks if more generous or restrictive UI benefits influence unemployment duration, but also why and how this occurs. A further contribution is the examination of not only one type of alteration of UI benefits, but also various dimensions, including changes in the level, duration, and eligibility. This is important as it offers not only a more detailed picture of potential inequality in policy-reforms, but also more evidence-based policy directives to understand which changes impact, which types of individuals or circumstances, and how these different social groups are affected. Finally, it pays attention to the dynamic interplay between specific UI reforms with individuals' resources, job search behavior, and previous employment histories over a longer period of time.

The study is organized as follows. We first provide a brief elaboration of the Dutch UI system and UI benefit reforms over the past twenty years. This is followed by an outline of our theoretical framework and evidence from previous empirical studies, which are used as a basis to derive specific hypotheses about the relationship between UI benefit reforms, unemployment durations and re-entry patterns. The data and the statistical models are then described followed by the empirical findings and a discussion of more general conclusions that can be drawn from this research.

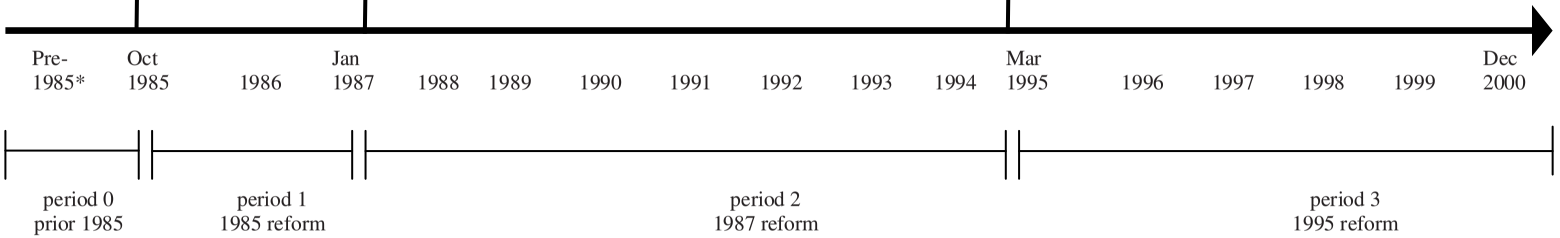
3.2 From Dutch Disease to Dutch Miracle: UI Reforms in the Netherlands

After a difficult economic period in the 1970s, the Dutch economy recovered in the late 1980s into what is now referred to as the 'Dutch employment miracle' (Visser and Hemerijck 1997). Employment during this period was characterized by the increased (part-time) labor market participation of women, active employment measures and the Wassenaar agreement of 1982. The Wassenaar agreement between trade unions, employer organizations and the government introduced a consensus-based wage-moderation policy to reduce tax levels and social security premiums in order to allow real net incomes to increase even in the absence of gross wage increases (Van Ark and Haan 1997). Several major structural reforms to the Dutch social security system were also introduced, aimed at reducing budget deficits by decreasing the number, level, and duration of social transfers and simplifying the social security system (Hoff and Jehoel-Gijsbers 1998).

These structural reforms led to a virtual 'natural experiment' of policy changes, with three waves of UI reforms in 1985, 1987 and 1995, summarized in Figure 3.1 according to level, duration or eligibility factors over three periods of time. Changes often involved transformations in more than one aspect of UI reforms, which are underlined within the figure. The first reform in 1985 was a reaction to the extreme rise in unemployment rates in the early 1980s. Central elements of this reform included the reduction of the replacement rate from 80 to 70 percent, for a maximum of 6 months and a follow-up benefit (Wet Werkloosheid Voorziening) for up to 2 years. For those ineligible for any UI benefit, a replacement of 100 percent of the statutory minimum wage was provided (MISEP 2003).

Figure 3.1. Timing of Changes in Unemployment Insurance Laws by Type of Change, 1985-2000, The Netherlands

	Before 6 months	***Long-term benefit:***	***Short-term benefit:***	***Long-term benefit:***	***Short-term benefit:***
Level	70% replacement last salary	70% replacement last salary	70% replacement minimum wage	70% replacement last salary	70% replacement minimum wage
Duration	Max. 6 months	Dependent on work history: min. 6 months to max. 2 years	Max. 6 months	Dependent on work history: min. 6 months to max. 5 years	Max. 6 months
Eligibility	Week requirement: Worked 13 of last 52 weeks	Week requirement: Worked >26 weeks of last 52 weeks prior to unemployment Year requirement: extension if worked ≤52 weeks in 3 of 5 years prior to unemployment	Week requirement: Worked >13 & <26 weeks prior to unemployment	Week requirement: Worked >26 of last 39 weeks prior to unemployment Year requirement: extension if worked ≤52 weeks in 4 of 5 years prior to unemployment	Week requirement: Worked >13 & <39 weeks prior to unemployment



NOTE: - Underlined text indicates a change in relation to the last UI policy reform. * Pre-1985. 80% of replacement rate, max. 6 months if worked 13 weeks prior to unemployment.

In 1987, further restrictions doubled the qualifying period (from 13 to >26 weeks), and entrenched the development of a two-tiered system, which distinguished between a group of 'short-term' benefit recipients versus a second group of salary-related 'long-term' beneficiaries. The key difference was that UI benefits became even more dependent on previous work history meaning that the latter group of 'long-term' beneficiaries did relatively well in comparison to the considerable drops in benefits experienced by short-term beneficiaries, which translated into 70 percent of the minimum wage (MISEP 2003). Short-term recipients were often youth, women and temporary workers that did not fit the more restricted qualifying period, also meaning not only lower payouts, but also a significant reduction in the benefit duration from the maximum length of 2 years (the previous follow-up benefit) to a maximum of 6 months (the new short-term benefit). Conversely, the move to link an individuals' previous employment history to the duration of UI benefits led to an effective increase in the length of UI payouts for the long-term beneficiaries (generally men) to a maximum of 2 years.

Another consequence, which was likely unintended, was that the unemployed older than 57.7 years were no longer required to find a job since their benefits were extended to the age of 65. The third UI reform 'experiment' in 1995 introduced even more stringent eligibility criteria and scrutinizing of recipients (Abbring et al. 2005; MISEP 2003). This included further restrictions in the 'week' eligibility (entitlement for working >26 of 39 weeks) and 'year' eligibility (entitlement for working 52 weeks in 4 of 5 years) and conversely, an increase in the benefit period for long-term recipients to a maximum of 5 years (MISEP 2003).

3.3 Job Search Behavior under Conditions of UI Reforms

In order to understand how UI benefit reforms operate as either a stimulus or disincentive to re-enter the labor market, it is essential to reflect upon previous empirical findings and build a theoretical framework that delves into both individual variation in job search behavior and contextual factors. This section synthesizes existing research with job search theory to understand these mechanisms and draw tangible hypotheses.

3.3.1 Previous Empirical Evidence

A large body of international research exists on the impact of UI benefit reforms on unemployment duration and outcomes. Microeconomic research highlights the dynamic nature of job search incentives of the unemployed, linking incentives and extensions in UI benefits with the timing of benefit exhaustion. In a study of the impact of UI benefit extensions among 12 US states, Katz and Meyer (1990) report a high increase in the escape rate from unemployment around the time of benefit exhaustion. Other studies (Newton and Rosen 1979; Moffitt and Nicholson 1982; Ham and Rea 1987) show that a one-week increase in the potential benefit duration leads to an increase in unemployment durations by 0.16 to 0.20 weeks.

While the American evidence is largely consistent, studies on Europe have produced mixed results, underpinning the importance of the welfare regime and availability of additional sources of government support such a social assistance, training programs or relief jobs. In harmony with previous US findings, Hunt (1995) finds that extended benefit durations in Germany result in longer unemployment durations for those entitled. However, contrary to American findings, significantly more German UI claimants enter non-participation after the expiration of the benefit period. Bratberg and Vaage (2000) found that when the unemployed in Norway were affected by a three-year extension of UI benefits, there was no significant increase in employment re-entry around the period of benefit exhaustion, rather the benefit changes prompted more exits to non-participation. This evidence may points to the shielding effect of social assistance benefits for the unemployed within social-democratic and corporatist welfare regimes in comparison to the liberal regime of the United States (Esping-Andersen 1990). This aspect undoubtedly also plays a role in the Netherlands that increasingly follows the social-democratic (Scandinavian) model, with workers no longer eligible for UI benefits generally receiving some type of social assistance.

Whereas an extension of the potential benefit duration leads to changing incentives at the end of an unemployment spell, an extension of the benefit level has been found to alter incentives at the beginning of the spell. Existing evidence on the benefit sanctions in the Netherlands shows that temporary benefit cuts between 5 to 30 percent cause immediate increases in job finding rates among workers in the metal industry and the banking industry. More recently, evidence in

Finland shows that an increase in the level of UI benefits lowers the re-employment hazard in the beginning of a spell, but the hazard rate returns to pre-reform level once the period on increased benefits expires (Uusitalo and Verho 2007). Such disincentive effects, however, may vary among men and women. Recent evidence shows that while marginal changes in unemployment benefits affect the behavior of men, the threat of benefit termination affects women much more than men (Roed and Zhang 2003).

A final area of research often overshadowed by the focus on the disincentive or 'trap' effect of UI benefits, is the study of favorable long-term outcomes or 'bridging' effects of UI benefits for job matching and re-employment quality. Several studies link receipt of UI benefits with higher reemployment wages (Addison and Blackburn 2000; Belzil 1995; Burgess and Kingston 1976; Gangl 2002). Gangl (2002) notes that longer unemployment spells are attributed to lead to longer job search processes that are used to improve job matching and result in higher re-employment wages. In a comparative study of the US and Germany, Gangl (2004) illustrates the protective effect of UI benefits in shielding workers against earnings losses, downward occupational mobility and entering unstable jobs. This is supported by other studies such as Pollman-Schult and Büchel (2005), who found that while a reduction in the UI benefit level and duration in West Germany led to shorter unemployment spells, it was at the price of subsequent job matching and quality.

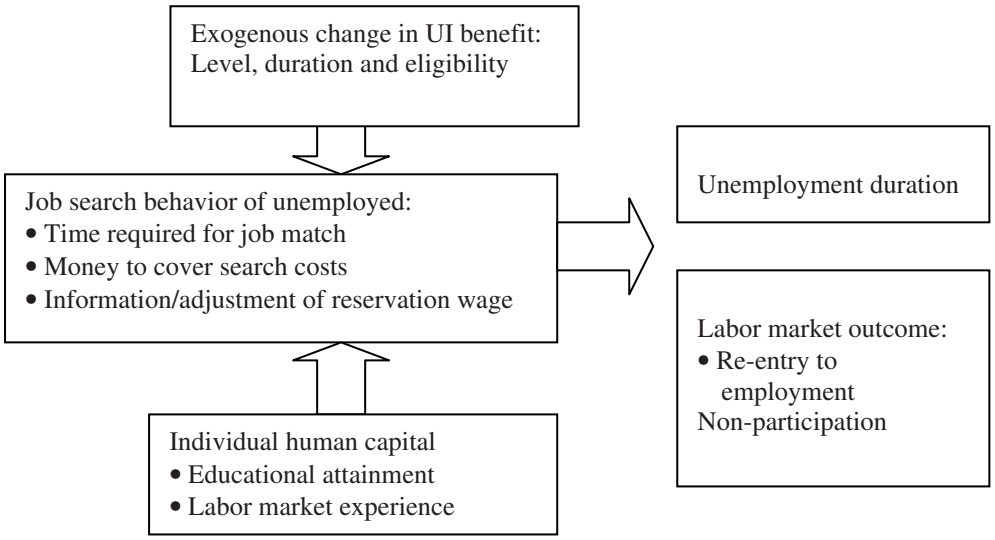
These previous findings, coupled with our knowledge of the type of UI reforms and context of the Netherlands, leads us to anticipate that decreases in the UI benefit levels and restriction of potential benefit duration will result in shorter unemployment spells. Yet we also anticipate that the policy reform to connect previous labor market history to UI benefits will result in the creation of a two-tiered system, which will be highly divided by the level of human capital and impact both unemployment durations and outcomes. On the one hand, for the 'long-term beneficiaries' entitled to extended potential benefit durations we expect an increase in unemployment durations but also more 'successful' outcomes out of unemployment to employment (as opposed to leaving the labor force). On the other hand, for those with more fragmented or short-term employment periods, connecting UI benefits to previous work history will automatically place them in the 'short-term beneficiary' group, resulting in shorter unemployment durations

and more 'unsuccessful' transitions out of the labor market after benefit exhaustion.

3.3.2 A Theoretical Framework on Job Search Behavior under Conditions of UI Reforms

Job search theory describes how an unemployed individual maximizes her/his income and future job chances during a job search (Devine and Kiefer, 1991; Mortensen, 1986; Lippman and McCall, 1976; Van den Berg 1990). Our model, depicted in Figure 2, illustrates that the observed unemployment duration and labor market transitions are a result of a job search that is influenced by both the level of an individuals' human capital and the exogenous change in UI benefits.

Figure 3.2. The Impact of Changes in UI Reforms on Unemployment Durations and Labor Market Outcomes



Job search theory provides a classic supply-side model that assumes that job seekers have access to imperfect information about job offers and require time to find a job that matches their skills and money to cover the search costs during the unemployment period. The cornerstone of this theory is the assumption that for an optimal search strategy, a job seeker forms a reservation wage, which is the

function of the perceived wage distribution and the value of remaining unemployed (Mortensen, 1986). In our model, UI benefits operate as a subsidy that provides the unemployed with more time and money to optimize their search. A reform in UI benefits, such as a decrease in benefit levels, would provide less time and money to cover search costs thereby altering job search behavior by forcing individuals to either intensify their search or lower their reservation wage. This leads us to our first general hypothesis:

UI reform hypothesis: A decrease in UI benefits (levels, duration and/or eligibility) will result in shorter unemployment durations and poorer labor market outcomes (remaining unemployed or exiting the labor force to non-participation). Conversely, an increase in UI benefits will result in longer unemployment durations and more favorable labor market outcomes (employment re-entry).

We anticipate that UI benefit restrictions operate as an exogenous 'external shock' offering a lower search subsidy, hastened job search and decline in the reservation wage and job preferences. Poorer labor market outcomes include accepting a job that does not match prior experience and education, or as examined in our models, exiting the labor market entirely after the exhaustion of benefit receipt instead of re-entering employment. Long-term implications would be an overall trend in the downward occupational mobility of certain groups of individuals, unstable 'patchwork' employment careers and repeated unemployment spells (Mills and Blossfeld, 2006).

An additional consideration is that reforms do not have a blanket impact on all individuals, but rather affect individuals in disparate ways who make decisions with future outcomes in mind. As Mortensen (1977) and later Van den Berg (1990) argued, there is also an 'entitlement effect'. This refers to the phenomenon that an increase in UI benefits may actually result in shorter unemployment durations for certain groups. The logic is that an increase makes it potentially more attractive to re-enter employment for those who are presently ineligible, which in turn qualifies them for future UI benefits. A restriction or reduction in UI benefits would discourage this group to re-enter employment since the (insured) level would not exceed the present value of their social benefits. This leads us to our next hypothesis.

Entitlement hypothesis: For those who are currently not eligible for UI benefits, an increase in benefits will result in a shorter unemployment durations (i.e., higher reemployment rates), with a decrease resulting in longer unemployment durations.

By extension, those who already qualify for benefits may also be influenced, as an increase in future benefits increases the value of employment relative to unemployment thereby speeding up the job search process and resulting in shorter unemployment durations. Job search theory offers a more basic economic supply-side model of behavior, assuming that all individuals engage in the same rational utility maximizing calculations. It neglects the importance of individual characteristics and how these characteristics serve as 'signals' to employers. Classic human capital theory is useful to understand how diversity in human capital characteristics impact job search behavior (for an overview see Becker and Tomes 1986; Groot et al. 1990). In this theory, a workers' wage rate (and in our case also UI eligibility status) is related to their stock of human capital, which consists of two important components: educational attainment and employment and unemployment experience. Education and (un)employment experience afford different groups of individuals with not only the ability to engage in diverse types of utility maximization calculations, but also as a protective 'shield' during the job search (e.g., higher benefits since they are often based on previous wage levels). These human capital characteristics also serve as 'signals' to employers, urging us to move beyond simple supply-side models to also include demand factors via signaling theory (Albert Ma and Weiss 1993). Using this theory, higher education, a lower frequency of the number of unemployment experiences, short unemployment durations and a longer uninterrupted career serve as a positive 'signals' to potential employers. This allows us to draw an additional hypothesis.

Human capital signaling hypothesis: More unemployment and non-participation episodes, less employment experience and lower levels of education will result in negative 'signals' to employers and therefore longer unemployment durations and a lower likelihood of employment re-entry.

Human capital theory also helps us to differentiate between two main UI entitlement groups. First, there are those with higher human capital who benefit from higher salary-related or long-term UI benefits. Second, there are workers with lower human capital (i.e., less accumulated work experience, more unemployment spells, lower education) who are more likely to be short-term UI benefit recipients, often with lower benefit levels. Those with lower human capital who are eligible for only short-term benefits are in a potentially more volatile situation. They do not have the option to remain unemployed for a longer period since they do not meet the eligibility requirements or have the financial ability to sustain extended unemployment. The value of remaining unemployed therefore becomes lower than the perceived value of job re-entry wages. Those with long-term salary-related benefits can afford more reserved job search behavior. This leads to an additional sensitivity hypothesis.

Sensitivity hypothesis: Short-term benefit recipients will be more sensitive to decreases in UI benefits and demonstrate shorter unemployment durations. Long-term salary-related recipients will be less sensitive to policy changes and have longer unemployment durations.

The focus on education level and (un)employment experience in human capital theory omits a central predictor of divergent labor market experiences – gender. This is particularly relevant in the Dutch context, which is characterized as a 'male-breadwinner' or 'one-and-a-half-earner' labor market system. Although there was a substantial increase in female labor market participation in 1980s, cultural preferences and institutional structures have meant that women's employment is concentrated in part-time jobs, interspersed with exits from the labor market during childbearing and rearing periods (Van der Lippe and Van Dijk 2002). In fact, although 64 percent of women were employed in 2003, 75 percent of those were part-time workers, compared to the European average of 25 percent (OECD 2006).

We expect that being male or female is highly related to levels of human capital and thus likely related to whether the individual is a long-term salary-related or short-term recipient. Patchwork careers, part-time employment and lower accumulated work experience may mean that women will not be entitled for long-

term, salary-related UI benefits. It also suggests that women are situated in jobs with lower occupational prestige and wages, which would translate into lower salary-related benefits if they did in fact qualify. Lacking a search subsidy, women may therefore be prompted to take a job at a faster rate than their male counterparts or withdraw from the labor market entirely. In an extension of our sensitivity hypothesis, we therefore have the following expectation.

Gender hypothesis: The female labor market career (with more unemployment and non-participation episodes, less employment experience), will mean that women more often will have the ability to meet the criteria for short-term UI benefits, have shorter unemployment durations and higher exits to non-participation. Conversely, men will have a higher chance of eligibility for long-term salary-related benefits, resulting in longer unemployment durations and higher entries to employment.

A final addition to this theoretical framework is the acknowledgement of demand-side factors in the form of economic cycles, with the probability of leaving unemployment expected to decrease as the unemployment rate increases (Kalwij 2003; Lockwood 1991). Negative duration dependence is stronger in tighter labor markets since a long spell of unemployment during a recession is less often a negative signal to a firm than one during an economic upturn (Blanchard and Diamond 1994; Lockwood 1991). In the mid and end of 1980s, the Netherlands had considerably higher unemployment rates, which subsided at the beginning and mid of 1990s. Based on this, we develop a labor-demand hypothesis.

Labor-demand hypothesis: Unemployment durations will be shorter during the third (1995) UI reform implemented in a time of low unemployment rates and higher vacancy stocks. Unemployment durations will be longer during times of high unemployment and a low stock of vacancies after the first and second reform in the mid and end of 1980s.

We also expect that birth cohort will play a role, with the 1965-1969 cohort representing unemployed youth who, due to lack of previous labor market experience, do not often receive any UI benefits. Whereas those born between 1940-1950, 1930-1940 and 1920-1930 will represent the registered unemployed

who will generally receive UI benefits and are situated in their mid- and late careers. Demand-side factors and the contextual environment are essential to understanding the impact of UI reforms. We will therefore now turn to a brief description of these aspects.

3.4 Data, Variables and Statistical Modeling

3.4.1 Data Set

To assess the empirical implications of UI reforms on unemployment duration and employment outcomes, the analysis uses longitudinal data from the OSA Labor Supply Panel from waves 1985-2000. Since 1985, standard interviews were conducted every two years to assess the labor market dynamics of the working population. In each wave, between 4000-5000 respondents participated, who were either employed, unemployed or non-employed at the time of the interview. Panel members starting from the age of 16 years old were asked a series of detailed demographic, labor market and income-related questions relating to the period between the last and current interview.

Our analysis is restricted to those unemployed workers between 16-64 years old who were unemployed at the moment of interview and were actively searching for a job[12]. The data was reconstructed into monthly (un)employment histories over the 20 year observation period from April 1980 to September 2000. The analysis only includes unemployment spells that occurred during the observation period and therefore excludes left-censored spells. Spells interrupted because of a withdrawal from the sample are recorded as truncated. These restrictions leave us with a total of 4,399 unemployment spells from 1,788 respondents. Of the 4,399 spells of unemployment, 22.4 percent are right-censored (remain unemployed), 68.4 percent end in employment, 2.3 percent in self-employment, 5.7 percent in non-participation and 1.1 percent in education. In addition to the unemployment spells, the data also includes core and control

[12] The definition of unemployment used in this analysis follows standard ILO definitions, which were implemented during the OSA data collection. Following standard definitions (e.g., Gangl, 2004), unemployment spells were included if individuals had worked at least three months before the start of an employment spell.

variables discussed shortly, with the summary statistics for these variables shown in Table C1 of Appendix C.

3.4.2 Definition of Variables

Construction of the Control and Treatment Groups. As described at the onset of this chapter, a central goal of this study is to engage in a quasi-experiment to disentangle the effects of changes in UI benefits from aspects such as labor market demands, economic cycles or other factors. To achieve this we follow the 'difference-in-difference' approach (Blundell and McCurdy 1999; Blundell and Dias 2000). This approach examines the effect of policy changes by creating control and treatment groups and by comparing their hazards before and after the UI reform (see also, for example Van Ours and Vodopivec 2006). The control group is used in order to "difference out" confounding factors that isolate the treatment effect. In other words, this group reflects factors of those not affected by the UI reforms and shows the change in their transition out of unemployment, which can be attributed to changes in labor market conditions. The hazard rates of the treatment and control groups are compared to each other before and after the policy changes. If the hazard rate for the treatment group increases/decreases more than the hazard rate for the control group around the dates of the UI reforms, we conclude that the reform increased/decreased the hazard rate. The advantage of this method is that each group's outcomes serve as the group's own control to account for unmeasured time effects (Fu et al. 2007).

In this chapter, we distinguish between the following control and treatment groups. The first treatment group that is affected by the policy change in 1985 comprises those registered unemployed that had worked for at least 13 weeks prior to becoming unemployed with a maximum daily wage ranging between 91 and 300 Guilders. The control group in 1985 comprises those unemployed that had worked less than 13 weeks prior to becoming unemployed and were not eligible to UI benefits. This group is important for theoretical reasons as it tests assumptions of job search theory regarding the entitlement effect[13]. The groups affected by the 1987 UI reform are divided into short-term and long-term treatment groups. The

[13] Increase in the value of UI benefits, leads to an increase in the job finding rates because it re-qualifies for higher benefits in the future. In other words, work not only pays during employment but also during unemployment spells.

first treatment group here comprises those registered unemployed that had worked between 13 and 26 weeks of the last 52 weeks prior to becoming unemployed but with no consecutive work experience over their past employment history. The latter treatment group comprises those registered unemployed that had worked at least 26 weeks out of the 52 weeks immediately prior to becoming unemployed and had received wages in at least 3 out of the 5 last years. The control group in 1987 comprises those registered unemployed with no change in their qualifying period i.e., their qualifying period was equal to 26 weeks of the last 52 weeks prior to becoming unemployed who had received wages in 3 out of 5 last years. Finally, the groups affected by the 1995 UI reform distinguish also between short-term and long-term treatment groups. The first group comprises those registered unemployed that had worked 39 out of 52 weeks prior to becoming unemployed who had not received wages in 4 out of 5 last years. This group was eligible to short-term benefits. The latter group comprises those registered unemployed who had worked 39 out of 52 weeks and had received wages in 4 out of 5 last years. The control group in 1995 comprises those registered unemployed that had worked at least 26 out of 39 weeks prior to becoming unemployed and had received wages in 4 out of 5 last years.

Dependent and Independent Variables. The dependent variable in our analyses is *the duration of unemployment before the transition to re-employment* (and in some analyses also to non-participation, with other transitions treated as right-censored). To avoid biased estimations, three different periods of inflow before and after the policy changes are taken, which were illustrated previously in Figure 3.1. This permits the observation of whether there were any other pre-existing differences in trends. To avoid seasonal differences in the composition of the inflow, the periods of inflow were taken over a period of two years before and two years after the implementation of each policy change. In other words, the period measure for the 1985 policy change is 0 if it refers to the period prior to October 1985 and 1 for the period between 1985-1987. For the second reform in 1987, the period prior to January 1987 is 0 and 1 between 1987-1995. The final reform in 1995 is 0 prior to March 1995 and 1 between 1995-1997. The period dummies are constructed to indirectly measure the effects of the UI reforms. Interaction of the time-varying period dummies (that indicate the period of a new UI reform) with the treatment group dummies captures the effect of the UI reforms

for the treatment group. The interaction of these variables will also reveal more about the predicted entitlement effects.

To assess the (un)employment experience hypothesis two variables are constructed: (1) the number of past employment experiences, and (2) the number of past unemployment experiences. Education-skill level was defined using the Dutch Standard Education Classification (Standaard Opleidings Indeling) that distinguishes between five categories: (1) elementary school (BO); (2) lower intermediate school (LBO-MAVO-VMBO); (3) upper intermediate school (HAVO-VWO-MBO); (4) college (HBO) and (5) university degree (WO). A gender variable controls for differences between men and women. By running separate models for men and women, we can further test the gender hypothesis and account for major differences that between male and female labor market participation. The variable age (ranges from 16 to 64) is also included to control for its relationship with unemployment duration. Age squared on the other hand is incorporated to control for a curvilinear relation between age and unemployment duration. Birth cohort variables were entered in the model to explain how the probability of leaving unemployment changes among different generations. The birth cohort 1965-1969 represents unemployed youth at onset of unemployment often not receiving any UI benefits situated at the beginning of their career. Birth cohorts 1940-1950; 1930-1940 and 1920-1930 represent those registered unemployed, mostly receiving UI benefits situated in their mid- and late career. A detailed description of the construction of the variables is presented in Table C2 of the Appendix C.

3.4.3 Statistical Modeling

The statistical modeling relies on survival or event history methods (Allison 1984; Blossfeld and Rohwer 1995) where we first begin with the descriptive Kaplan-Meier estimates of unemployment duration. In a second set of analyses, we produce parameter estimates in the form of the more flexible continuous-time semi-parametric Cox models of the transition from unemployment to employment re-entry. We first produce estimates of the broader impact of the UI reforms across the three periods, with three general treatment groups (one for each year). This is then followed by a more detailed analysis that produces the estimates for the detailed five treatment groups. In the third set of analyses, we move beyond only

the examination of successful transitions to employment re-entry to adopt an independent competing risk framework that examines both the transition from unemployment-to-employment and from unemployment-to-non-participation. Here the log-likelihood is split into the sum of its risk-specific hazards (Lancaster, 1990). Following this, we turn to the estimation of a parametric Weibull model, which assumes the hazard to raise or fall monotonically over time. This also allows us to control for unobserved heterogeneity, which we assume follows a Gamma distribution. Finally, we engage in a series of sensitivity analyses to control for whether the results are robust to changes in the composition of the control and treatment groups.

The Cox (1972) proportional hazard model is a flexible approach that allows the baseline hazard to assume any shape and can easily accommodate time-dependent covariates, allowing us to model the fluctuations in the waiting time distribution. It allows us to form an impression about the effects of UI reforms without imposing a rigid structure in the empirical model. The Cox (1972) proportional hazard model yields an overall hazard of:

$$h_{ij}(t;X_i) = h_0(t)\exp(X_i\beta_j) \tag{1}$$

where $\mathbf{X}_i$ is a set of time-varying covariates including individual characteristics and h_0 is the baseline hazard rate. β_j represents the estimated coefficients that are restricted to act proportionally on this baseline, with (t) representing the elapsed unemployment duration.

Figure 3.1 illustrated how the policy changes were implemented over three periods. Recall also from the previous discussion of control and treatment groups that the UI reforms affected only one portion of the unemployed group, leaving a control group, which allows us to estimate the evolution of the hazard rates before and after each policy change using the 'difference-in-difference' approach. To estimate the transition rate of individuals before their transitions to these domains after each UI reform we write the hazard as:

$$h_{ij}(t;\mathrm{X}_i) = h_0(t)\exp(\mathrm{X}_{it},\mathrm{Z}_t)\beta_1 + P_t * \beta_2 + T_i * \beta_3 + \lambda(T_i^a * P_t^{85}) + \lambda(T_i^b * P_t^{87}) + \lambda(T_i^c * P_t^{95}) \tag{2}$$

where, $\mathbf{X}_{it}$ refers to a vector of individually based characteristics and the value Z_t refers to the time-varying covariates. The value P_t contains the three time-varying period dummies, the value of T_i refers to those treated (affected) by a particular policy change and the values P^{85}, P^{87}, and P^{95} denote the time-varying period dummies that point to the period of policy change. Values T^a, T^b, and T^c refer to those affected workers under a particular policy change and the value λ refers to the coefficient associated with the interaction between the treatment and period dummy variables needed to capture the effect of UI reforms for the treatment group.

As Figure 3.1 and our previous discussion described, the 1985 change resulted in only one treatment group. The changes in 1987 and 1995, however, resulted in the creation of two new eligibility groups for each respective reform (i.e., long-term or and short-term recipient group). In total we therefore need to account for the effect of five different treatment groups (T^a, $T^{b\text{-}l}$, $T^{b\text{-}s}$, $T^{c\text{-}l}$, *and* $T^{c\text{-}s}$) and estimate the effects of policy changes recognizing the different UI reform implications on replacement rates and eligibility criteria. In this case, we yield the following specification:

$$h_{ij}(t;\mathrm{X}_i) = h_0(t)\exp(\mathrm{X}_{it},\mathrm{Z}_t)\beta_1 + P_t * \beta_2 + T_i * \beta_3 + \lambda(T_i^a * P_t^{85}) + \lambda(T_i^{b-l} * P_t^{87}) + \lambda(T_i^{b-s} * P_t^{87}) + \lambda(T_i^{c-l} * P_t^{95}) + \lambda(T_i^{c-s} * P_t^{95}) \quad (3)$$

where, $T^{b\text{-}l}$, $T^{b\text{-}s}$, $T^{c\text{-}l}$, and $T^{c\text{-}s}$ refer to the long-term and short-term recipient group during the period of 1987 ($T^{b\text{-}l}$, $T^{b\text{-}s}$)and 1995 ($T^{c\text{-}l}$, $T^{c\text{-}s}$).

Although the Cox model is a flexible choice for the initial analysis, it lacks efficiency because it does not specify the functional form of the baseline hazard. In order to control for unobserved heterogeneity and estimate how the hazard rises or falls over the course of an unemployment spell, it is necessary to specify a parametric structure for the hazard that shows positive or negative duration dependence. Following assumptions from the job search theory and evidence from previous studies, we assume that workers' incentives to find a job are higher near the benefit exhaustion leading thereby to increasing hazards over time. To model this, we need a model that specifies a parametric structure for the baseline hazard. We therefore specify a Weibull model, which allows the parametric structure of the

hazard to grow monotonically over time ($\alpha > 1$). This specification is also equivalent to what we have observed in the estimated cumulative baseline hazard function that shows the hazard to increase monotonically at an increasing rate (see Figure C1 and Figure C2 in Appendix C). The baseline hazard in this case summarizes the pattern of duration dependence, assumed to be common for all individuals yielding the following specification:

$$h_{ij}(t; X_i) = \alpha t^{\alpha-1} \exp(X_i \beta_j) \tag{3}$$

Making a distributional assumption also allows us to control for unobserved heterogeneity. Heterogeneity can be a problem when relevant covariates are left out of the model, such as those that are difficult or impossible to measure. We therefore include the estimations from 'frailty' models, which isolate whether some observations are more failure-prone or 'frail' in the data (Hougaard 2000). In frailty models, we distinct between the hazard that individuals face and the population hazard that is an average over all the survivors (Cleves et al. 2004). More specifically, in practice we distinguish among unemployed workers with more capacities, social networks or incentives to find a job who have higher propensities to leave unemployment than others. An implication of this is that after a while we are left with a population that is more homogenous in terms of motivation and capacities, leading to misleading standard errors and parameter estimates of duration dependence. We therefore address unobserved heterogeneity by introducing an additional random parameter (υ) with a set of unobserved characteristics independent from the X_i that accounts for random frailties in the hazard rate. In this analysis, we assume that such heterogeneity follows a gamma distribution, which tests whether the variance component is different from zero. If this is the case, we can then suppose that unobserved heterogeneity plays a significant role in the model.

3.5 Empirical Results

3.5.1 Descriptive Results

Descriptive statistics for treatment and control groups in Table C3 of Appendix C, show that those treated in 1985 are more often married men in their mid age with intermediate education and higher work experience compared to the control group. Those short-term treated in 1987 and 1995 are more similar to each other. These are more often married women in their mid 30s, mostly with upper intermediate school who have experienced more often unemployment in their past relative to the salary related and those not affected. Also the long-term treatment groups in both 1987 and 1995 show similarities. These are more often married men in their late 30s or beginning of their 40s with intermediate upper education and relative low unemployment experiences.

Figure 3.3 charts the hazard rate of exit out of unemployment of the five treatment groups before and after each UI reform, with two striking results. First, the implementation of all UI reforms resulted in an upward trend in exit rates out of unemployment for all eligible UI recipients, suggesting that the reforms generated shorter unemployment durations among different eligibility groups. Second, the figures show clear 'spikes' in the hazard of employment re-entry, which reflect the changes in the potential duration benefit cut-off. The short-term UI recipients (Figure 3.3c and 3.3e) for instance, show spikes at 12 and then again at 24 months. Long-term recipients (Figure 3.3b and 3.3d) show a different temporal effect with a higher immediate effect, which more steadily rises over time and then peaks at 12 months (particularly with the 1987 reform) and again at 20 and 24 months at the time of the maximum benefit period.

Figure 3.3. Hazard Rates of Re-Entry into Employment from Unemployment among Different Treatment Groups, Before and After Each UI Reform, 1980-2000, The Netherlands

Figure 3.3a. Treated, 18 months Before and After, 1985 Reform

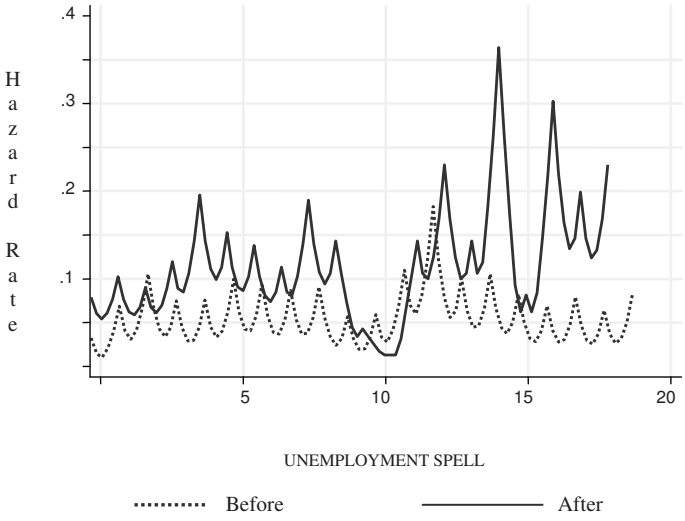


Figure 3.3 *(Continued)*

Figure 3.3b. Salary-related Treated, 2 years Before and After, 1987 Reform

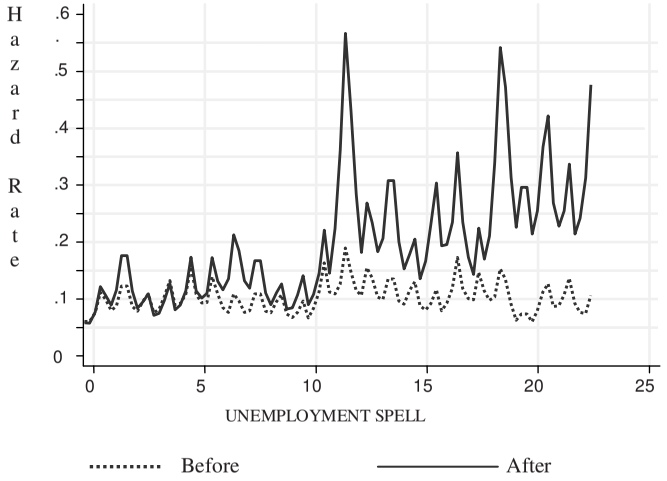


Figure 3.3c. Short-Term Treated, 2 years Before and After, 1987 Reform

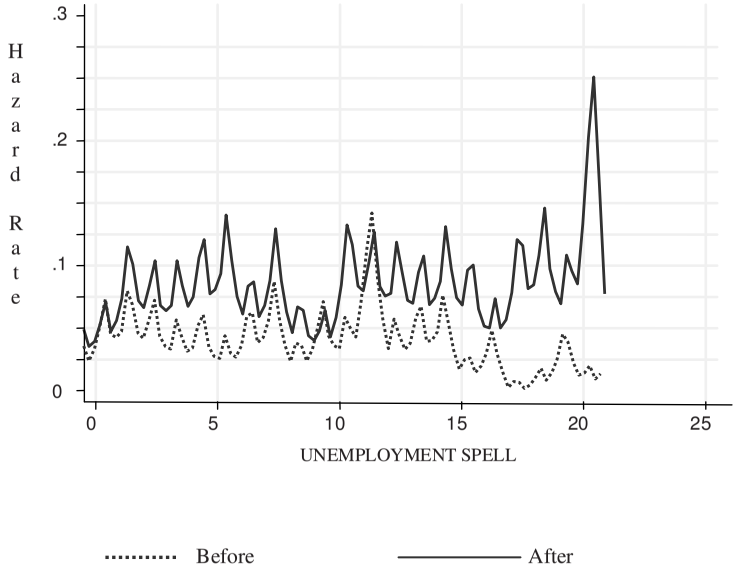


Figure 3.3 *(Continued)*

Figure 3.3d. Salary-related Treated, 2 years Before and After, 1995 Reform

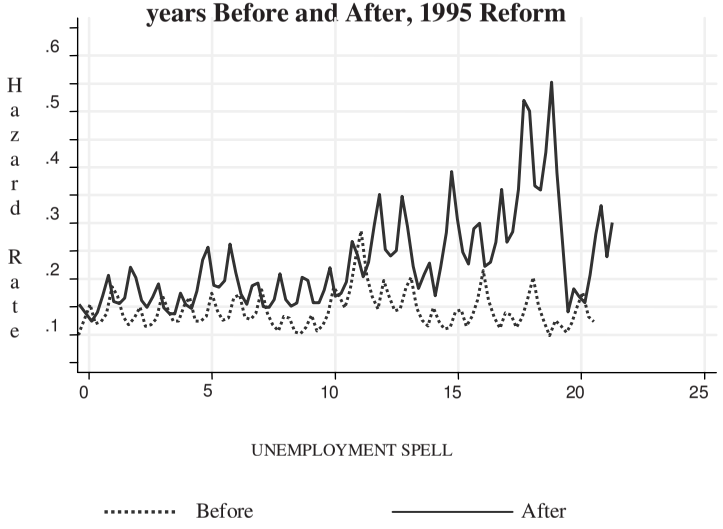
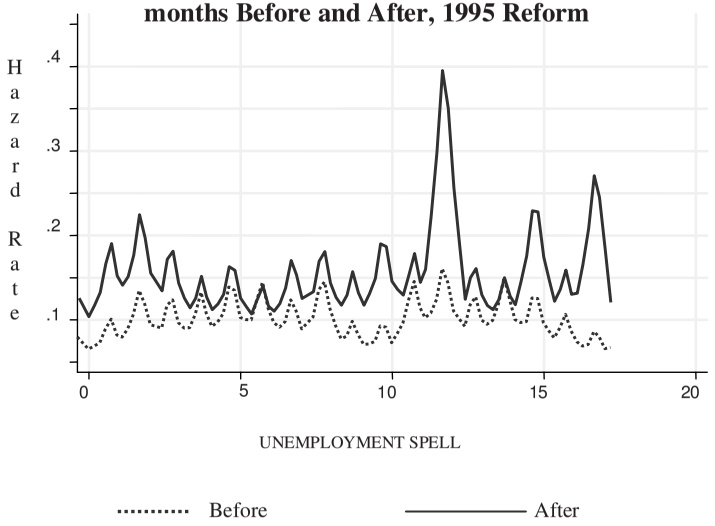


Figure 3.3e. Short-Term Treated, 18 months Before and After, 1995 Reform



Although this is an interesting exploratory exercise, these results compare only the spells of the treatment groups. Further analyses shown in Model 1 until Model 3 in Table 3.1 compare the size of the policy effect by calculating the difference in the failure rates between the treatment and control groups before and after the policy changes. The table shows these effects in percentages by each policy reform and whether it is an exit into employment or non-participation, showing the percentages before and after and the difference between these two, followed by a column with the policy effect of the 'difference-in-difference.' Examining the policy effect of exits into employment for the group eligible for UI benefits in 1985 (treatment group), results indicate that lowering the benefit level by 10 percent significantly increases the re-entry rates of those eligible for UI benefits by 15.1 percent compared to a control situation with no decrease. Conversely, we detected deterioration in the re-entry rates for those not eligible for UI benefits (control group) by -7.9 percent. This finding supports our UI reform hypothesis by showing that a reduction in the benefit level results in shorter unemployment durations. It likewise sustains the entitlement hypothesis by showing that a decrease in benefit levels discourages those who are not entitled. The explanation is probably that when UI benefit levels are low, those not entitled to UI benefits become more demoralizing yielding lower re-entry rates to employment. Furthermore, we also see that the 1987 policy restriction of 13 additional weeks of work experience in the qualifying period for UI benefits triggered a 9.9 percent faster re-entry rates among the short-term UI beneficiaries. On the other hand, the long-term recipients had longer unemployment durations (-5.4). In 1995, when the work history restrictions became more stringent, we again see policy effects of shorter unemployment durations among short-term recipients and longer durations among long-term recipients.

Table 3.1. The Effect UI reforms on Re-entry and Non-Participation Rates, 12 Months Before and After Implementation, In Percentages

EXITS TO EMPLOYMENT	***1st UI reform***				***2nd UI reform***				***3rd UI reform***			
	Before (B)	After (A)	Change (A-B)	Diff-in-Diff	Before (B)	After (A)	Change (A-B)	Diff-in-Diff	Before (B)	After (A)	Change (A-B)	Diff-in-Diff
Eligible in 1985	63.3	70.5	7.2	15.1								
Control Group in 1985	52.2	44.3	-7.9									
Eligible long-term UI benefits in 1987					67.6	68.8	1.2	-5.4				
Eligible short-term UI benefits in 1987					56.0	72.6	16.6	9.9				
Control Group in 1987					48.7	55.3	6.6					
Eligible long-term UI benefits in 1995									54.1	46.4	-7.7	-18.2
Eligible short-term UI benefits in 1995									60.8	76.0	15.2	4.7
Control Group in 1995									47.5	58.0	10.5	

Table 3.1. The Effect UI reforms on Re-entry and Non-Participation Rates, 12 Months Before and After Implementation, In Percentages *(Continued)*

EXITS TO NON-PARTICIPATION	***1st UI reform***				***2nd UI reform***				***3rd UI reform***			
	Before (B)	After (A)	Change (A-B)	Diff-in-Diff	Before (B)	After (A)	Change (A-B)	Diff-in-Diff	Before (B)	After (A)	Change (A-B)	Diff-in-Diff
Eligible in 1985	2.8	1.8	-1.0	-2.0								
Control Group in 1985	12.0	13.0	1.0									
Eligible long-term UI benefits in 1987					7.8	8.3	0.5	-0.8				
Eligible short-term UI benefits in 1987					4.2	6.7	2.5	1.2				
Control Group in 1987					11.8	13.1	1.3					
Eligible long-term UI benefits in 1995									7.5	9.7	2.2	-5.3
Eligible short-term UI benefits in 1995									5.5	4.5	-1.0	-8.5
Control Group in 1995									10.8	18.3	7.5	

SOURCE: -Author's calculations using data from the OSA Supply Panels, 1985-2000.

Although the failure rates are interesting to explore general trends of the effects of UI reforms, they do not allow detailed explanatory variables and therefore assume no heterogeneity in the sample (Meyer 1990). It is therefore useful to continue with a more detailed examination that controls for further explanatory variables and explores the unfolding of the temporal duration of unemployment in a more sophisticated manner.

3.5.2 Parameter Estimates of Three Policy Reforms (Main Treatment Groups)

Cox proportional hazard models for the transition from unemployment to re-entry into employment after each implemented UI reform are run separately for men and women and reported in Table 3.2A (men) and Table 3.2B (women). Negative estimates indicate decreasing hazard rates and therefore longer unemployment durations with positive estimates indicating increasing hazard rates and shorter unemployment durations. For statistical reasons we will focus on the interpretation of the results in the last column (columns 3) of Table 3.2A and 3.2B that control for various demographic and labor market characteristics.

Table 3.2A. Cox Estimates Predicting the Transition From Unemployment-to-Employment for Men, The Netherlands 1980-2000

	Men		
	Model 1	Model 2	Model 3
After 1985 UI reform (1985-1987)[a]	-0.328	-0.322	-0.278
	(1.44)	(1.41)	(1.18)
After 1987 UI reform (1987-1989)	0.267	0.261	0.261
	(1.39)	(1.36)	(1.30)
After 1995 UI reform (1995-1997)	0.350**	0.351**	-0.073
	(2.08)	(2.05)	(0.33)

Table 3.2A. Cox Estimates Predicting the Transition From Unemployment-to-Employment for Men, The Netherlands 1980-2000 *(Continued)*

	Men		
	Model 1	Model 2	Model 3
Treated in 1985	0.418**	0.405**	0.496**
	(2.09)	(2.04)	(2.17)
Long-term treated in 1987[b]	0.856	0.877	0.426
	(0.63)	(0.66)	(0.37)
Short-term treated in 1987	0.135	0.235	-0.453
	(0.11)	(0.19)	(0.72)
Long-term treated in 1995	0.650*	0.754*	0.523
	(1.65)	(1.84)	(1.33)
Short-term treated in 1995	0.816	0.828	0.817
	(1.51)	(1.55)	(0.91)
After 1985 UI reform x Treated in 1985	0.109**	0.103**	0.102**
	(2.13)	(2.00)	(2.03)
After 1987 UI reform x Treated in 1987	0.064***	0.062***	0.051***
	(4.77)	(4.58)	(3.22)
After 1995 UI reform x Treated in 1995	0.073***	0.073***	0.115***
	(5.30)	(5.00)	(5.77)
Received UI benefits during spell		0.031	0.195**
		(1.18)	(2.20)
Age		-0.002	-0.004**
		(1.41)	(2.23)
Age squared		0.000	0.000**
		(1.49)	(2.11)
Birth cohort (1940-1950)[c]			0.173**
			(2.41)
Birth cohort (1930-1940)			0.140*
			(1.71)
Birth cohort (1920-1930)			0.168*
			(1.68)
Lower Intermediate School[d]			-0.043
			(0.48)
Upper Intermediate School			0.096
			(1.00)
College			-0.098
			(0.89)

Table 3.2A. Cox Estimates Predicting the Transition From Unemployment-to-Employment for Men, The Netherlands 1980-2000 *(Continued)*

	Men		
	Model 1	Model 2	Model 3
University			0.348**
			(2.00)
Number of employment experiences			0.554**
			(2.23)
Number of unemployment experiences			0.093***
Observation Months	28,269	28,254	15,220
Events	1,591	1,589	1,004
LR-chi	788.12	815.87	528.47
Log-Likelihood	-10439.66	-10423.44	-6116.57

SOURCE: - Author's calculations using data from the OSA Supply Panels, 1985-2000.
NOTE: - Z-values are in parentheses.
[a] Reference category for the period dummies refers to the period 2 years before each policy change.
[b] Reference category for the eligible groups are those not affected, not eligible individuals.
[c] Reference category for the birth cohort refers to birth cohort (1965-1969).
[d] Reference category for education refers to elementary school.
*** p < .001; ** p < .05; * p < .1

The central variables of interest are the policy variables that estimate the effects of each policy change. To show the size of the policy changes, the difference in exit rates were estimated before and after the policy changes between the treatment and control groups. Results indicate that in comparison to the control groups, all three types of restrictions led to significantly higher employment re-entry rates for both male and female recipients who experienced unemployment after the implemented UI reforms. When we look at the magnitude of these restrictive effects, results show that the first 1985 reform results in a high propensity to re-enter employment for both male and female recipients, with coefficients varying between 0.102 for men and 0.116 for women. This implies that a decrease in UI benefits by 10 percent shortens an expected ten-month spell by

approximately one month for both men and women[14]. Our results regarding elasticity are in line with earlier studies, which report an elasticity that ranges between 0.2 – 0.9 (Layard 1991). But, as Layard (1991:25) argues in his review study, "estimates as low as 0 (Atkinson et al. 1984) and as high as 3.3 (Ridder 1986) may be found".

Table 3.2B. Cox Estimates Predicting the Transition From Unemployment-to-Employment for Women, The Netherlands 1980-2000

	Women		
	Model 1	Model 2	Model 3
After 1985 UI reform (1985-1987)[a]	-0.224	-0.234	-0.275
	(1.15)	(1.20)	(1.28)
After 1987 UI reform (1987-1989)	0.087	0.078	0.281
	(0.50)	(0.45)	(1.47)
After 1995 UI reform (1995-1997)	-0.085	-0.098	-0.227
	(0.48)	(0.55)	(1.07)
Treated in 1985	0.696***	0.701***	0.852***
	(6.42)	(6.35)	(7.39)
Long-term treated in 1987[b]	-0.209	-0.203	0.480
	(0.74)	(0.71)	(1.13)
Short-term treated in 1987	-0.533***	-0.582***	0.210
	(3.53)	(2.91)	(1.38)
Long-term treated in 1995	0.453	0.419	-0.302***
	(1.64)	(1.45)	(14.54)
Short-term treated in 1995	0.161	0.173	-0.334***
	(0.44)	(0.47)	(7.02)
After 1985 UI reform x Treated in 1985	0.139***	0.138***	0.116**
	(3.36)	(3.31)	(2.46)
After 1987 UI reform x Treated in 1987	0.112***	0.112***	0.091***
	(7.71)	(7.64)	(5.32)
After 1995 UI reform x Treated in 1995	0.124***	0.128***	0.124***
	(6.24)	(6.36)	(5.09)

[14] The first UI reform involved a 10 percent cut in the replacement rate, which implies a 12.5 percent reduction in benefits (i.e., from an 80 to 70 percent replacement rate: 80-70/80=0.125). In this case, a 10 percent increase in the hazard would imply an average elasticity for the expected duration with 0.85 for men [$(\exp^{10.2})$-1/12.5]=0.85 and 0.904 for women [$(\exp^{11.3})$-1/12.5]=0.904

Table 3.2B. Cox Estimates Predicting the Transition From Unemployment-to-Employment for Women, The Netherlands 1980-2000 *(Continued)*

	Women		
	Model 1	Model 2	Model 3
Received UI benefits during spell		0.013	-0.228
		(0.40)	(1.03)
Age		-0.001	-0.004**
		(0.80)	(1.98)
Age squared		0.000	0.000**
		(0.61)	(1.96)
Birth cohort (1940-1950) [c]			-0.024
			(0.35)
Birth cohort (1930-1940)			0.050
			(0.61)
Birth cohort (1920-1930)			0.004
			(0.04)
Lower Intermediate School [d]			-0.092
			(0.55)
Upper Intermediate School			-0.186
			(1.11)
College			-0.082
			(0.47)
University			0.257
			(1.22)
Number of employment experiences			0.108***
			(6.88)
Number of unemployment experiences			-0.221***
			(7.05)
Observation Months	26,450	26,450	15,614
Events	1,444	1,444	1,042
LR-chi	353.24	367.79	895.77
Log-Likelihood	-9369.33	-9367.99	-6410.09

SOURCE: - Author's calculations using data from the OSA Supply Panels, 1985-2000.
NOTE: - Z-values are in parentheses.
[a] Reference category for the period dummies refers to the period 2 years before each policy change.
[b] Reference category for the eligible groups are those not affected, not eligible individuals.
[c] Reference category for the birth cohort refers to birth cohort (1965-1969).
[d] Reference category for education refers to elementary school.
*** p < .001; ** p < .05; * p < .1

Comparing the different effects for the three policy reforms, findings show that compared to the second 1987 UI reform, the third reform of 1995 clearly results in a higher overall propensity to re-enter employment, for both men (0.115) and women (0.124). More specifically, while restricting the qualifying period by 13 additional experience weeks leads to an average elasticity of the hazard rate between 0.05 and 0.10[15] for respectively men and women, restricting the base period with 13 additional experience weeks leads to an average elasticity of the hazard rate of roughly 0.35[16] for both men and women. This implies that while the second 1987 UI reform shortens an expected ten-month unemployment duration by almost half a week (for both men and women), the third 1995 UI reform shortens the spell by 1-2 weeks. These results are in line with earlier studies on the UI benefit effects and support our UI reform hypothesis that assumed restrictions in benefit level, duration, and eligibility force the unemployed to lower their job and wage preferences and subsequently lead to shorter unemployment durations among UI recipients. The higher hazard rates during the third UI reform compared to the hazard of the previous reforms, is in line with the labor demand hypothesis. Apparently, individuals succeed to find much sooner a job during better economic times, which reflects the shorter unemployment spells after the third 1995 UI reform.

Further estimates in Model 3 of Table 3.2A and 3.2B reveal another striking finding, which is divided along gender lines. This is the clear difference in the effect of receiving UI benefits and re-entry rates between the sexes. Whereas receiving UI benefits positively influences men's rate of re-entry into employment, there is a slightly negative (non-significant) impact of UI benefit receipt for the re-

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[15] The second UI reform involved a restriction that doubled the number of experience weeks (i.e., from 13/53 weeks to 26/53 weeks), which implies:
$\left(\frac{\textit{13/53 weeks - 26/53 weeks)}}{\textit{13/53 weeks}}\right)$ = 100 percent restriction in the potential benefits duration.
This restriction therefore implies an average elasticity for the expected duration with 0.052 for men $[(\exp^{5.1})\text{-}1/100]=0.052$ and 0.10 $[1\text{-}(\exp^{9.1})/100]=0.096$ for women.

[16] The third UI reform involved a restriction in the base period (i.e., from 26/53 weeks to 26/39 weeks) which implies:
$\left(\frac{\textit{26/53 weeks - 26/39 weeks)}}{\textit{26/53 weeks}}\right)$ = 35.89 percent restriction in the potential benefits duration.
This restriction therefore implies an average elasticity for the expected duration with 0.34 for men $[(\exp^{11.5})\text{-}1/35.89]=0.339$ and 0.37 for women $[(\exp^{12.4})\text{-}1/35.89]=0.367$

entry rates of women. In line with job search theory, this finding suggests that UI benefits play the role of a subsidy that indemnifies job search costs and accelerates the job search process, especially for men. Apparently, these benefits reduce the job search costs, simplify the job search process, and stimulate the re-entry rates instead of creating disincentive effects. This result is in line with Hunt (1995:95), who attributes positive re-entry rates on the "positive unobserved qualities of recipients". The different gender effect of UI benefit receipt, however, raises some questions about whether the underlying premises of job search theory hold for women, particularly in societies such as the Netherlands where men are considered as the primary earners and women hold a secondary, often part-time position in the labor market.

Age has a significantly negative effect on the re-entry rates of both sexes. Each increase of 10 years in age triggers a decrease in the re-entry rates for both males and females by 4 percent. There are no significant effects of birth cohort and skill-level on the increase or decrease of re-entry rates for women. However, we do find that especially males born between 1940 -1950 have an 18 percent higher propensity to re-enter employment compared to those of the birth cohort 1965-1969. Findings also suggest that males with a university degree re-enter employment much sooner than other skill-levels. This is in line with the international literature that demonstrates the protective nature of higher education for re-entry into employment, particularly for men (e.g., Teulings 1993; Blossfeld, Mills, and Bernardi 2006; Roed and Zhang 2003). This group commands a higher labor demand due to their possession of greater social capital and more experience with job-shopping. In support of the human capital signaling hypothesis, results also demonstrate that the relative number of prior employment experiences increases the propensity to re-enter employment for both sexes, whereas the relative number of prior unemployment experiences operates to lengthen unemployment durations. In line with previous research, this finding suggests that not only the length of the unemployment spell signals negative effects on the labor market, but that the occurrence of past unemployment spells is a further hindrance, regardless of the duration.

3.5.3 Parameter Estimates of Five Treatment Groups

Why do we find relatively lower hazard rates among men? To answer this question we now undertake a more detailed analysis and present the Cox proportional hazard estimates including the distinct short-term and long-term eligibility groups in 1987 and 1995 (D^{TA}; $D^{TB(1)}$; $D^{TB(2)}$; $D^{TC(1)}$; $D^{TC(2)}$). In other words, what distinguishes these results from the previous estimates is the fact that this analysis allows us to distinguish between different eligibility groups in relation to an individuals' prior work history and thereby uncover more detailed results regarding the impact of particular UI reforms on these different groups.

Once again, the results are estimated separately for men (Table 3.3A) and women (Table 3.3B) and we especially focus in the last column of these tables for the interpretation of the results. The policy variables in this model indicate the effect of the policy change on the different treatment groups. To show the size of policy effects on the five different treatment groups, this variable calculates the difference in exit rates before and after the policy changes. Results show that the coefficient of the first policy change remains around 0.104 for men and 0.120 for women. In other words, both men and women who were eligible for UI benefits and experienced unemployment after the first UI reform left unemployment almost one month sooner (see previous section) than those who were not entitled to UI benefits (control group).

Table 3.3A. Cox Estimates Predicting the Transition from Unemployment-to-Employment by Specific Eligibility Groups, For Men, The Netherlands 1980-2000

	Men		
	Model 1	Model 2	Model 3
After 1985 UI reform (1985-1987)[a]	-0.323	-0.316	-0.272
	(1.42)	(1.39)	(1.17)
After 1987 UI reform (1987-1989)	0.277	0.276	0.257
	(1.44)	(1.44)	(1.28)
After 1995 UI reform (1995-1997)	0.207	0.219	-0.066
	(1.17)	(1.22)	(0.30)

Table 3.3A. Cox Estimates Predicting the Transition from Unemployment-to-Employment by Specific Eligibility Groups, For Men, The Netherlands 1980-2000 *(Continued)*

	Men		
	Model 1	Model 2	Model 3
Treated in 1985	0.407**	0.393**	0.505**
	(2.06)	(2.01)	(2.20)
Long-term treated in 1987[b]	1.019	1.049	0.369
	(0.75)	(0.79)	(0.32)
Short-term treated in 1987	0.183	0.313	-0.462
	(0.15)	(0.26)	(0.73)
Long-term treated in 1995	0.577	0.688*	0.456
	(1.47)	(1.70)	(1.15)
Short-term treated in 1995	1.070**	1.073**	0.766
	(1.97)	(2.02)	(0.85)
After 1985 x Treated in 1985	0.114**	0.109**	0.104**
	(2.16)	(2.04)	(2.01)
After 1987 x Long-term treated in 1987	-0.012	-0.014	-0.010
	(0.40)	(0.46)	(0.28)
After 1987 x Short-term treated in 1987	0.159***	0.158***	0.115***
	(4.23)	(4.17)	(2.85)
After 1995 x Long-term treated in 1995	-0.065**	-0.068**	-0.074
	(1.98)	(2.01)	(1.54)
After 1995 x Short-term treated in 1995	0.276***	0.275***	0.158***
	(6.05)	(5.98)	(3.16)
Received UI benefits during spell		0.017	0.207**
		(0.64)	(2.35)
Age		-0.002	-0.004**
		(1.51)	(2.23)
Age squared		0.000	0.000**
		(1.61)	(2.11)
Birth cohort (1940-1950)[c]			0.171**
			(2.36)
Birth cohort (1930-1940)			0.141*
			(1.71)
Birth cohort (1920-1930)			0.169*
			(1.66)
Lower Intermediate School[d]			-0.028
			(0.30)
Upper Intermediate School			0.106
			(1.10)

Table 3.3A. Cox Estimates Predicting the Transition from Unemployment-to-Employment by Specific Eligibility Groups, For Men, The Netherlands 1980-2000 *(Continued)*

	Men		
	Model 1	Model 2	Model 3
College			-0.090
			(0.81)
University			0.347**
			(1.97)
Number of employment experiences			0.091***
			(5.63)
Number of unemployment experiences			-0.228***
			(6.72)
Observation Months	28,269	28,254	15,220
Events	1,591	1,589	1,004
LR-chi	759.66	782.61	522.34
Log-Likelihood	-10428.93	-10412.77	-6115.10

SOURCE: - Author's calculations using data from the OSA Supply Panels, 1985-2000.
NOTE: - Z-values are in parentheses.
[a] Reference category for the period dummies refers to the period 2 years before each policy change.
[b] Reference category for the eligible groups are those not affected, not eligible individuals.
[c] Reference category for the birth cohort refers to birth cohort (1965-1969).
[d] Reference category for education refers to elementary school.
*** p < .001; ** p < .05; * p < .1

When the qualifying period of UI benefits was restricted based on work history, which was the case for the first time in 1987, results show that both men and women eligible for short-term benefits re-enter employment sooner relative to those who became unemployed after the second UI reform but were unaffected by the policy change. These results reflect our earlier theoretical predictions of the sensitivity hypothesis by showing that short-term recipients, often with lower human capital, are more sensitive to UI restrictions and have higher exit rates out of unemployment.

Table 3.3B. Cox Estimates Predicting the Transition from Unemployment-to-Employment by Specific Eligibility Groups, For Women, The Netherlands 1980-2000

	Women		
	Model 1	Model 2	Model 3
After 1985 UI reform (1985-1987)[a]	-0.233	-0.242	-0.280
	(1.20)	(1.23)	(1.29)
After 1987 UI reform (1987-1989)	0.095	0.087	0.285
	(0.54)	(0.50)	(1.48)
After 1995 UI reform (1995-1997)	-0.098	-0.109	-0.194
	(0.57)	(0.63)	(0.93)
Treated in 1985	0.700***	0.706***	0.850***
	(6.45)	(6.40)	(7.44)
Long-term treated in 1987[b]	-0.229	-0.228	0.500
	(0.82)	(0.81)	(1.23)
Short-term treated in 1987	-0.554***	-0.620***	0.193
	(3.62)	(3.16)	(1.28)
Long-term treated in 1995	0.401	0.355	-0.307***
	(1.44)	(1.23)	(15.24)
Short-term treated in 1995	0.266	0.278	-0.326***
	(0.73)	(0.76)	(7.18)
After 1985 x Treated in 1985	0.146***	0.146***	0.120**
	(3.49)	(3.46)	(2.52)
After 1987 x Long-term treated in 1987	0.082***	0.085***	0.087**
	(2.65)	(2.73)	(2.26)
After 1987 x Short-term treated in 1987	0.154***	0.152***	0.099***
	(4.46)	(4.37)	(2.58)
After 1995 x Long-term treated in 1995	0.020	0.024	0.051
	(0.52)	(0.63)	(1.02)
After 1995 x Short-term treated in 1995	0.251***	0.254***	0.187***
	(5.67)	(5.77)	(3.99)
Received UI benefits during spell		0.008	-0.225
		(0.25)	(1.83)
Age		-0.001	-0.004*
		(0.61)	(1.94)
Age squared		0.000	0.000*
		(0.41)	(1.94)
Birth cohort (1940-1950)[c]			-0.028
			(0.40)
Birth cohort (1930-1940)			0.046
			(0.56)

Table 3.3B. Cox Estimates Predicting the Transition from Unemployment-to-Employment by Specific Eligibility Groups, For Women, The Netherlands 1980-2000 *(Continued)*

Women			
	Model 1	Model 2	Model 3
Birth cohort (1920-1930)			-0.007
			(0.07)
Lower Intermediate School [d]			-0.047
			(0.54)
Upper Intermediate School			-0.135
			(1.51)
College			-0.039
			(0.34)
University			0.309**
			(2.03)
Number of employment experiences			0.103***
			(6.57)
Number of unemployment experiences			-0.221***
			(7.04)
Observation Months	26,450	26,450	15,614
Events	1,444	1,444	1,042
LR-chi	344.97	358.39	898.28
Log-Likelihood	-9365.00	-9363.74	-6409.13

SOURCE: - Author's calculations using data from the OSA Supply Panels, 1985-2000.
NOTE: - Z-values are in parentheses.
[a] Reference category for the period dummies refers to the period 2 years before each policy change.
[b] Reference category for the eligible groups are those not affected, not eligible individuals.
[c] Reference category for the birth cohort refers to birth cohort (1965-1969).
[d] Reference category for education refers to elementary school.
*** p < .001; ** p < .05; * p < .1

Another notable result relates to the impact of an extension in the maximum unemployment benefit period, which occurred for long-term beneficiaries in both the second 1987 and the third 1995 reform (see Figure 3.1). We see that an extension leads to a slightly negative (non-significant) impact on the hazard rates of long-term male beneficiaries. The decreasing hazard rates in this group are a logical implication of the second UI reform, since the potential benefit

duration was dependent on work history and could be extended to a maximum of 2 years. However, we find an opposite effect for long-term eligible women, with their hazard to re-enter employment rising after the second 1987 UI reform by roughly 8 percent. This finding once again highlights our expectations in the gender hypothesis and the differences in the ability to meet the more stringent eligibility requirement for women, suggesting that there is a different underlying job search behavior, interpretation, and use of UI benefits for men and women in the Dutch context.

Recall that the main change in the third 1995 UI reform was a change in the potential benefit duration period for long-term recipients (to a maximum of 5 years) and alterations in the week and year work history requirements (see Figure 3.1). For short-term recipients, changes in the eligibility requirements went from needing to work >13 and <26 weeks prior to unemployment to >13 and <39 weeks. The results show that men eligible for short-term UI benefits leave unemployment sooner than those unaffected by the policy change. On the other hand, women in this short-term eligibility group show very high propensities of employment re-entry after such restrictions, reasons that were discussed previously. The extension of the potential benefit period to a maximum of 5 years for long-term recipients translated into longer unemployment durations for men, who largely fell into the group that was able to qualify for these types of benefits. However, this effect disappears after controlling for individual characteristics and (un)employment experiences.

Again, we see a very divergent gender effect with women in the long-term beneficiary group re-entering employment faster than those unaffected by the policy change. Controlling for demographic and human capital characteristics, we find similar results as those presented in the previous table. Again, the receipt of UI benefits positively affects the re-entry rates of men; age has a significantly negative effect on re-entry rates and men in the birth cohort 1940-1950 re-enter employment earlier than other birth-cohorts. The highly educated also re-enter employment sooner than other skill levels with prior unemployment experiences once again operating to lengthen unemployment durations. In sum, the lower hazard rates among men in previous table 3.2A reflect the negative and non-significant hazard rates of long-term benefit recipients that when pulled together with the group of short-term recipients lead to lower overall hazard rates compared to women.

3.5.4 Parameter Estimates of Competing Risk Models of Employment Re-entry versus Non-participation

To this point, we have presented only the estimates of the impact of UI reforms on the transition to employment re-entry. The estimates of the independent competing risk models by sex shown in Table 3.4 model exits to employment versus exits to non-participation. The previous results illustrated that the first 1985 reform, which reduced benefit levels by 10 percent, resulted in higher re-entry rates for both sexes. Table 3.4, however, shows that there appears to be no significant impact on exits to non-participation. The second reform in 1987, where the qualifying period was adjusted, increased the re-entry rates among short-term eligible men and women and decreased the non-participation rates of these groups. On the other hand, results suggest that an extension of the maximum benefit period, which occurred in the second 1987 reform, simultaneously led to lower re-entry rates and higher non-participation rates for men who qualified for the long-term UI benefits. What this model demonstrates is that women on the other hand, show higher re-entry rates but also higher rate of entry into non-participation compared to those not affected by the policy change. These results are in line with previous evidence reported by Hunt (1994) and Bratberg and Vaage (2000). Our results at this point may reflect the relatively generous safety net in the Netherlands, in comparison to countries such as the US.

Table 3.4. Cox Estimates for the Transition from Unemployment-to-employment and from Unemployment-to-Non-participation By Specific Eligibility Groups and By Sex, The Netherlands 1980-2000

	Re-entry to employment		***Exits to non-participation***	
	Male	Female	Male	Female
	Model 1	Model 2	Model 1	Model 2
After 1985 UI reform (1985-1987)[a]	-0.200	0.243***	0.702	0.754
	(0.25)	(3.38)	(0.92)	(1.01)
After 1987 UI reform (1987-1989)	-0.916	0.799	0.331	0.629*
	(0.98)	(1.03)	(0.71)	(1.83)
After 1995 UI reform (1995-1997)	1.208*	1.051*	1.057*	-0.266
	(1.81)	(1.87)	(1.69)	(0.44)

Table 3.4. Cox Estimates for the Transition from Unemployment-to-employment and from Unemployment-to-Non-participation By Specific Eligibility Groups and By Sex, The Netherlands 1980-2000 *(Continued)*

	Re-entry to employment		***Exits to non-participation***	
	Male	Female	Male	Female
	Model 1	Model 2	Model 1	Model 2
Treated in 1985	0.461***	0.731***	-0.294***	-0.384***
	(19.51)	(10.15)	(4.12)	(6.52)
Treated in 1987[b]	-0.433***	-0.387***	1.136	1.481
	(2.97)	(3.26)	(1.03)	(1.17)
Treated in 1995	-0.035	-0.178	-0.272	-0.615
	(0.25)	(1.51)	(0.25)	(0.49)
After 1985 x Treated in 1985	0.104**	0.120**	0.042	-0.199
	(2.01)	(2.52)	(0.19)	(0.79)
After 1987 x Long-term treated in 1987	-0.010	0.087**	0.789***	1.345***
	(0.28)	(2.26)	(5.45)	(5.11)
After 1987 x Short-term treated in 1987	0.115***	0.099***	-0.378***	-0.736***
	(2.85)	(2.58)	(2.75)	(4.21)
After 1995 x Long-term treated in 1995	0.074	0.051	1.091***	1.625***
	(1.54)	(1.02)	(11.19)	(6.73)
After 1995 x Short-term treated in 1995	0.158***	0.187***	-1.006***	-1.444***
	(3.16)	(3.99)	(4.60)	(4.64)
Observation Months	15,220	15,614	15,220	15,817
N events	1,004	1,042	119	112
LR-chi	522.34	898.28	330.37	116.63
Log-Likelihood	-6115.10	-6409.13	-435.70	-313.76

SOURCE: - Author's calculations using data from the OSA Supply Panels, 1985-2000.
NOTE: - Each model includes all other independent variables shown in table 3.3 (unemployment rate, received UI benefits, age, age squared, birth cohort 1940-1950, birth cohort 1930-1940, birth cohort 1920-1930, lower intermediate school, upper intermediate school, college, university, relative number of employment experiences, and relative number of unemployment experiences).
NOTE: - Z-values are in parentheses.
[a] Reference category for the period dummies refers to the period 2 years before each policy change.
[b] Reference categories for the eligible groups are those not affected.
*** p < .001; ** p < .05; * p < .1

We find similar results for the effect of the third policy change in 1995, which added 13 additional experience weeks to the base eligibility period and extensions in the benefit durations for long-term beneficiaries. Findings suggest that once again men eligible for long-term benefits have lower propensities to re-enter employment and higher propensities to withdraw from the labor market after a period of time. Conversely, men eligible for short-term UI benefits have lower unemployment durations and a lower propensity to withdraw from the labor market. In contrast, women eligible for short-term benefits show very high re-entry rates into employment and thus shorter unemployment durations. However, women who experienced an extension in the maximum benefit period experienced an increase in entry into non-participation.

These results display pronounced differences in the job search process, behavior and use of UI benefits between gender and eligibility groups. Differences in gender can be largely attributed to the prior work history of unemployed. Unemployed men profited much more from the policy changes in terms of longer job search periods compared to women, since they had built up more work experience and could therefore satisfy the eligibility criteria for the long-term benefits. Dutch women, however, were penalized by the more stringent eligibility criteria, due to the fact their employment histories were often fragmented and interrupted by career breaks for caring duties and their more general secondary labor market position.

Another explanation for these profound differences may not lie in the different labor market histories, but different perceptions of changes in and use of UI benefits by men and women. Women may perceive restrictions in UI benefits as threats and act risk-aversely by accepting jobs at much faster rate. Men on the other hand may be protected by higher human capital (such as education and work experience) and thus have the confidence to be more careful and restrained in their job search. Furthermore, in general Dutch women would have lower salary-related returns as the majority engages in part-time employment. Higher re-entry rates are also attributed to a larger pool of available jobs. Differences between eligibility groups is most likely related to the fact that men eligible for long-term benefits can afford longer job search periods, and are more careful in accepting jobs that do not satisfy their wage-preferences since the future benefit level is related to the last

income earned. On the other hand, men eligible for short-term benefits will have to lower their preferences in order to account for the reduction in the benefit duration.

3.5.5 Unobserved Heterogeneity, Sensitivity Analyses and Controlling for Frailty

The estimates of the Cox models shown until this point do not have fixed parametric assumptions about the distribution of the unemployment duration. We now produce estimates using a Weibull model specification of a hazard that is allowed to rise or fall monotonically with time (Table 3.5). As described previously, by virtue of this distributional assumption, we are then able to control for unobserved heterogeneity, which is assumed to follow a Gamma distribution.

Table 3.5. Estimation Results by Two Different Specifications Predicting the Transition from Unemployment-to-Employment, By Sex, The Netherlands 1980-2000

	Weibull		***Weibull with Gamma Distribution***	
	Male	Female	Male	Female
	Model 1	Model 2	Model 1	Model 2
After 1985 UI reform (1985-1987) [a]	1.157***	0.148***	1.186***	0.161***
	(6.25)	(10.21)	(6.05)	(9.92)
After 1987 UI reform (1987-1989)	0.206***	0.185***	0.209***	0.201***
	(10.94)	(10.27)	(11.07)	(10.95)
After 1995 UI reform (1995-1997)	0.229***	0.229***	0.233***	0.245***
	(12.25)	(12.97)	(12.02)	(12.16)
Treated in 1985	0.557***	0.692***	0.557***	0.680***
	(3.53)	(5.93)	(3.38)	(5.39)
Long-term treated in 1987 [b]	0.288	-0.082	0.320	0.063
	(0.41)	(0.21)	(0.42)	(0.12)
Short-term treated in 1987	-0.472	-0.688***	-0.473	-0.513*
	(0.82)	(2.75)	(0.78)	(1.89)
Long-term treated in 1995	0.390	0.181	0.417	0.319
	(0.97)	(0.51)	(0.96)	(0.63)

Table 3.5. Estimation Results by Two Different Specifications Predicting the Transition from Unemployment-to-Employment, By Sex, The Netherlands 1980-2000 *(Continued)*

	Weibull		***Weibull with Gamma Distribution***	
	Male	Female	Male	Female
	Model 1	Model 2	Model 1	Model 2
Short-term treated in 1995	0.672	0.348	0.722	0.430
	(1.21)	(0.72)	(1.20)	(0.64)
After 1985 x Treated in 1985	0.136***	0.163***	0.127***	0.131***
	(3.01)	(4.33)	(2.67)	(3.66)
After 1987 x Long-term treated in 1987	-0.066*	0.042	-0.077**	0.005
	(1.76)	(0.98)	(1.99)	(0.12)
After 1987 x Short-term treated in 1987	0.144***	0.124***	0.149***	0.136***
	(3.45)	(3.01)	(3.41)	(2.70)
After 1995 x Long-term treated in 1995	-0.047	-0.064	-0.057	-0.129
	(1.04)	(1.28)	(1.23)	(1.57)
After 1995 x Short-term treated in 1995	0.269***	0.293***	0.277***	0.323***
	(5.58)	(6.31)	(5.45)	(5.66)
Constant	-8.065***	-9.826***	-8.219***	-9.934***
	(8.81)	(7.53)	(8.76)	(7.13)
(σ) Duration Dependence	1.539	1.521	1.587	1.726
	(0.03)[c]	(0.04)[c]	(0.06)[c]	(0.06)[c]
(θ) Heterogeneity Variance			0.066	0.230
			(0.07)[c]	(0.09)[c]
Observation Months	22,963	23,829	22,963	23,829
Events	1,235	1,307	1,235	1,307
LR-chi	1128.21	1177.18	1033.64	1029.84
Log-Likelihood	-1643.91	-1715.16	-1643.36	-1701.40

SOURCE: - Author's calculations using data from the OSA Supply Panels, 1985-2000.
NOTE: - Each model includes all other independent variables shown in table 3.3 (unemployment rate, received UI benefits, age, age squared, birth cohort 1940-1950, birth cohort 1930-1940, birth cohort 1920-1930, lower intermediate school, upper intermediate school, college, university, relative number of employment experiences, and relative number of unemployment experiences).
NOTE: - Z-values are in parentheses. *** p < .001; ** p < .05; * p < .1.
[a] Reference category for the period dummies refers to the period 2 years before each policy change.
[b] Reference categories for the eligible groups are those not affected.
[c] Standard errors in parentheses.

Table 3.5 compares the estimates of the Weibull and Weibull with Gamma distribution. The duration dependence parameter (σ), shown at the bottom of the table, summarizes the hazard pattern over time, demonstrating positive duration dependence and supporting our expectation that individuals increasingly leave unemployment as the benefit period ends. The results that allow for the unobserved risk factor which are fixed in time and are individually distinct imply that policy changes have a stronger effect on the hazard rates of employment re-entry of unemployed individuals. To further investigate the sensitivity of our estimates we introduced an unobserved heterogeneity parameter that follows a Gamma distribution with a mean value of 1 (last column of Table 3.5). The heterogeneity parameter (θ) shows that, especially for women, the frailty distribution variance is significantly greater than zero, indicating that the estimated coefficients on the regressors are larger in magnitude compared to the corresponding coefficients in the reference Weibull model. It is important to note that most of the controls that provide empirical support about the impact of UI reforms on unemployment durations of different eligibility groups are persistently significant across different model specifications with and without unobserved heterogeneity.

To control for whether the results are robust to changes in the composition of the control and treatment groups, sensitivity analyses were also undertaken (see Table 3.6). If the estimated policy effects were attributed to the divergent composition of the treatment and control group, we would expect the following. First, the low-skilled (with higher number of unemployment spells) and second, older workers (with longer work experience, and thus longer benefit durations) should have biased the results since their hazards of employment re-entry would decrease as unemployment spells lengthen. To check whether this assumption holds, we first excluded those aged 55-65 years old from the analysis. This potentially reduces the heterogeneity in the sample with respect to pre-unemployment work experience, which offers the unemployed the possibility to afford longer unemployment spells. The estimations shown in Table 3.6 provide little support that the inclusion of older workers in the analyses has biased prior estimations. The coefficients remain (almost) the same as does their significance.

Table 3.6. Sensitivity Estimates from Weibull Models, Excluding Older Workers and Low Skilled, By Sex, The Netherlands 1980-2000

	Excluding Older Workers between 55-65 years		***Excluding low-skilled***	
	Men	Women	Men	Women
	Model 1	Model 2	Model 3	Model 4
After 1985 x Treated in 1985	0.123**	0.162***	0.144***	0.126***
	(2.40)	(4.31)	(2.99)	(3.07)
After 1987 x Long-term treated in 1987	-0.074*	0.042	-0.069*	-0.013
	(1.87)	(0.97)	(1.79)	(0.29)
After 1987 x Short-term treated in 1987	0.156***	0.124***	0.145***	0.136***
	(3.40)	(2.99)	(3.39)	(2.99)
After 1995 x Long-term treated in 1995	-0.062	-0.065	-0.069	-0.114
	(1.26)	(1.28)	(1.46)	(1.07)
After 1995 x Short-term treated in 1995	0.255***	0.292***	0.260***	0.285***
	(4.81)	(6.28)	(5.11)	(5.53)
Observation Months	20,971	23,835	20,886	21,361
Events	1,023	1,308	1,129	1,152
LR-chi	1031.67	1178.82	1160.86	987.60
Log-Likelihood	-1401.07	-1721.76	-1550.68	-1504.73

SOURCE: - Author's calculations using data from the OSA Supply Panels, 1985-2000.
NOTE: - Each model includes all other independent variables shown in table 3.3 (unemployment rate, received UI benefits, age, age squared, birth cohort 1940-1950, birth cohort 1930-1940, birth cohort 1920-1930, lower intermediate school, upper intermediate school, college, university, relative number of employment experiences, and relative number of unemployment experiences).
NOTE: - Z-values are in parentheses; *** p < .001; ** p < .05; * p < .1

The second stage of analyses excluded the low-skilled unemployed workers. Again the policy effects remained almost unchanged, which suggest that the policy effects are not influenced by any skill-level selection bias. To observe whether the estimations were biased by the inclusion of individuals with higher repeated unemployment spells, cases with the lowest number of unemployment spells in our treatment groups and cases with the highest number of unemployment spells in our control groups were eliminated from the analysis. Also here the policy effects remained almost the same for both sexes of the unemployed[17].

[17] Detailed estimations are available from the authors on request.

A common problem in the differences-in-difference approach is the failure of the parallel trend assumption, which is the case if labor market developments in a certain time period operate differently for the control and treatment group. This would trigger different upward/downward shifts in the hazards of control and treatment groups and bias the estimations. To assess this, in Figures C3 to C5 of Appendix C, we have examined graphically the percentage outflows from unemployment for the control and treatment groups in the period before the policy changes. In all of the figures, we see a parallel trend in the outflows from unemployment indicating that we are not violating the parallel trend assumption of the difference-in-differences approach. In more detailed analyses (not shown here), we also examined the possibility of divergent labor market opportunities among treatment and control groups by including the variable yearly rates of UI claimants to control for any period-specific change in the rates of UI claimants. Estimation of these models did not affect the coefficient of our policy variables. We also included the yearly vacancy rates as a macro-variable to measure the labor demand in particular periods for the control and treatment groups. Again, here the policy effects were not affected by the inclusion of these variables.

In summary, the estimations of the parametric Weibull models with and without control for frailty did not lead to different results than what we estimated using the Cox models. However, the models did show a much higher effect of the policy changes on the treatment groups. Frailty on the other hand was important for the models and corrected for omitted variables, which were correlated to the variables in our models and worked to increase the magnitude of the policy effects to an even larger extent.

3.6 Summary and Conclusions

Using a natural experiment setting of three diverse and deep-reaching policy changes that took place in the Netherlands since the mid-1980s, this study examined the effects of UI reforms on the duration of unemployment and transitions to employment re-entry versus out of the labor force. We asked whether extensions in the potential benefit period resulted in longer unemployment durations, studied the rates of exit from unemployment across time and explored what the impact was on the restrictions of the level of payment (largely 1985

reform) and linked benefits to work history (1987, 1995 reforms) had on unemployment duration and exit options.

A central finding was that the increasingly stringent eligibility requirements and reductions in UI levels and duration resulted in a two-tiered division of the unemployed. UI benefit reforms in the levels, duration and eligibility criteria served as extension of the job search period for the unemployed who qualified for long-term benefits, such as men and those with higher human capital. Yet these reforms restricted the job search periods for the ineligibles, such as women or those with more fragmented labor market careers who were unable to meet eligibility criteria, and either exited the labor market entirely after the exhaustion of their UI benefit or re-entered the labor market rapidly, likely at the expense of a suitable job match.

Results highlighted that incentives to leave unemployment are dynamic, with exit rates showing 'spikes' being particularly higher near the end of the exhaustion of the benefit period. Moreover, findings demonstrated that extensions of the base and qualifying period of UI benefits in better economic cycles lead to a reserved job search behavior among the long-term male beneficiaries, but achieve an opposite effect for women. On the other hand, reduction of UI benefits led to increased re-employment rates in all the cases. The findings of this study indicate that extensions of UI benefits do not always lead to longer unemployment spells and that job search incentives are related to contextually specific circumstances determined by gender, human capital and eligibility status in conjunction with existing labor market conditions.

These findings also have additional implications for further research. First, there is clearly more refined research required in the area of effects of these types of policy changes on different age groups, displaced or discouraged workers and eligibility groups. Second, there is room for elaboration within job search theory regarding gender differences in the underlying job search behavior, interpretation and use of UI benefits between men and women, particularly in different contexts (e.g., male-breadwinner societies). Third, it was beyond the scope of this study to examine the long-term consequences of these UI reforms on employment careers. Further research should isolate whether these patterns, such as longer unemployment spells of the long-term recipients actually resulted in improved occupational prestige, wage returns, and so forth. Conversely, more research is

required on the impact of shorter unemployment spells on long-term negative employment outcomes.

Although this study provides some detailed and useful results for those interested in the study of the Netherlands, the implications of these results are applicable to a much broader audience. In addition to providing evidence-based research for future policymaking decisions, key contributions are the policy implications for UI reforms. First, the result of positive duration dependence in the Weibull estimations suggests a need for flexible time-varying UI benefit levels that would go from higher to lower receipts over the unemployment duration. The results demonstrate that individuals engage in a much more intensified search process as the end of their benefit period encroaches. Lowering the benefit level as the unemployment spell continues could minimize the disincentive effects that might appear at the beginning of the period. A somewhat lower benefit level that would continue to decrease over the insured period would still balance the rapid loss in human capital and increased job search efforts as unemployment spells lengthen.

Second, a more optimal UI benefit design should also take into consideration the diversity of its recipients, particularly in relation to gender and eligibility differences. These results provide clear evidence that women are impacted and react differently to policy changes than men. Women and other groups, such as youth or immigrants, who are relative newcomers to the labor market, have fragmented careers or are trying to re-enter after a break, were punished by the stricter week and year qualifying period requirements that tied UI benefits to previous work experience. In fact, these policy changes operate to widen the extremes of inequality, with the already more advantaged group of mid-career men benefiting even more from these reforms. Reforms could work to be more 'tailored' and 'targeted' to match the different needs and (un)employment histories of diverse groups instead of blanket reforms that often only serve the mainstream and classic labor market experiences that generally characterize men's employment.

Finally, restrictions in the benefit level discourage those who are not eligible to re-enter the labor market, creating a benefit 'trap' for a group of long-term discouraged workers. A more optimal benefit design would not worsen the labor market position of the already weak and more vulnerable groups. On the

contrary, active labor market policies could place more attention on stimulating re-entry of those not eligible for UI benefits as opposed to finding new ways to exclude them.

Chapter 4: How Changes in Unemployment Insurance Benefits Impact Individuals' Re-employment Wages[18]

Abstract

This paper uses longitudinal data from the Dutch Labor Forces Survey (1985-2000) to examine the relationship between unemployment insurance (UI) benefits and workers' re-employment wages. Using the exogenous variation of three subsequent policy reforms in the Netherlands, we extend current research by not only asking if restrictive changes in UI benefits affect re-employment wages, but also explore variation by the level, duration and eligibility conditions of UI benefits across different social groups and over time. Results of a series of fixed-effects models show that decreasing the replacement ratio of UI benefits by 10% yields a re-employment wage penalty of around 3.7% three years after the policy change. In addition, restrictions in the eligibility conditions with 10 additional weeks in the qualifying or the base period yield a re-employment wage penalty of respectively 3% and 1.2% three years after the policy changes. The analyses also show that the re-employment wage penalties are largely persistent and particularly significant for high skilled and more experienced workers. These penalties may stem partly from the risk-averse responses of workers and compositional effects that lead to location and concentration in jobs with lower productivity levels and hence lower re-employment wages. In addition, this study shows that UI reforms have the potential to impose an unintended stratification effect, by creating a wage gap among social groups that differ only with respect to their treatment status.

4.1 Introduction

The impact of UI benefits on (dis)incentives to re-enter the labor market is one of the most studied topics in the labor market research over the last twenty years. The bulk of literature on this topic has widely agreed that generous UI benefits may

[18] Earlier versions of this chapter have been presented at Society of Labor Economics, Methodology Section of the American Sociological Association at Yale University and RC-28 at Stanford University.

prolong unemployment durations by affecting workers' incentives to work (Katz and Meyer 1990; Holmlund 1998; Nickell 1997; Narendranathan et al. 1985; Johnson and Layard 1986). While empirical evidence on the negative effects of UI benefits has been conclusive, evidence on whether UI benefits improve unemployed workers' job matching in terms of re-employment wages has remained unclear and scant. Previous studies show that lower UI benefit levels and shorter benefit durations lead to lower and deteriorated re-employment wages (Burgess and Kingston 1976; Ehrenberg and Oaxaca 1976; Holen 1977; Addison and Blackburn 2000; Gangl 2002; Gangl 2004; Shen 2006; Gangl 2006). Other studies by contrast, show inconclusive findings or do not find statistical support for any relationship between UI benefits and re-employment wages (Classen 1977; Blau and Robins 1986; Kiefer and Neumann 1989; Meyer 1995; Van Ours and Vodopivec 2006).

Although important attempts have been made to explore the relationship between UI benefits and re-employment wages, several key problems remain. First, existing literature has often examined re-employment wage effects using relatively short observation periods. This short-term focus has provided a limited view on UI benefit effects, allowing assessment of merely initial re-employment wages but excluding other effects that may well accrue in wages when we examine them over longer periods. The apparent wage effects over longer periods are important because they provide a more balanced view on the UI benefit effects, which is weak in existing literature. Another shortcoming in existing research is that the majority of research has summarized the impact of UI benefits on re-employment wages solely in terms of the benefit level. In reality, the institutional structure of UI benefits consists of three main dimensions, notably – the level, duration and eligibility conditions – that not only vary across individuals, but have also been object of constant changes in many European countries. Yet, to date, little effort has been made to assess how these different dimensions of UI benefits influence re-employment wages in separate ways and whether their influence transforms under changing policy reforms. This latter point is crucial because it not only detects potential inequality in policy reforms but also complements our understanding of the determinants of re-employment wage dynamics.

The goal of this study is to build upon and extend existing literature by asking: To what extent do restrictive changes in the UI benefit level, duration and eligibility conditions lead to unequal patterns of wage developments across different social groups and over time? To answer this main research question empirically, the study uses the exogenous variations from three policy reforms that changed respectively the level, duration and eligibility conditions of UI benefits in the Netherlands in 1985, 1987 and 1995. These UI reforms act as an excellent example of a quasi-experiment[19], that independent of a worker's prior employment history and earnings, created a two-tiered system including groups affected by the policy change (treatment group) and otherwise similar groups unaffected by the change (control group). The non-random but natural formation of the control and treatment groups that emerge as result of the policy changes are typical characteristics of a quasi-experimental approach. This approach makes it possible to compare the re-employment wages of the treatment and control groups in the periods before and after the policy changes. In doing so, it also allows us to disentangle the causal effect of UI benefits on the re-employment wages, from effects caused by other factors related to workers' potential unemployment duration. Data for the current analyses come from the Dutch Labor Supply Panel (OSA), that include detailed information on individuals' labor market history and earnings over a period that spans from 1980-2000. In addition, the panel character of the OSA data is enriched with detailed retrospective information regarding individuals' working histories. The rich information on the start and ending dates of employment and unemployment episodes makes it possible to trace back workers' employment status and their wages at the time of interview. This is very important because it provides a detailed picture on workers' labor market careers and their wages that is a key element in the construction of the treatment variables.

This study contributes to the existing unemployment literature in three different ways. First, assessing the effect of UI reforms not only helps to reflect upon the extent to which UI benefits may minimize economic costs of unemployment but also reveals the threats that are involved when institutional based support is lacking. This is important to provide a more balanced view of the

[19] In the literature, quasi-experiment is defined as: "an experiment-like study that evaluates the effects of different programs or interventions, but does not randomly assign individuals to treatment groups." (Shadish, Cook and Campbell 2002:6)

true effects of UI benefits that are not solely judged in terms of outflows from unemployment. Second, this study is one of the few (except an earlier study by Lalievé et al. 2004) that brings together the longitudinal impact of three different policy changes that have often been studied in partial isolation from each other (see previous studies by Classen 1977; Blau and Robins 1986; Kiefer and Neumann 1989; Meyer 1995; Van Ours and Vodopivec 2006). This approach is important as it allows comparing and classifying the effects of each dimension of UI benefits on re-employment wage mobility and stability and provides empirical evidence of the effectiveness of each type of UI reform. Finally, our study proposes a continuous measure for the treatment variable that is more powerful than the use of a dummy variable as used in previous research. In doing so, we move beyond the question of 'whether' individuals are affected by a certain policy change, but provide a richer examination of 'how much' they are affected.

This study is organized as follows. In the next section, the context in which the Dutch UI benefit system was reconstructed is summarized and the implications of each major structural reform are briefly highlighted. Subsequently, existing empirical research together with labor market theories are integrated to derive hypotheses that predict the relationship between UI benefits and re-employment wage developments. The chapter continues with a description of the data and discussion of the statistical methods before presenting the empirical results in a separate section. Finally, the last section summarizes the findings and ends with a brief conclusion.

4.2 Curing the Dutch Unemployment Problem

4.2.1 A Brief Overview

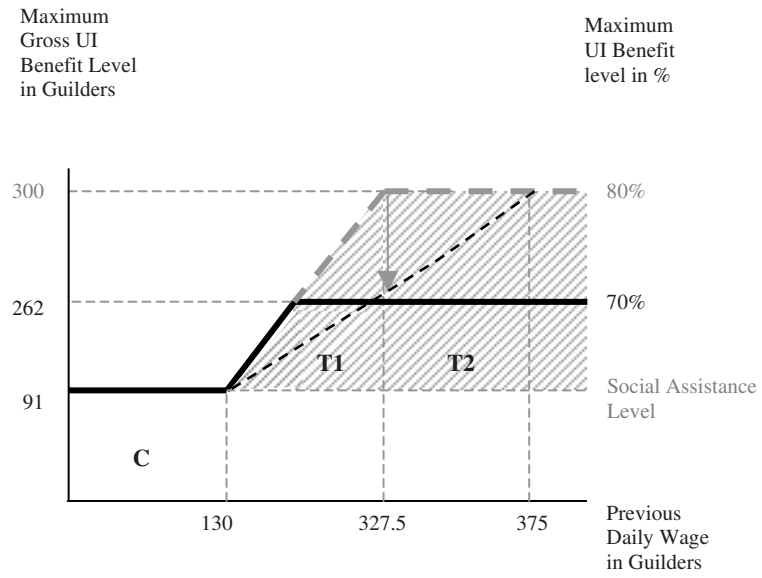
During the past decennia, various historical and socio-economic developments have impacted the Dutch labor market significantly. The oil crises in the 1970s and 1980s led to one of the most difficult periods of the Dutch economy, which was characterized by high unemployment spells, jobless growth and welfare without work (Van Ark & Haan, 1997). Despite the difficult economic period, the Dutch economy recovered very fast in the late 1980s. The evolution of employment in the Netherlands in the late 1980s is often referred to as the 'Dutch miracle', when labor market participation increased to 70% in 1998, and registered unemployment was

brought down from 13.9% in 1983 to 3.3% in 2000 (Visser & Hemerijck, 1997). The falling unemployment figures are often attributed to two major structural changes that were implemented in the Netherlands in the beginning of the 1980s. First, the so-called Wassenaar agreement, in 1982, between trade unions and employer organization that introduced a wage-moderation policy - that supported by the government - reduced the level of taxes and social security premiums to allow real net incomes to increase even in absence of gross wage increases (Van Ark & Haan, 1997). Second, three major structural reforms in the Dutch social security system were implemented that aimed at reducing the number of social security claimants. Although the implemented UI reforms were of a rather different nature, they had a common aim, namely to lower the costs of the social security system and to simplify the structure of the system by holding down the level and duration of the social transfers (Hoff and Jehoel-Gijsbers, 1998). Below, the three major UI reforms are summarized.

4.2.2 The Context in which UI reforms took Place

During the mid 1980s the rate of Dutch UI claimants had reached a peak it had not previously reached in the post-war period. While the gross domestic product (GDP) was rather low, the rates of UI claimants were accompanied by rising unemployment levels that reached almost 23% among workers with elementary education (Van Ours 2003). In response to this poor labor market performance and as part of the announced budget-cutting package, a law took effect on October 1985, reducing the replacement rates of unemployed from 80% to 70% of their last earned wages for a maximum of 6 months (MISEP 2003). Replacement rates are defined as the ratio of monthly UI benefits to the monthly wages received prior unemployment. This policy change had implications for UI benefit recipients with higher benefit levels. To give a clear impression of this policy change, Figure 4.1A, illustrates how the level of UI benefits varied before and after the first reform creating two groups of workers, namely: those affected by this policy change, thus the treated (T) and those not affected the policy change, thus the control group (C).

Figure 4.1A: The Implications of the First UI Policy Change in 1985



Note: C = Control group; T1=Treatment group 1; T2= Treatment group 2; Old policy; New policy

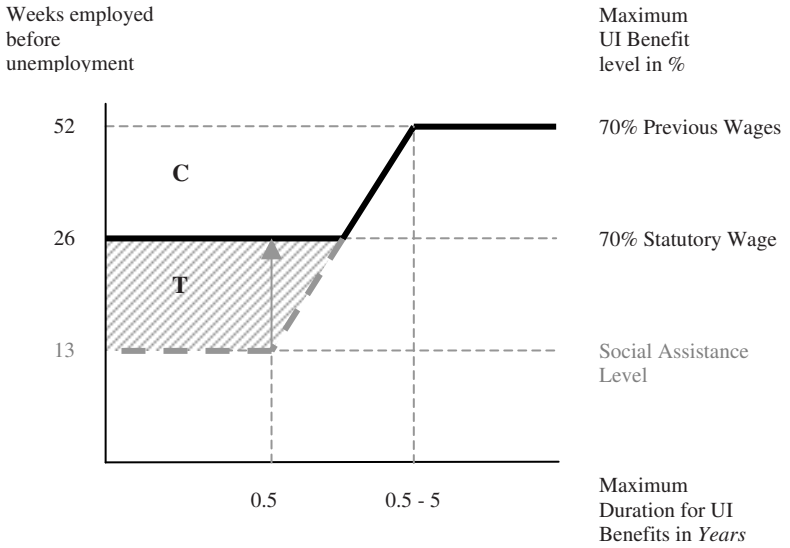
As illustrated above, before the policy change (grey dashed line and grey words), unemployed workers were entitled to UI benefits with a daily gross maximum wage of 300 Guilders[20] per day (= 80% of previous daily wage), paid five days a week. After the policy change (the solid line) the replacement rates were lowered to a maximum daily wage of 262 Guilders (i.e., 70% of the previous daily wage). This policy change created a two-tiered benefit structure affecting workers that received exactly 80% before the change (T1), those receiving between 300 and 262 Guilders per day (T2) and those who continued to receive 91 Guilders or less per day (C). In other words, the latter group remained unaffected by this first policy change.

In January 1987 another UI reform was implemented which restricted the so called 'week requirement'. Under the new system the unemployed became entitled to the 'salary-related' UI benefit if they had been employed for a period of at least 26 weeks of the 52 weeks (as opposed to 13 weeks) immediately prior to

[20] 1 Euro = 2.23 Guilders

becoming unemployed (MISEP 2003). In other words, this policy change restricted the qualifying period, which is the minimum number of the required working weeks, with 13 additional qualifying weeks. If workers had been employed for less than 26 weeks prior to the year of becoming unemployed, they became eligible for a newly introduced 'short-term' UI benefit with a replacement rate of 70% of the statutory minimum wage and a maximum length of 6 months (as opposed to 2 years). To enhance the interpretation of this policy, Figure 4.1B, illustrates the variation in the qualifying weeks before and after the policy change.

Figure 4.1B: The Implications of the Second UI Policy Change in 1987

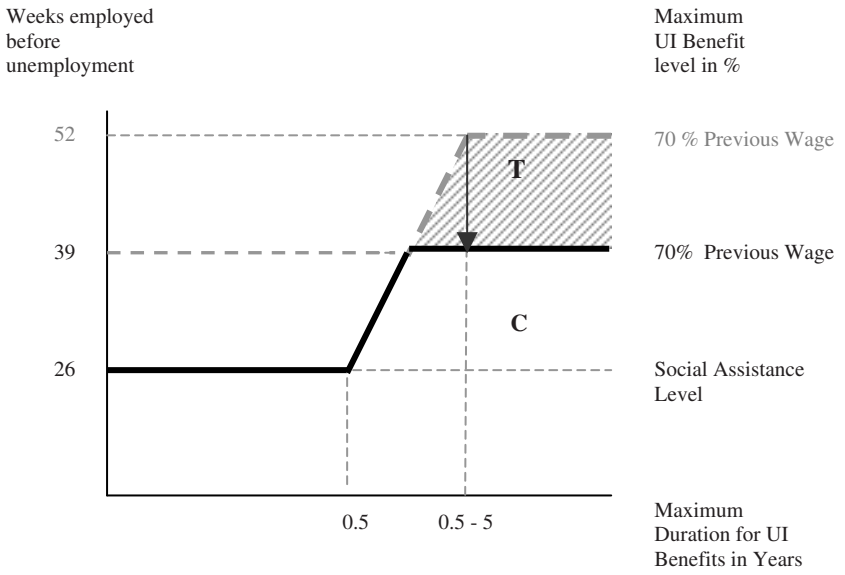


Note: C= Control group; T= Treatment group; Old policy; New policy

The new policy change (solid line and black words) created a two-tiered structure by affecting those with a pre-unemployment work experience in the interval between 13 and 26 experience weeks (T) and leaving those above this interval not affected (C). In other words, this time the policy change affected mostly those workers with interrupted careers who were unable to satisfy the week and year requirements.

At the beginning of the 1990s, the policy of Dutch public employment agencies was focused on punishment of those misusing the generosity of the Dutch UI schemes. Therefore, the 1995 UI reform focused on stricter eligibility criteria and increased monitoring towards those receiving UI benefits (MISEP 2003). Again the 'week-requirement' was under fire, but this time not the qualifying period but the baseline period was subject to change. The baseline period refers to the period when last employment occurred, for example, last employment took place within the last 52 weeks. Under the new benefit system the unemployed became entitled only if they had worked for a period of at least 26 weeks out of 39 weeks (as opposed to 52 weeks) immediately prior to becoming unemployed (Abbring et al. 2005). In other words, the baseline period was given a ceiling of 39 weeks implying a limitation on the dispersion of prior employment by 13 weeks. Figure 4.1C illustrates the implications of this policy change.

Figure 4.1C: The Implications of the Third UI Policy Change in 1995



Note: C= Control group; T= Treatment group; Old policy; New policy

As in the prior policy changes, the new situation (solid line and black words) created again a two-tiered benefit system, affecting those who had worked

39 out of 52 weeks (T) prior to becoming unemployed, and leaving those who had worked at least in the 26 out of 39 weeks prior to becoming unemployed, not affected (C). Additional changes were imposed to conditions related to the previous wage receipt and length of the potential UI benefits. To become entitled to 'salary-related UI benefits' wages should have been received over 52 days or more in at least four of the last five calendar years prior to the year in which the person in question became unemployed (MISEP 2003). In addition, the length of UI benefits depends on the employment history of an unemployed with a minimum of 6 months and a maximum of 5 years.

4.3 Re-employment Wage Developments under Conditions of Unemployment

4.3.1 Previous Empirical Evidence

Only a limited number of studies have examined the effects of UI benefits on re-employment wages. Although small in number, the studies vary in their conclusions, some suggesting a positive relationship between UI benefits and re-employment wages, others demonstrating also a weak or non-significant effect. The most extensive literature stems from the US studies, which dates back to mid 1970s. Ehrenberg and Oaxaca (1976) use samples of both recipients and non-recipients to estimate the effect of the UI replacement ratio on re-employment wages. In their study they demonstrate that raising the replacement rate by 10 percentage points increases the re-employment wages of older male workers by 7%, with lower or no significant effects for other demographic groups. Another study of Burgess and Kingston (1976) finds that a US$ 1 rise in weekly benefit payment is related to a US$ 25 increase in the annual re-employment wages. On the other hand, a one-week extension in the benefit duration corresponded to US$ 69 higher annual re-employment wages. Holen (1977) supports these findings and demonstrates a somewhat higher benefit effect than the study of Burgess and Kingston. More recently, the study of Petrongolo (2007) examines the effect of stricter eligibility conditions and post-unemployment wages in the UK. In her study, Petrongolo demonstrates that those affected by the reform suffered around 4% lower post-unemployment wages compared to those who were not affected. This empirical evidence demonstrates the existence of a positive relationship

between UI benefits and re-employment wages, which indicates that UI benefits serve as a search subsidy rather than a subsidy of leisure as it is assumed by static labor-leisure models (see Moffitt and Nicholson 1982).

In addition to this empirical evidence, recent studies of Gangl (2002, 2004) follow another empirical approach by examining the effect of UI benefits on wages, rather than illustrating the effect of changes in UI benefits on re-employment wages. Using panel data from the Survey of Income and Program Participation and the German Socio-Economic Panel for the 1980s and 1990s, studies demonstrate two central findings: a) UI benefits lower exit rates out of unemployment; and b) UI benefits lower the risk of any re-employment wage loss by 10%. Limited but positive evidence is found in the studies of Addison and Blackburn (2000) and Belzil (2001), which support these findings and show a positive link between the receipt of UI benefits and higher re-employment wages. One explanation that empirical studies often use to interpret this positive relationship relates to the fact that longer job search periods and higher job costs lead to jobs with higher utility levels in the long run. UI benefits show highly positive effects on protecting individuals from incurring earnings losses, experiencing occupational downward mobility and of entering unstable jobs in both the US and Germany (Gangl 2004). In addition, a study of Gangl (2006) among 12 Western European countries and the US demonstrates post-unemployment earnings losses to be buffered through either generous UI benefits or strict labor market regulations. Such results highlight the positive function of UI benefits as a social institution that favor workers' behavioral responses and prevent downward occupational and income mobility.

In sharp contrast, there are US studies that find no statistical support that UI benefit recipients earn higher re-employment wages than non-recipients. In her study, Classen (1977) examines the effect of a legislated increase in weekly UI benefit amount on re-employment wages. She finds a positive relationship between weekly UI benefits increase and re-employment wages; however, the coefficient estimates remain statistically insignificant. Blau and Robins (1986) also find a positive relationship, which is also not statistically significant. Also the study of Kiefer and Neumann (1989) finds a positive but insignificant relationship between UI benefits and earnings. On the other hand Meyer (1995), examining the effect of re-employment bonuses on re-employment wages, finds such bonuses to shorten

UI benefit periods, without affecting the re-employment wages. Additional studies of Van Ours and Vodopivec (2006) examine the effects of reductions in benefit duration on the re-employment stability, quality and earnings in Slovenia. The study finds no effect on either the type of the contract, the re-employment duration or the re-employment earnings.

Although mixed, this empirical evidence highlights the possible existence of a positive relationship between UI benefits and re-employment wages. The weak but positive support that is found points to the need for more empirical research that focuses not only on the initial re-employment wages, but also on the longer-term development of re-employment wages. Against this background, the following part of this section will integrate labor market theories to predict the relationship between UI benefits and re-employment wages.

4.3.2 Unemployment Benefits and Re-employment Wages: Some Essential Mechanisms

The effects of UI benefits on re-employment wages are predicted the best by job search theory. Standard job search theory portrays the dynamic job search of an unemployed worker through a set of exogenously determined wages (Mortensen, 1977; Lippman and McCall, 1976; Van den Berg 1990). Traditional job search models are based on the assumption that all unemployed workers receive UI benefits with an infinite duration. Under such circumstances, the strategy of the unemployed worker is to set up a reservation wage, which is the minimally acceptable wage offer in the labor market. If a wage offer exceeds the level of the reservation wage, than a decision is made to accept the job offer, otherwise the job offer is denied (Mortensen 1977; Barron and Mellow 1979; Van den Berg 1990). An additional assumption of job search theory is that it expects reservation wages to decline monotonically over the spell of unemployment. This because individuals' human capital depreciates with time spent in unemployment leading to a lower value of remaining unemployed and thereby to a downward adjustment of reservation wages with time.

Taking this theory as point of departure, in our study, we portray an unemployed worker after his/her search for a job (see Figure 4.2 for an overview of the theoretical model). There is imperfect information about the job offer distribution, which involves time to search and money to cover the search costs.

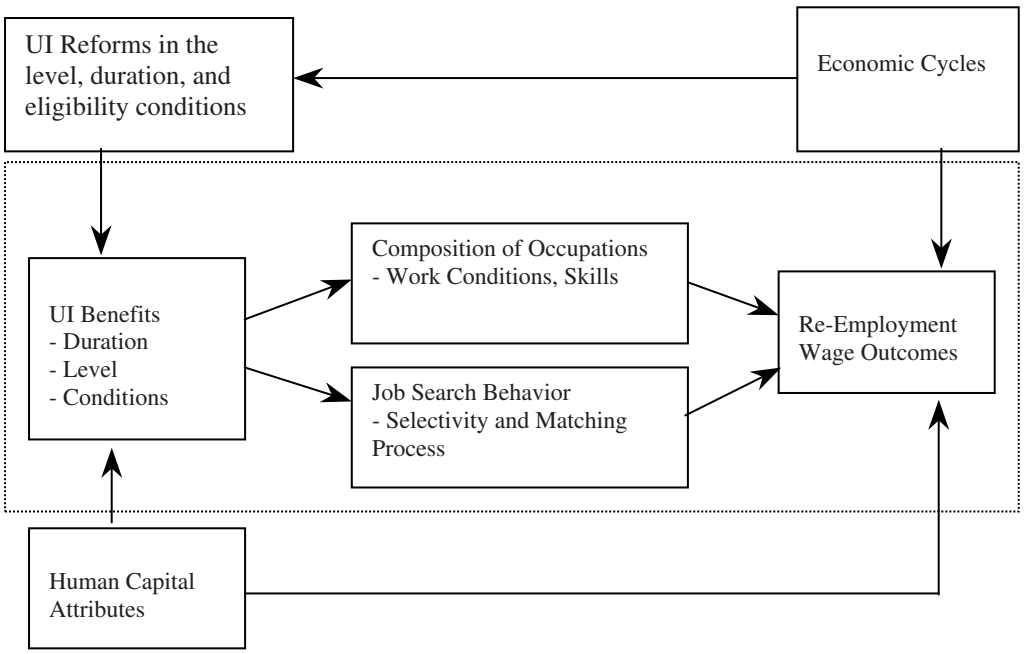
Different from the traditional job search theory, our model implies that UI benefits are time-limited and conditional on workers' prior employment and wage history.

Recall that in our study we attempt to examine re-employment wage developments under a restrictive change in one of the UI benefit dimensions (i.e. level, duration, eligibility). Previous studies that examined re-employment wages under changing UI regimes, found that an increase in level and duration of UI benefits led to higher re-employment wages as result of better job matches (Burgess and Kingston 1976; Ehrenberg and Oaxaca 1976; Holen 1977). But through which mechanisms do policy changes affect workers' re-employment wages? In this study we purpose two mechanisms through which UI benefits may affect individuals' re-employment wages. First, in a situation with restrictive changes we anticipate workers to develop a risk-averse behavior. This behavior is characterized by stronger incentives to select jobs with less than desired working hours and lower productivity levels that lead to lower re-employment wages. This assumption implies that restrictions in UI benefits lead workers to choose involuntarily jobs with poor characteristics, trading the short-term employment security for lower re-employment wages.

Second, over and above this behavioral effect, UI reforms may affect the composition of occupations, by creating a pool of affected workers that are concentrated in lower paid and less favorable jobs. This follows from the fact that governed by processes of UI reforms those affected workers will be pushed to change industries or sectors more often, which in turn increase the risks of dismissals and job mismatches. This assumption implies that UI reforms leave better occupations outside the competition of affected workers because they cost more time and money to locate. As result, those affected are expected to suffer more often from fragmented careers that lower the chances of a durable employment and predict downward earning spirals over time. These negative effects may cumulate over time, creating a wage gap among social groups that differ only with respect to their treatment status. These two different mechanisms lead to the expectation that re-employment wage losses of those affected workers may increase over time, due to the job mismatches involved with UI reforms. These arguments lead to our first expectation:

Hypothesis of UI reforms: Compared to those not affected workers, UI reforms will impose re-employment wage losses on those affected workers.

Figure 4.2: Predicted Effects of UI Reforms on Re-employment Wages: A Theoretical Framework



Do the effects of UI reforms vary systematically across social groups and over time?

The above hypothesis suggests that UI reforms generate equal patterns of wage losses among workers. However, effects of UI reforms may vary across different social groups depending on one's incentive structure, human capital, and gender but may be also different over time depending on the macro-economic situation in a particular period.

Changing incentives. Previous empirical research (e.g., Katz and Meyer 1990; Moffitt and Nicholson 1982; Ham and Rea 1987) demonstrates that job search incentives have a dynamic nature that varies with the level and duration of UI benefits. This finding presumes that there may be a variation in the anticipating

behavior of workers that may lead to unequally distributed wage losses across the different types of UI reforms. We therefore anticipate that UI reforms that affect workers' instant value of remaining unemployed, such as lower benefit levels, may lead to negative wage effects that are highest in periods immediately after the policy change. This relates to the fact that affected workers, whose value to remain unemployed decreases at once, will settle faster for a job below their reservation wage than in a situation without such a drop. By contrast, UI reforms that restrict the eligibility criteria or the duration of the benefits will lead to wage penalties that are most apparent near the exhaustion of the benefit period. This because workers' value of remaining unemployed is expected to decrease monotonically over the unemployment spell leading to a lower bargaining power over an unemployment spell and more pronounced wage losses near the exhaustion of the benefit duration. These arguments lead to the following expectation:

Hypothesis of anticipatory behavior: Compared to reforms that restrict the eligibility and durations of UI benefits, reforms that restrict the level of UI benefits will lead to higher re-employment wage penalties during recent periods after the policy change.

Human capital. How unemployed workers select their jobs during an unemployment spell depends largely on their human capital. According to human capital theory, an individual's human capital consists of two important components, namely: general skills, which reflect years of attained education; and specific skills that reflect years of working experience in a specific industry or occupation (see for an overview Becker and Tomes 1986; Becker 1962). Both of these components mirror individuals' marginal productivity and may affect workers job search strategies in different ways. In particular, workers with skills more specific to a particular industry or occupation (i.e. high human capital) are expected to show a more selective search strategy that may last longer, but may lead to jobs with higher re-employment wages. Conversely, workers with less specific and general skills (i.e. low human capital) are expected to use broader search strategies that involve shorter search durations but also lower re-employment wages. When the heterogeneity of workers' human capital and their search strategies are taken into account, an UI reform is expected to influence

mostly the job search strategies of those with high human capital. This follows from the fact that under the influence of a UI reform, workers with high human capital will have a lower bargaining power over their occupational positions or wages. This situation will push them to search more broadly and accept jobs located in different industries or sectors, which go hand-in-hand with significant wage losses as result of loss and devaluation of industry-specific skills. Conversely, those with lower human capital are expected to experience less extensive wage penalties, because the difference between their expected and the actual wages lies much closer to each other. This leads to the next hypothesis:

Human capital hypothesis: Compared to those lower educated, UI reforms will impose higher re-employment wage penalties to those with higher human capital.

Gender. In this study, we argue that UI reforms do not affect all individuals in the same way. Following the previous argumentations, we would expect the effects of UI reforms to vary among groups that differ in their human capital or employment histories. It seems therefore straightforward to expect also differences in the re-employment wage outcomes among men and women. Especially for the case of the Netherlands this is an interesting issue since women only started to participate the labor market in their full extent only in the late 1980s (Van Ours 2003; Morgan 2006). Starting from that period, women were especially engaged in part-time and temporary type of jobs that provided them the opportunity to combine work and private life (Van der Lippe and Van Dijk 2002). One important advantage of this labor force participation was related to the fact that through employment women could build up rights for pensions and other work-related benefits such as UI benefits. Despite this positive development, there is reason to believe that, especially during the late 1980s, Dutch women were more often situated in jobs with lower occupational levels, which often translate into jobs with lower prestige, wages, and rewards. Taking this view as a starting point, we have reason to believe that women's limited and fragmented employment careers entitle them only to short-term UI benefits excluding them from longer search periods that are related to long-term UI benefits. In a situation with restrictions in the UI benefits, we expect that women, more than men, would react risk-aversely by accepting jobs with less working hours thereby receiving lower

wages. This follows from the fact that in the Dutch situation, women are less 'choosy' and accept jobs more easily than men, because they are not the main breadwinner in a household, but contribute partly to the household earnings. This logic leads to the following hypothesis:

Gender hypothesis: Women affected by UI reforms will more often enter jobs with fewer working hours thereby receiving lower wages than men do.

Economic cycles. We also expect that workers' opportunities to find re-employment depend largely on the macro-economic situation in a country. However, we know relatively little about how UI reforms affect wages during different economic cycles. From previous economic studies, we know that in depressed labor markets workers have less bargaining power and often settle for a lower wage relative to their desired wage (Pissarides 1990; Diamond 1982; Lockwood 1991). As discussed earlier, in the mid 1980s the Dutch economy was suffering from economic slowdowns coupled with high unemployment rates and relative low vacancy levels. It was during the late 1980s when the Dutch economy started to recover again. Taking this picture as a starting point, we have reason to expect that:

Economic cycle hypothesis: UI reforms enacted during periods of depressed economic cycles such at the time of the 1985 and 1987 UI reforms, inflict more extensive wage losses relative to UI reforms enacted in better economic times such as the 1995 UI reform.

4.4 Data, Variables and Statistical Modeling

4.4.1 Data Set

To test the above expectations, this study uses longitudinal data derived from the Dutch Labor Supply Panel (OSA) over the period 1980-2000. Since 1985, every two years, standard interviews were used to collect retrospective data about labor market dynamics of the working population. This dataset is exceptional as it provides detailed information on the start and end dates of unemployment and employment periods, which make it easier to trace back the status of the workers in

a particular period and reconstruct their treatment status. In addition to the labor force information, starting from April 1985, this dataset provides information on wages of workers at the time of interview. This allows us to compare pre-treatment wage observation (April 1985) with the wage observations thereafter. Finally, the dataset includes also background information on demographic and human capital characteristics allowing for control of variables that might influence re-employment wages over time. Summary statistics are introduced in Table D1 of Appendix D.

To study the effects of UI benefits on the re-employment wage dynamics, analyses are limited to those employed at the moment of interview who had entered employment through a spell of unemployment. The initial sample counted 3,408 person-biannual wage observations spread over 1,799 respondents that were employed at the time of interview. For the purpose of the fixed-effects modeling, which will be explained later in more detail, at least two wage observations per worker are required. This is important, as our 'within-group' estimations require at least two observations on each respondent. This limits the sample size to 2,887 biannual wage observations spread over 1,151 respondents. This implies on average 2.5 biannual wage observations per worker in the sample.

The empirical strategy in this study relies on a "difference-in-difference" (DD) approach that is based on the standard assumption that selection bias across treatment groups is time invariant, and can be removed by taking differences over time. This approach compares the differences in re-employment wages outcomes before and after the UI reforms for the treatment group to the same differences for the control group. Comparing the wages before and after the UI reform for those treated reflects the re-employment wage change under influence of the exogenous shock. The presence of the control group before and after the UI reform that has not been object of exogenous changes reflects the wages under influence of changes in labor market conditions only. Two criteria are important when using the DD approach. First, the time effects such as changes in the labor markets need to be common for the control and treatment group. This is called the parallel trend assumption, which assumes that in the absence of the program, both treatment and control groups would have experienced changes of the same magnitude. Second, individual-level unobserved heterogeneity should be constant over time (Blundell and McCurdy 1999; Blundell and Dias 2000).

The analytical approach of this study addresses some of these concerns. First, restricting the analyses to individuals that have been in continuous employment in at least two consecutive waves allows assessment of the wage change within individuals and over time, which eliminates the influence of time invariant unobserved heterogeneity and thereby is a key requirement of the DD-approach. Furthermore, graphical examination of the re-employment wage patterns before and after the UI reforms for the control and treatment groups will provide another useful assessment of the parallel trend assumption, which is also key requirement of the DD-approach.

4.4.2 Definition of Variables

The dependent variable in this study is the *natural log of hourly wages* in the respondents' current job. This variable was constructed by taking the natural log of workers reported net monthly wage divided through their monthly worked hours. The principal independent variable in current analyses is the treatment status variable that not only determines whether, but also how much a respondent has been affected by a UI reform. To trace the treatment status of respondents at each specific period, unemployment and employment histories before and after each UI reform are matched with each other resulting in three continuous treatment status variables. The first variable, *treatment_85,* is a continuous variable with maximum daily wages ranging between 92-300 guilders[21] for those affected and 0, which refers to those not affected individuals receiving 91 guilders and less maximum daily wages. The second variable, *treatment_87*, is a continuous variable where 0 refers to those who had worked for more than 26 weeks in the last year prior to becoming unemployed (control group) and where 1-26 refer to the number of worked weeks one year prior to unemployment, indicating those affected. Finally, the third variable, *treatment_95*, is a continuous variable where 0 refers to those

[21]Following the standards of the Centre for Work and Income (CWI), daily wages are estimated using a two-step procedure: First, the daily wages *before* unemployment have been calculated as: (reported monthly wages before unemployment/ 4.4 working weeks * 52 weeks/262 working days). Second, the maximum daily wage of UI benefits is estimated as: R * daily wage before unemployment * 100/108, where R refers to the maximum replacement rate and 100/108 refers to the reservation of holiday allowance in the Netherlands. See for more information: http://www.st-ab.nl/wetcsvor1nrmfw.htm and http://www.kennisring.nl)

who had worked for more than 26 out of 39 weeks prior to unemployment (control group) and where 1-39 weeks refer to the number of worked weeks in 3/4 years prior to unemployment, indicating those affected. The continuous treatment variables are important as they provide information on how much or less individuals become affected after an UI reform, which is not possible when a treatment dummy variable is constructed. Table D2 of Appendix D shows a detailed definition and construction of these variables.

To capture the effect of the business cycle and to locate the period before and after each UI reform, three time-varying period-dummy variables are constructed. First, variable *Period_85,* where 0 refers to the period prior to October 1985 and 1 to the period between 1985-1988, thus after the first UI reform. Second the variable *Period_87*, where 0 refers to the period prior to January 1987 and 1 to the period between 1987-1990, thus after the second UI reform. Finally, the variable *Period_95*, where 0 refers to the period prior to March 1995 and 1 to the period between 1995-1998, thus after the third UI reform. The treatment status and the period variable are necessary to capture the predicted level and magnitude of re-employment wage effects, which may vary by the type of imposed changes. Following the difference-in-differences approach a *period x treatment group* interaction, captures the change in relative wages of those affected by the UI reforms.

To assess how UI reforms may trigger unevenly spread effects among groups with different types of human capital, two variables are constructed. First, the variable *attained years of education* that distinguishes between three categories: (1) 9 years of education, if elementary school completed (BO); (2) 12 years of education, if lower and upper intermediate secondary school was completed (LBO-MAVO-VMBO-HAVO-VWO-MBO); (3) 18 years of education if college or university degree was completed (HBO-WO). Second, the variable *work experience* reflects years of working experience, and will be used as a proxy for knowledge acquired at work. This variable is constructed by subtracting: age – years in education – 6 – periods in unemployment and non-employment. We acknowledge the limitation of this measure to capture important dimensions of human capital related to the human capital acquired in a specific industry or sector. However, this measure is constructed in such a way that it reflects the long-term advantages that are maintained through periods of past employment careers.

To investigate whether wage penalties of those affected by UI reforms remain persistent or widen over time the variable *employment duration after unemployment* is constructed. This variable refers to workers' employment duration after a spell of unemployment and is measured as the difference between the start of employment after a period of unemployment and the end of that employment period. To assess whether effects of UI reforms remain persistent after re-employment or evolve over different employment durations, a three-way interaction term will be introduced between this variable, the period variable and the eligibility status variable[22]. On the other hand, the variable *cumulative employment stability* is constructed to capture any diminishing re-employment wage penalty that comes as result of accumulating work experience after UI reforms.

To control for re-employment wage penalties that are related to previous unemployment history, several variables were constructed such as the variable *unemployment spell*, which denotes the most recent unemployment spell of an individual. The variable *cumulated duration of earlier unemployment spells*, which denotes the cumulative length of earlier unemployment spells. Finally, the variable *cumulated unemployment duration squared* will show whether any negative wage penalty related to unemployment spells diminishes or remains persistent over time. To control for any endogeneity of unemployment with respect to seasonal fluctuations, we use the variation in the starting month of employment as a control variable. Due to the restrictions of the fixed-effects models, which will be assessed more deeply in the next paragraph, time constant demographic variables such as sex and ethnicity are left outside estimations.

4.4.3 Statistical Modeling

As stated earlier, this study uses an unbalanced panel with workers contributing different amounts of wage observations depending on data availability. The data thus not only incorporates different wage observations within a respondent (within-

[22] This three-way interaction is referred to in the literature as the triple difference estimator (Meyer 1995). The advantage of this approach is that it corrects for the unobserved heterogeneity related to shocks that are specific to the employment durations, which although related with the treatment are not directly attributable to the UI reforms but to heterogeneity of individuals.

group), but also wage observations spread across different groups of workers (between-groups) and over time. Estimation of ordinary least squares (OLS) is not appropriate with this data as the errors are likely to be correlated within panels, due to unmeasured heterogeneity, and biased standard errors would be the result (Greene 2000). To address the issue of unmeasured heterogeneity, fixed-effects models are offered as an alternative (Greene 2000). In such models, the between-group differences are taken away by subtracting each observation from the within-group mean. To apply this within-group transformation at least two wage observations per worker are required and only time varying variables are entered in the model. Since unobserved heterogeneity is assumed to be constant over time, subtracting it with its mean would difference away any unobserved differences. In doing so, this approach guards against the possibility that unmeasured differences in workers' characteristics lead to re-employment wage penalties, causing a spurious relationship. Re-employment wage effects are specified using log-linear wage equation of the following form:

$$\ln w_{it} = \boldsymbol{\beta}'\mathbf{x}_{it} + \alpha_i + e_{it} \qquad (1)$$

wherein, $\ln(w_{it})$ is the natural logarithm of hourly wages for individual i at time t; $\mathbf{x}_{it}$ is a vector of labor market history and human capital controls. $\boldsymbol{\beta}$ refers to the vector of coefficients related to individuals' observable characteristics. The value α_i refers to the time-invariant individual specific error and e_{it} refers to the equation error term. To capture the effects of the policy reforms we extend equation (1) to the following specification:

$$\ln w_{it} = \boldsymbol{\beta}'\mathbf{x}_{it} + \gamma_1 a_i + \gamma_2 p_t + \eta\,(ap)_{it} + \alpha_i + e_{it} \qquad (2)$$

where, the value of a_i indicates those affected by the policy change and p_t indicates the period in which the policy changes were enacted. The values of γ_1 and γ_2 denote the coefficients associated with the main effects of the treatment and period variable while the value η refers to the estimated coefficient of the interaction term between these two variables (ap), which captures the policy effect of UI reforms on those treated.

To assess how re-employment wage penalties vary across individuals or evolve over time, wage equation (2) is extended into the following specifications:

$$\ln w_{it} = \boldsymbol{\beta}'\mathbf{x}_{it} + \gamma_1 a_i + \gamma_2 p_t + \gamma_3 d_i + \eta_1 (ap)_{it} + \eta_2 (ad)_i + \eta_3 (pd)_{it} + \eta_4 (apd)_{it} + \alpha_i + e_{it} \qquad (3)$$

wherein, d_i denotes workers' previous employment duration, the values of η_1, η_2, and η_3 denote the lower order effects while η_4 denotes the coefficient associated with the three-way interaction between the treatment variable, the period variable and the variable employment duration after unemployment (*apd*). This latter reflects the stability of employment carriers in the post-unemployment period. In doing so, the three-way interaction equation (3) is expected to capture the effect of policy changes on those treated with different patterns of employment stability after an UI reform.

To assess how the policy effects vary among workers with different human capital we again extend our initial equation (2) into the following specification:

$$\ln w_{it} = \boldsymbol{\beta}'\mathbf{x}_{it} + \gamma_1 a_i + \gamma_2 p_t + \gamma_3 h_i + \eta_1 (ap)_{it} + \eta_2 (ah)_i + \eta_3 (ph)_{it} + \eta_4 (aph)_{it} + \alpha_i + e_{it} \qquad (4)$$

wherein, h_i denotes workers' human capital in terms of work experience, the values of η_1, η_2, and η_3 denote the lower order effects while η_4 denotes the coefficient associated with the three-way interaction between the treatment variable, period variable and the variable human capital (*aph*). Also here the value α_i refers to the time-invariant individual specific error and e_{it} represents the equation error term.

Finally, to assess whether policy effects vary among men and women, we extend our initial equation (2) into the following specification:

$$\ln w_{it} = \boldsymbol{\beta}'\mathbf{x}_{it} + \gamma_1 a_i + \gamma_2 p_t + \gamma_3 f_i + \eta_1 (ap)_{it} + \eta_2 (af)_i + \eta_3 (pf)_{it} + \eta_4 (apf)_{it} + \alpha_i + e_{it} \qquad (5)$$

where, f_i refers to workers' gender, the values of η_1, η_2, and η_3 denote the lower order effects while η_4 denotes the coefficient associated with the three-way interaction between the treatment, period and the female variable (*apf*). In doing so, we estimate whether UI reforms have affected women different from men.

In studies that examine wage effects a problem occurs when wage information is not available for all the individuals. It may be that workers in the control and treatment groups with longer unemployment spells, or entering employment recently are not present in the wage sample. In order to correct for the sample selection bias the Heckman two-step procedure (1979) is used. In its first stage, Heckman's procedure estimates the probability of being in the control or treatment group and having more than one wage observation conditional on observable characteristics. Next, the expected value of the error term, Lambda (λ), is estimated and used in the wage equation as an additional variable to correct for any sample selection bias. To strengthen identification three additional variables have been added to the probit selection model, namely: (a) the variable marital status, (b) unemployed two waves earlier (UN_{t-4}), and (c) whether post-unemployment job was of a temporary character. These variables affect the probability of being unemployed and therefore having less than one wage observation, but do not necessarily affect the wage outcomes. For example, being married may influence the probability of employment in a particular period that in turn affects an individual's treatment status and the available wage information in our sample. On the other hand having been unemployed two waves earlier may affect the treatment status of an individual, but also lower the probability of more than one wage observation for that particular worker. Finally, having found a temporary job after unemployment may affect future eligibility structures but also the available wage observations if such a job has been found very recently. The choice of these variables is common in economic studies and is used in numerous studies to strengthen identification of the model (see Van Ours and Vodopivec 2006, Arulampalam 2000, Gregg and Tominey 2004, Gregory and Jukes 2004). The endogenous lagged variables[23] at longer lags are assumed to have been exogenously determined and to affect the selection but not the wage outcome. Another factor that strengthens the identification is the non-linear functional form of the probit model that is used in the first stage of Heckman's procedure. Table D3 of Appendix D provides a detailed description of this procedure. In addition, Table D4 of Appendix D provides estimates for the probability of belonging to a specific

[23] Exogenous variables are assumed to condition the outcome values of the endogenous variables but are not reciprocally treated because no feedback relation is assumed.

eligibility group with one or more wage observations conditional on a number of observable characteristics.

4.5 Empirical Results

4.5.1 Descriptive Results

As a starting point, Table 4.1 presents a summary of the characteristics of control and treatment groups at each specific year of UI reform.

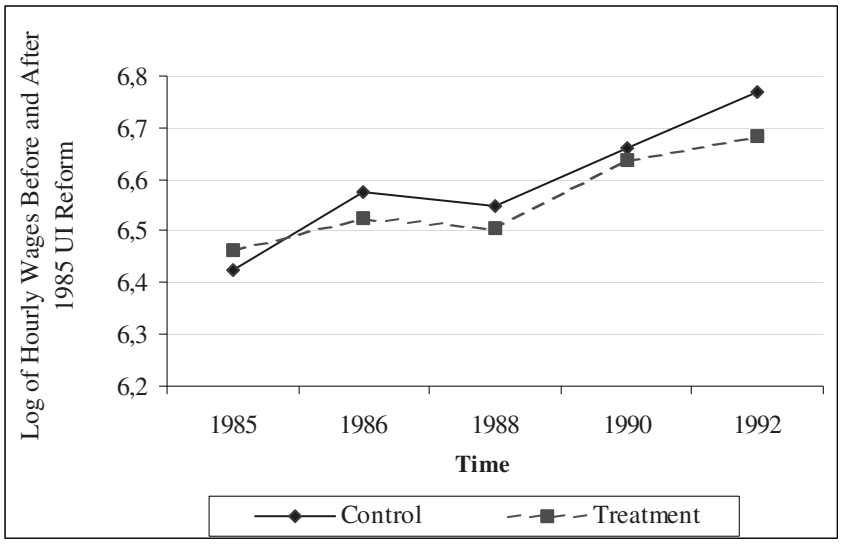
Table 4.1. Means and Standard Deviations of Demographic and Human Capital Variables for the Treatment and Control Groups *before* **the UI Reforms, The Netherlands 1980-2000**

	1985 UI Reform		***1987 UI Reform***		***1995 UI Reform***	
Variables	*Control*	*Treatment*	*Control*	*Treatment*	*Control*	*Treatment*
Log Hourly Wages *(in Guilders)*	6.42 (0.49)	6.46 (0.45)	6.49 (0.31)	6.47 (0.45)	6.84 (0.30)	6.77 (0.45)
Female	0.66 (0.37)	0.34 (0.52)	0.39 (0.49)	0.57 (0.50)	0.37 (0.48)	0.59 (0.49)
Age	43.52 (9.64)	43.31 (11.54)	38.18 (7.85)	37.25 (13.34)	40.23 (8.47)	35.82 (12.91)
Marital Status	0.83 (0.37)	0.86 (0.38)	0.82 (0.38)	0.71 (0.45)	0.83 (0.38)	0.71 (0.46)
Low Educated *(9 years)*	0.54 (0.49)	0.44 (0.50)	0.42 (0.50)	0.45 (0.50)	0.41 (0.49)	0.46 (0.50)
Medium Educated *(12 years)*	0.31 (0.49)	0.36 (0.48)	0.36 (0.48)	0.34 (0.48)	0.37 (0.48)	0.33 (0.47)
High Educated *(18 years)*	0.15 (0.39)	0.20 (0.38)	0.22 (0.41)	0.21 (0.41)	0.22 (0.41)	0.21 (0.41)
Recent months in unemployment	16.22 (7.39)	9.12 (13.21)	11.47 (6.25)	13.43 (13.38)	8.81 (6.22)	14.96 (13.52)
Cumulated Work Experience *(in mths)*	41.68 (38.32)	51.82 (41.13)	52.36 (38.86)	30.32 (38.75)	53.06 (39.69)	28.85 (37.58)
Work Experience *(in years)*	21.17 (15.21)	21.00 (13.15)	24.31 (10.31)	20.22 (9.52)	19.49 (10.31)	18.85 (9.47)
# Prior unemployment *(> 0)*	1.39 (0.36)	1.12 (0.75)	1.16 (0.37)	1.32 (0.74)	1.15 (0.37)	1.32 (0.75)

Descriptive statistics24 show that those treated by the 1985 UI reform (which lowered the benefit level), have slightly higher hourly wages, are more often married men with medium and high education and have higher cumulated work experience, compared to the control group. Those affected by the 1987 and the 1995 UI reform (which restricted the qualifying and base conditions) show more similarities with each other. These are more often prime-age working women with a low and/or medium education that earn relatively lower hourly wages compared to the control group. This group is also characterized by longer spells of unemployment and lower labor market experience. It is obvious that those affected by the 1987 and 1995 UI reform are more often women with fragmented work careers that have not been able to build up a consistent and stable work career.

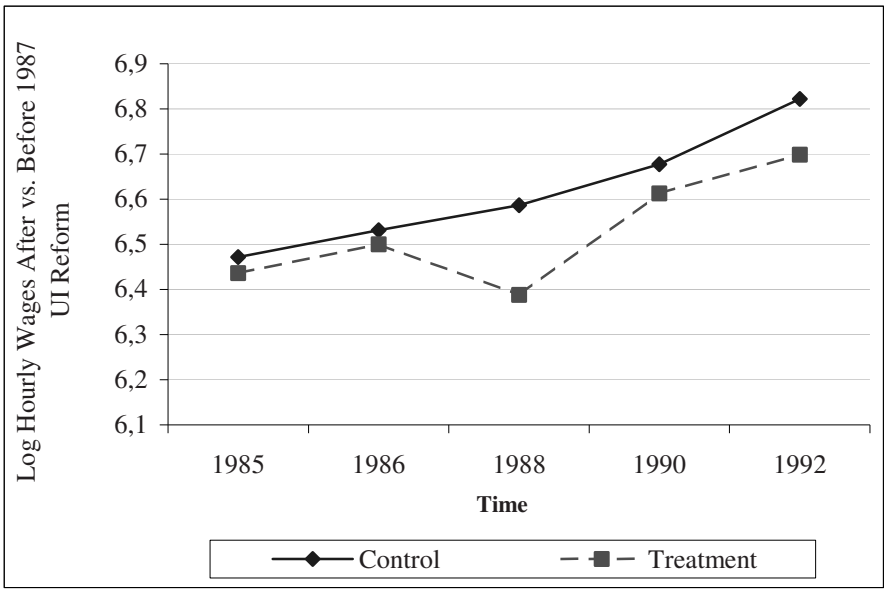
Although results in Table 4.1 show only slight differences between the observable characteristics of the control and treatment groups, it is important to assess whether the control and treatment groups experience similar trends in the development of their re-employment wages. Figure 4.3 to Figure 4.5 illustrate the development in the mean of log hourly wages, before and after each UI reform, for the treatment and control groups.

Figure 4.3. Mean of Log Hourly Wages of the Control and Treatment Group, Before and After the 1985 UI Reform



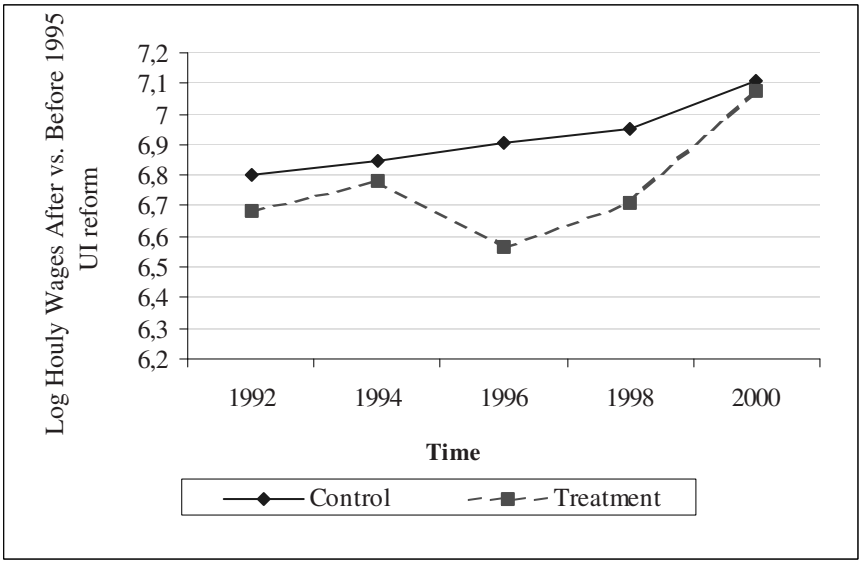
[24] Additional statistics are summarized in Table D1 in Appendix D.

Figure 4.4. Mean of Log Hourly Wages of the Control and Treatment Group, Before and After the 1987 UI Reform



SOURCE: - Author's calculations using data from the OSA Supply Panels, 1985-2000.

Figure 4.5. Mean of Log Hourly Wages of the Control and Treatment Group, Before and After the 1995 UI Reform



SOURCE: - Author's calculations using data from the OSA Supply Panels, 1985-2000.

Two aspects about the evidence provided in Figure 4.3 to Figure 4.5 are striking. First, after virtually all UI reforms the re-employment wages of those treated progress in line, but do not exceed the re-employment wages of those not affected by such restrictions. Second, the figures suggest brief evidence that patterns of re-employment wage penalties are sensitive to the type of the UI reforms. For example, while a restrictive change in the benefit level influences workers' job search behavior immediately, it imposes an immediate drop in workers' re-employment wages thereafter. Restrictive changes in the qualifying and base weeks, on the other hand, affect workers' job search decisions gradually, leading to higher wage penalties during the periods near to exhaustion of the UI benefit period. Although interesting as illustrative results, they are of a descriptive nature. However, Figures 4.3 to 4.5, do strongly suggest that the control and treatment groups at each specific period, have parallel trends in the mean of their log of hourly wages in absence of the UI reforms. The negative trend in the mean of log of hourly wages at the year of UI reforms suggests UI reforms to have triggered an important effect on individuals' wages, which needs to be assessed more deeply.

4.5.2 The Relationship between UI Reforms and Re-employment Wages

Is there a negative relationship between UI reforms and individuals' re-employment wages? If so, does this negative relationship persist or diminish over time? To answer these questions Table 4.2 summarizes estimations from nine baseline OLS estimates that test for the initial and longer-term effects of each UI reform on workers' log of hourly wages one until five years after the policy change. At this stage, the OLS estimates are necessary to provide evidence on the one-year wage effects of the UI reforms that are not possible using a fixed-effects model. In these models the variable of interest is the interaction variable between the period variable and the treatment status, which indicates the policy effect on those affected workers.

Table 4.2. Unstandardized Coefficients for the Effect of UI Reforms on Individuals' Log Hourly Wage 1 until 5 Years after the UI reforms, with NO Control for Individual-level and Labor Market History Variables and with *Unstandardized* Values for the Treatment Variables, from OLS Estimates, The Netherlands 1980-2000

	1985 UI Reform			***1987 UI Reform***			***1995 UI Reform***		
	Model 1 *1 year*	Model 2 *3 years*	Model 3 *5 years*	Model 4 *1 year*	Model 5 *3 years*	Model 6 *5 years*	Model 7 *1 year*	Model 8 *3 years*	Model 9 *5 years*
1985 UI Reform									
Period after 1st UI reform	-0.176*** (0.065)	-0.198*** (0.048)	-0.214*** (0.037)						
Treatment	0.028*** (0.004)	0.027*** (0.004)	0.025*** (0.004)						
Period* Treatment	-0.034* (0.019)	-0.029* (0.016)	-0.022* (0.013)						
1987 UI Reform									
Period after 2nd UI reform				-0.159*** (0.043)	-0.208*** (0.033)	-0.222*** (0.021)			
Treatment				-0.000 (0.000)	-0.000 (0.000)	-0.000* (0.000)			
Period* Treatment				-0.019*** (0.002)	-0.022*** (0.002)	-0.022*** (0.002)			

Table 4.2. Unstandardized Coefficients for the Effect of UI Reforms on Individuals' Log Hourly Wage 1 until 5 Years after the UI reforms, with NO Control for Individual-level and Labor Market History Variables and with *Unstandardized* Values for the Treatment Variables, from OLS Estimates, The Netherlands 1980-2000 *(Continued)*

	1985 UI Reform			***1987 UI Reform***			***1995 UI Reform***		
	Model 1 *1 year*	Model 2 *3 years*	Model 3 *5 years*	Model 4 *1 year*	Model 5 *3 years*	Model 6 *5 years*	Model 7 *1 year*	Model 8 *3 years*	Model 9 *5 years*
1995 UI Reform									
Period after 3rd UI reform							0.109*** (0.027)	0.119*** (0.021)	0.117*** (0.021)
Treatment							-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Period* Treatment							-0.011*** (0.003)	-0.016** (0.008)	-0.000 (0.003)
Constant	6.694*** (0.012)	6.704*** (0.012)	6.721*** (0.013)	6.730*** (0.005)	6.742*** (0.005)	6.772*** (0.006)	6.744*** (0.005)	6.736*** (0.006)	6.725*** (0.008)
Observations	726	726	726	996	996	996	1,081	1,081	1,081
Number	320	320	320	391	391	391	390	390	390
R-squared	0.136	0.161	0.202	0.033	0.067	0.138	0.032	0.048	0.061

SOURCE: - Author's calculations using data from the OSA Supply Panels, 1985-2000.
NOTE: - Robust standard errors are in parentheses.

Results from Model 1 to Model 9 in Table 4.2, hold a number of interesting implications. First, consistent with the UI reform hypothesis, results demonstrate that each UI reform in one of the dimensions of the UI benefits imposes significant negative re-employment wage effects compared to those unaffected workers. Second, as directly evident from Table 4.2, results show that restrictive changes need some time to produce their full effects. For example, Model 1 to Model 3 show that a decrease in the replacement ratio of UI benefits by 10% yields a re-employment wage penalty of around 3.4% one year after the policy change. These penalties remain significant and persistent three years (2.9%) and five years (2.2%) after the implementation of the 1985 UI reform. The relative higher wage penalties after the first year – compared to the wage penalties 3 and 5 years after the 1985 UI reform – support the hypothesis of anticipatory behavior that expected UI reforms in the benefit level to lead to higher wage penalties during recent periods after the policy change.

In case of restrictions of the qualifying (1987 UI reform) and base period (1995 UI reform), results show stronger and more significant effects indicating higher re-employment wage penalties compared to the 1985 UI reform. Further examination of Models 4 to Model 9 suggest that a restriction with ten additional weeks in the qualifying and base period imposes a drop in workers' re-employment wages by respectively 2% and 1% several years after the policy changes. These penalties remain constant when qualifying conditions are restricted (1987 UI reform) and diminish after five years when base conditions are restricted (1995 UI reform). The constant wage penalties over time support again the hypothesis of anticipatory behavior. It seems that policy changes in the qualifying and base weeks, affect workers' job search decisions gradually, thereby leading to constant wage penalties over the mid (3 years) and long (5 years) term. These results hold an important implication for the sensitivity of re-employment wage effects. When UI reforms in the benefit level are enacted, the estimated re-employment wage effects over mid or longer terms may underestimate the true effects of the UI reform, which in this case are most apparent one year after the policy change. On the other hand, restrictions in the qualifying and base periods prove not to be sensitive to short or long estimation periods.

When are the effects of UI reforms the most extensive? Recall we argued theoretically that during less favorable economic conditions workers often settle for a lower wage relative to their desired wage. We therefore expected that the effect of UI reforms enacted during depressed economic cycles, such as the 1985 and 1987 UI reforms, would be more extensive relative to the 1995 UI reform that was enacted during better economic times. To compare the effects of different reforms to each other, in Model 1 to Model 9 in Table 4.3, the treatment status variable has been converted into a 0..1 variable[25]. The conversion can be seen as a way of standardization that translates the treatment variables into the same units of measurements. In doing so, the treatment variable is transformed and converted into the same units, which makes comparison of the policy effects possible.

After controlling for labor market and human capital variables, results of Model 1 to Model 9 show that the wage loss between the less and the most impacted individuals is the highest after the 1987 UI reform with 12.6 % three years after its implementation. This is followed by 4% and 2.8 % wage loss for respectively the 1985 and 1995 UI reform. These results are in line with the theoretical expectations in the economic cycles hypothesis and imply that UI reforms enacted during less favorable economic times lead to higher wage losses compared to reforms enacted in better economic times. Besides the economic situation in a country, these findings may also relate to the type of the UI reform indicating that stricter eligibility criteria on the qualifying (1987 UI reform) impose higher re-employment wage penalties relative to lower UI benefit levels (1985 UI reform). These results also concur with earlier findings of Burgess and Kingston (1976) and Holen (1977), but also with more recent findings of Petrongolo (2007) that find stricter eligibility conditions that go hand in hand with shorter unemployment durations to impose higher re-employment wage penalties than lower UI benefit levels.

[25] More about the distribution of the 0..1 variable can be found in the Figures D1 to D6 in Appendix D

Table 4.3. Unstandardized Coefficients for the Effect of UI Reforms on Individuals' Log Hourly Wage 1 until 5 Years after the UI reforms, with Controls for Individual-level and Labor Market History Variables and with *Standardized* Values for the Treatment Variables, from OLS Estimates, The Netherlands 1980-2000

	1985 UI Reform			***1987 UI Reform***			***1995 UI Reform***		
	Model 1 *1 year*	Model 2 *3 years*	Model 3 *5 years*	Model 4 *1 year*	Model 5 *3 years*	Model 6 *5 years*	Model 7 *1 year*	Model 8 *3 years*	Model 9 *5 years*
1985 UI Reform									
Period after 1st UI	-0.125	-0.123*	-0.158***						
Reform	(0.091)	(0.066)	(0.059)						
Treatment	0.042***	0.043***	0.045***						
	(0.010)	(0.010)	(0.011)						
Period* Treatment	-0.064*	-0.040*	-0.039*						
	(0.036)	(0.021)	(0.021)						
1987 UI Reform									
Period after 2nd UI				-0.047	-0.023	-0.087			
Reform				(0.064)	(0.050)	(0.053)			
Treatment				-0.011	-0.011	-0.012			
				(0.010)	(0.010)	(0.009)			
Period* Treatment				-0.117***	-0.126***	-0.119*			
				(0.041)	(0.042)	(0.063)			

Table 4.3. Unstandardized Coefficients for the Effect of UI Reforms on Individuals' Log Hourly Wage 1 until 5 Years after the UI reforms, with Controls for Individual-level and Labor Market History Variables and with *Standardized* Values for the Treatment Variables, from OLS Estimates, The Netherlands 1980-2000 *(Continued)*

	1985 UI Reform			***1987 UI Reform***			***1995 UI Reform***		
	Model 1 *1 year*	Model 2 *3 years*	Model 3 *5 years*	Model 4 *1 year*	Model 5 *3 years*	Model 6 *5 years*	Model 7 *1 year*	Model 8 *3 years*	Model 9 *5 years*
1995 UI Reform									
Period after 3rd UI							0.046**	0.075***	0.055***
Reform							(0.023)	(0.023)	(0.018)
Treatment							-0.013*	-0.009	-0.011
							(0.007)	(0.008)	(0.008)
Period* Treatment							-0.027*	-0.028*	-0.009
							(0.014)	(0.018)	(0.009)
Constant	5.726***	5.803***	5.918***	5.950***	5.931***	6.146***	6.036***	6.074***	6.075***
	(0.347)	(0.251)	(0.272)	(0.582)	(0.594)	(0.311)	(0.567)	(0.557)	(0.567)
Observations	600	600	600	842	842	842	918	918	918
Number	303	303	303	368	368	368	370	370	370
R-squared	0.463	0.462	0.465	0.362	0.362	0.365	0.325	0.366	0.367

SOURCE: - Author's calculations using data from the OSA Supply Panels, 1985-2000.
NOTE: - Robust standard errors are in parentheses.

To assess the effects of UI reforms in the wage developments of an individual over time, the regression estimates from Table 4.4 are limited to three-year effects that will be estimated using fixed-effects models. In doing so, policy effects will suffer less from unobserved heterogeneity and confounding factors that may arise from changing trends in outcomes which vary over time such as inflation, aging and wage growth (Meyer 1994). Moreover, to allow for the assessment of sample selection bias, the effects of each restrictive change will be modeled separately including a separate correction term for each model. In addition, robust standard errors are used to correct for any pattern of correlation among errors within individuals (Rogers 1993).

Table 4.4. Unstandardized Coefficients for the Effect of UI Reforms on Individuals' Log Hourly Wage, 3 Years after the Policy Change, from Fixed-Effects Models with Correction for Sample Selection Bias, The Netherlands 1980-2000

	1985 UI Reform	***1987 UI Reform***	***1995 UI Reform***
	Model 1	Model 2	Model 3
Period	0.072	-0.075	0.084**
	(0.077)	(0.071)	(0.035)
Treatment group	0.035**	-0.002	0.001
	(0.017)	(0.000)	(0.000)
Period* Treatment	-0.037*	-0.030***	-0.012*
	(0.019)	(0.009)	(0.000)
Labor Market History Measures			
Most recent unemployment spell (in months)	-0.006*	-0.006	-0.005
	(0.004)	(0.004)	(0.004)
Most recent unemployment spell squared (in months)	0.000	-0.000	0.000**
	(0.000)	(0.000)	(0.000)
Cumulated unemployment spells (in months)	-0.004*	-0.005*	-0.004
	(0.003)	(0.003)	(0.004)

Table 4.4. Unstandardized Coefficients for the Effect of UI Reforms on Individuals' Log Hourly Wage, 3 Years after the Policy Change, from Fixed-Effects Models with Correction for Sample Selection Bias, The Netherlands 1980-2000 *(Continued)*

	1985 UI Reform	***1987 UI Reform***	***1995 UI Reform***
	Model 1	Model 2	Model 3
Employment duration after unemployment (in months)	0.000	0.001	-0.001
	(0.001)	(0.002)	(0.001)
Cumulative employment stability after unemployment (in months)	0.001	-0.000	0.001
	(0.001)	(0.001)	(0.001)
Lagged unemployment duration (in months)	-0.001	-0.023	-0.004
	(0.012)	(0.024)	(0.013)
Human Capital Measures			
Attained years of education	0.034*	0.042*	0.022
	(0.018)	(0.024)	(0.019)
Work experience (in years)	0.039***	0.049***	0.044***
	(0.008)	(0.011)	(0.015)
Lambda (λ)	-0.159	0.092	0.115
	(0.219)	(0.067)	(0.122)
Constant	5.477***	5.236***	5.647***
	(0.337)	(0.479)	(0.282)
Nr. Observations	600	842	918
Nr. Workers	303	368	370
R-squared	0.464	0.365	0.325

SOURCE: - Author's calculations using data from the OSA Supply Panels, 1985-2000.
NOTE: - Robust standard errors in parentheses; *** p < .001; ** p < .05; * p < .1; two-tailed tests.

Regression estimates that control for differences in workers' labor market history and human capital and correct for time constant unobserved differences and sample selection bias are reported in Model 1, 2, and 3 in Table 4.4. In line with the theoretical predictions from the UI reform hypothesis, results in Models 1, 2, and 3 are consistent with earlier results that demonstrated a negative relationship between UI reforms and workers' re-employment wages. These effects become larger in their magnitude after controlling for differences in workers' labor market history and human capital characteristics. The included correction term remains

insignificant in all models and leaves the wage equation unchanged, suggesting that those treated with more than one wage observation are similar to those otherwise similar workers with only one wage observation. This is in line with earlier results from Van Ours and Vodopivec (2006) that argue this to be the case when the potential selectivity in the availability of wage information to be uncorrelated with the processes that determine wages. Gregory and Jukes (2001) and Arulampalam et al (2001) also report similar results.

4.5.3 The Varying Patterns of Re-employment Wage Penalties

To understand the underlying negative relationship between UI reforms and re-employment wages, we theoretically distinguished between behavioral and compositional forces of UI reform effects. Based on the predicted behavioral and compositional implications of UI reforms we predicted that those affected by the UI reforms would suffer from more fragmented careers as a result of jobs with lower productivity levels and higher risks of dismissals. This in turn would predict downward earnings spirals that accumulate over time creating wage differentials of a persistent nature. To assess how UI reforms affect the stability and mobility of re-employment wages over time, Table 4.5 summarizes the estimation results from three fixed-effects regression models. The three-way interaction term between the period variable, treatment status and employment duration after unemployment was used to examine whether re-employment wage penalties diminishes as soon workers find re-employment.

Consistent with our wage gap hypothesis, results from Model 1, 2, and 3, in Table 4.5 provide support for a persisting negative effect of UI reforms on re-employment wages compared to those not affected. Estimates from Model 2 and 3 suggest that compared to those not affected by the policy changes, stricter qualifying (1987 UI reform) and base conditions (1995 UI reform) impose wage penalties with a persistent character. Results show that these effects cumulate over time. This suggests that especially UI reforms that restrict the eligibility conditions have the potential to generate an unintended stratification effect by creating a wage gap among social groups that differ only with respect to their treatment status. Apparently, the initial wage gap of those affected accumulates over time and fails to recover to the level of those not affected.

Table 4.5. Unstandardized Coefficients for the Effect of UI Reforms on Individuals' Log Hourly Wage across Employment Durations, from Fixed-Effects Models with Correction for Sample Selection Bias, The Netherlands 1980-2000

	1985 UI Reform	***1987 UI Reform***	***1995 UI Reform***
	Model 1	Model 2	Model 3
Period	0.056	-0.132*	0.083**
	(0.082)	(0.077)	(0.036)
Treatment group	0.035	-0.002	0.001
	(0.024)	(0.000)	(0.000)
Employment duration (in months)	-0.002	-0.001	0.000
	(0.001)	(0.001)	(0.001)
Period* Treatment	0.005	-0.003***	-0.025**
	(0.042)	(0.001)	(0.010)
Period*Employment duration	-0.028	0.001	0.001
	(0.017)	(0.001)	(0.001)
Treatment * Employment duration	-0.000	0.001**	-0.001
	(0.000)	(0.000)	(0.001)
Period*Treat*Employment duration	-0.004	-0.003***	-0.002***
	(0.010)	(0.000)	(0.000)
Labor Market History Measures			
Most recent unemployment spell (in months)	-0.003	-0.012**	-0.007*
	(0.004)	(0.005)	(0.004)
Most recent unemployment spell squared	0.000	-0.000**	-0.000*
	(0.000)	(0.000)	(0.000)
Cumulated unemployment spells (in months)	-0.007*	-0.009**	-0.004
	(0.004)	(0.005)	(0.004)
Cumulative employment duration after unemployment	0.002	0.000	0.001
	(0.001)	(0.001)	(0.001)
Lagged unemployment duration (in months)	0.003	-0.023	-0.004
	(0.011)	(0.024)	(0.014)
Human Capital Measures			
Attained years of education	0.038*	0.042*	0.028
	(0.011)	(0.024)	(0.019)
Work experience (in years)	0.043***	0.051***	0.044***
	(0.010)	(0.014)	(0.015)

Table 4.5. Unstandardized Coefficients for the Effect of UI Reforms on Individuals' Log Hourly Wage across Employment Durations, from Fixed-Effects Models with Correction for Sample Selection Bias, The Netherlands 1980-2000 *(Continued)*

	1985 UI Reform	***1987 UI Reform***	***1995 UI Reform***
	Model 1	Model 2	Model 3
Lambda (λ)	-0.101	0.092	0.112
	(0.321)	(0.067)	(0.123)
Constant	5.791***	5.236***	5.657***
	(0.194)	(0.479)	(0.280)
Nr. Observations	600	842	918
Nr. Workers	303	368	370
R-squared	0.485	0.360	0.375

SOURCE: - Author's calculations using data from the OSA Supply Panels, 1985-2000.
NOTE: - Robust standard errors in parentheses; *** $p < .001$; ** $p < .05$; * $p < .1$; two-tailed tests.

From the perspective of employers, this wage gap may be the result of the stigmatization attached to workers with more fragmented careers, as it was the case for the treatment groups in the second and third UI reform. However, as the models have corrected for any stigmatization effect related to labor market history or human capital depreciation, any wage penalty can be attributed to stigmatization effects related to individuals' exposure to UI reforms. Another explanation for these results can be offered from a labor market perspective, namely: an increase in labor supply in periods after the policy changes may have led to an imbalance in the job supply and demand, which in turn is translated, into lower initial re-employment wages.

How are re-employment wage penalties spread over the distribution of workers with different levels of human capital? As stated earlier, one fundamental component of human capital, besides the level of education, is the extent of individuals' work experience in the labor market. Recall that in this study we used workers' experience in the labor market as a proxy of the knowledge obtained through participation in employment. To analyze explicitly how UI reforms influence re-employment wages of groups with different levels of work experience, Model 1, 2, and 3 in Table 4.6, introduce a triple difference estimate of policy

effects on re-employment wages over time. As stated earlier, the 'triple difference' estimator interacts the period variable with the treatment status variable and the continuous variable of individuals' working experience. Following argumentations from the human capital hypothesis, UI reforms were expected to affect more negatively those with higher specific skills, as they would be pushed to give up a higher part of their initial re-employment wages in exchange to lower and shorter UI benefits.

Table 4.6. Unstandardized Coefficients for the Effect of UI Reforms on Individuals' Log Hourly Wage across Work Experience, from Fixed-Effects Models with Correction for Sample Selection Bias, The Netherlands 1980-2000

	1985 UI Reform	***1987 UI Reform***	***1995 UI Reform***
	Model 1	Model 2	Model 3
Period	0.074	-0.075	0.059**
	(0.078)	(0.071)	(0.023)
Treatment group	0.035**	-0.003	-0.002
	(0.017)	(0.000)	(0.000)
Work Experience (in years)	0.006	0.076***	0.007
	(0.023)	(0.026)	(0.009)
Period* Treatment group	-0.001	-0.033***	-0.001
	(0.023)	(0.001)	(0.001)
Period*Work Experience	0.009	-0.011	0.003
	(0.010)	(0.008)	(0.002)
Treatment * Work Experience	0.000	-0.001*	0.002*
	(0.001)	(0.001)	(0.001)
Per*Treat*Work Experience	-0.019**	-0.001***	0.000
	(0.001)	(0.000)	(0.001)
Labor Market History Measures			
Most recent unemployment spell (in months)	-0.006*	0.006	0.004
	(0.004)	(0.004)	(0.003)
Most recent unemployment spell squared (in months)	0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)
Cumulated unemployment spells (in months)	-0.004*	-0.005*	-0.002
	(0.003)	(0.003)	(0.002)
Employment duration after unemployment (in months)	0.000	0.049***	0.033*
	(0.001)	(0.011)	(0.018)

Table 4.6. Unstandardized Coefficients for the Effect of UI Reforms on Individuals' Log Hourly Wage across Work Experience, from Fixed-Effects Models with Correction for Sample Selection Bias, The Netherlands 1980-2000 *(Continued)*

	1985 UI Reform	***1987 UI Reform***	***1995 UI Reform***
	Model 1	Model 2	Model 3
Cumulative employment duration after unemployment (in months)	0.001	-0.000	0.000
	(0.001)	(0.001)	(0.001)
Lagged unemployment duration	-0.001	-0.019	-0.001
(in months)	(0.012)	(0.023)	(0.014)
Attained years of education	0.004	0.001	0.001
	(0.006)	(0.002)	(0.001)
Lambda (λ)	-0.155	0.097	0.099
	(0.219)	(0.079)	(0.076)
Constant	5.356***	5.248***	5.225***
	(0.327)	(0.465)	(0.385)
Nr. Observations	600	842	918
Nr. Workers	303	368	370
R-squared	0.474	0.369	0.380

SOURCE: - Author's calculations using data from the OSA Supply Panels, 1985-2000.
NOTE: - Robust standard errors in parentheses; *** $p < .001$; ** $p < .05$; * $p < .1$; two-tailed tests.

Results in Model 1 and Model 2 partly support these expectations and hold a number of interesting implications. First, restrictions in the level (1985 UI reform) and qualifying period of UI benefits (1987 UI reform) impose negative effects in the re-employment wages of those with longer work experience. More specifically, when benefit levels are restricted by 10 percentage points, they yield a re-employment wage penalty of around 1.9% three years after the policy change. On the other hand, a restriction by 10 additional qualifying weeks inflicts a re-employment wage penalty by 1% three years after the policy change. Second, the persisting wage penalties three years after the policy change suggest that those with high human capital do not experience a swift recovery from these policy changes.

One explanation to these results may be related to earlier predictions of the human capital theory that expected re-employment wage penalties to reflect the dislocation costs arising from UI reforms. Especially, the devaluation of industry-specific human capital may have led to these permanent and pronounced re-employment wage penalties relative to those not affected by the policy changes.

Are women differently impacted than men? To explain why UI reforms may impact women different from men we argued earlier that in a situation with a UI reform, women more than men would behave risk-aversely by accepting jobs with less working hours thereby receiving lower wages. To examine this theoretical expectation more explicitly, Model 1, 2, and 3 in Table 4.7, introduce a triple-difference estimate of policy effects on re-employment wages across different gender. Results in Model 1 and Model 2 show mixed support for our gender hypothesis. Against our expectations, results in Model 1 demonstrate that, the negative effect of the first 1985 UI reform on the treated becomes 3.2% weaker if the treated were female. This implies that men have suffered from larger wage penalties during the first 1985 UI reform. On the other hand, a restriction by 10 additional qualifying weeks has inflicted for women a re-employment wage penalty by 1.5% three years after the policy change. The explanation for these results may relate to the fact that when firms receive job applications they hire the person with the shortest unemployment spell. During the first 1985 UI reform, these persons were more often women who because of shorter benefit periods accounted also for the shortest unemployment spells compared to men. During the second 1987 UI reform, when the employment prospects continued to be scant, it was especially men with more work experience that were willing to accept jobs with lower productivity levels for which they were overqualified. In doing so, they indirectly increased the qualification standards for new hires and made it harder for women with relatively short work experience to compete pushing them to accept low-paid jobs.

Table 4.7. Unstandardized Coefficients for the Effect of UI Reforms on Individuals' Log Hourly Wage across Gender, from Fixed-Effects Models with Correction for Sample Selection Bias, The Netherlands 1980-2000

	1985 UI Reform	***1987 UI Reform***	***1995 UI Reform***
	Model 1	Model 2	Model 3
Period	0.115	0.015	0.022
	(0.083)	(0.047)	(0.023)
Treatment group	0.020***	-0.000	-0.000
	(0.005)	(0.000)	(0.000)
Female	-	-	-
Period*Treatment Group	-0.044**	-0.002***	-0.026***
	(0.019)	(0.000)	(0.006)
Treatment Group *Female	0.017*	0.000	0.000
	(0.010)	(0.000)	(0.000)
Period *Female	-0.291**	-0.117*	0.003
	(0.138)	(0.068)	(0.026)
Treatment *Period *Female	0.032**	-0.015*	0.000
	(0.011)	(0.008)	(0.000)
Labor Market History Measures			
Most recent unemployment spell (in months)	-0.012***	-0.000	0.001
	(0.004)	(0.003)	(0.002)
Most recent unemployment spell squared (in months)	0.000**	0.000	-0.000
	(0.000)	(0.000)	(0.000)
Cumulated unemployment spells (in months)	-0.003*	-0.005*	-0.002
	(0.002)	(0.003)	(0.002)
Employment duration after unemployment (in months)	-0.000	0.000	0.000
	(0.001)	(0.002)	(0.001)
Cumulative employment duration after unemployment (in months)	0.001	-0.000	0.000
	(0.001)	(0.001)	(0.001)
Lagged unemployment duration (in months)	-0.002	-0.003	0.000
	(0.009)	(0.007)	(0.000)

Table 4.7. Unstandardized Coefficients for the Effect of UI Reforms on Individuals' Log Hourly Wage across Gender, from Fixed-Effects Models with Correction for Sample Selection Bias, The Netherlands 1980-2000 *(Continued)*

	1985 UI Reform	***1987 UI Reform***	***1995 UI Reform***
	Model 1	Model 2	Model 3
Human Capital Measures			
Attained years of education	0.022	-0.029	-0.003
	(0.015)	(0.043)	(0.022)
Work experience (in years)	0.033***	0.037***	0.036***
	(0.004)	(0.004)	(0.004)
Lambda (λ)	-0.134	0.081	0.114
	(0.242)	(0.069)	(0.076)
Constant	5.706***	6.244***	5.866***
	(0.255)	(0.560)	(0.311)
Nr. Observations	600	842	918
Nr. Workers	303	368	370
R-squared	0.478	0.365	0.462

SOURCE: - Author's calculations using data from the OSA Supply Panels, 1985-2000.
NOTE: - Robust standard errors in parentheses; *** $p < .001$; ** $p < .05$; * $p < .1$; two-tailed tests.

4.5.4 Robustness Checks

To assess whether effects of UI reforms on re-employment wages are robust to changes in the composition of the control and treatment groups, sensitivity analyses were undertaken. In particular, to check whether younger and older workers bias our results, we simultaneously eliminated workers younger than 21 and older than 55 years old. This potentially reduces the heterogeneity in the sample with respect to pre-unemployment work experience, which offers the unemployed the possibility to afford longer unemployment spells. Estimates in Table 4.8 show that although the magnitude of the estimated effects decreases, their significance remains present. As a further check, cases were excluded with the lowest number of unemployment spells in the treatment groups and cases with the highest number of unemployment spells in the control groups. This is done to assess whether the observed differences in the unemployment histories of the control and treatment

groups affects the robustness of our estimated results. Again the magnitude of the effects becomes smaller, showing a lower effect size of UI reforms on post-unemployment wages, but still significantly present.

Table 4.8. Unstandardized Coefficients for the Effect of Changing Group Composition and Extra Controls from Fixed-Effects models with Correction for Sample Selection Bias, The Netherlands 1980-2000

	1985 UI Reform	***1987 UI Reform***	***1995 UI Reform***
	Model 1	Model 2	Model 3
Reference model (Table 4.4)	-0.037*	-0.030***	-0.012*
	(0.019)	(0.009)	(0.000)
Excluding cases with lowest and highest # unemployment spells	-0.036**	-0.028***	-0.004**
	(0.016)	(0.008)	(0.002)
Excluding workers younger than 21 and older than 55 years old	-0.031*	-0.026***	-0.003*
	(0.018)	(0.009)	(0.002)
Excluding cases with lowest previous hourly wages	-0.027*	-0.026***	-0.002*
	(0.016)	(0.009)	(0.001)
Excluding cases with lowest and highest previous hourly wages	-0.024*	-0.025***	-0.001*
	(0.015)	(0.008)	(0.000)
Extra Controls			
Controlling for starting month re-employment	-0.034**	-0.022***	-0.001*
	(0.017)	(0.007)	(0.000)

SOURCE: - Author's calculations using data from the OSA Supply Panels, 1985-2000.
NOTE: - Controls are also included for most recent unemployment spell, cumulated duration of earlier unemployment spells, age, employment stability, cumulated spells of employment duration, lagged unemployment duration, attained years of education and work experience.
NOTE: - Robust standard errors in parentheses; *** $p < .001$; ** $p < .05$; * $p < .1$; two-tailed tests.

To check whether our results are robust to individuals' wage distribution, cases in the bottom and top wage distribution have also been excluded, thereby reducing the heterogeneity of the sample regarding pre-unemployment wages. Also here there is no evidence that UI reform effects disappear. As a final check, we included starting month of re-employment as an additional control variable to correct for any seasonal fluctuation that would influence re-employment wages.

The estimates show little support that the inclusion of this additional variable biased prior estimations with the coefficients and their significance remaining (almost) the same.

4.6 Summary and Conclusion

The aim of this study was to extend current research by examining whether restrictive changes in UI benefits lead to unequal patterns of wage developments across different social groups and over time. Drawing from different labor market theories and using data from the Dutch Labor Supply Panel (OSA) over the period 1980-2000, several hypotheses were developed and tested to predict the effects of UI reforms on re-employment wage dynamics.

A central finding in this study is that restrictions in the UI benefit level, duration, and eligibility criteria affect negatively workers' re-employment wages. Especially, restrictions on the qualifying conditions that are coupled with shorter benefit durations and restrictions in the base conditions impose higher re-employment wage penalties than restrictions in the level of the UI benefits. These penalties are largely persistent and particularly significant for men, high skilled and more experienced workers. But why are social groups impacted in a different way? One explanation to the variation of UI effects may be related to earlier predictions of the human capital theory that expected re-employment wage penalties to reflect the dislocation costs arising from UI reforms. Especially, the devaluation of industry-specific human capital may have led to these permanent and pronounced re-employment wage penalties relative to those not affected by the policy changes. Another explanation may be related to the risk-averse responses of workers and compositional effects that lead to location and concentration of affected workers into jobs with lower productivity levels and hence lower re-employment wages.

Does the negative relationship between UI reforms and individuals' re-employment wages persists or diminish over time? Following the results of this study, the wage penalties stemming from restrictions in the benefit duration and eligibility conditions not only persist three years after the policy change but also widen with 0.3 and 0.2 percentage points for each ten additional months in employment. Apparently, the initial wage gap of those affected accumulates over time and fails to recover to the level of those not affected. This leads to an

unintended stratification effect of UI reforms, creating a wage gap among social groups that differ only with respect to their treatment status. Evaluation of the implemented UI reforms in the light of these results suggests that restrictive policy changes may have been adequate to stimulate exit rates out of unemployment, but to have damaged workers' earnings prospects and enlarged economic inequality due to dislocation costs of unemployment and disruption of the job search process.

When are the effects of UI reforms the most extensive? Results in this study showed that the magnitude of the wage penalties is related to the economic cycles, and partly to the observation period following the UI reforms. Particularly, UI reforms enacted during less favorable economic times show steeper wage penalties compared to reforms enacted in better economic times. This can be explained by the fact that during less favorable economic conditions workers often settle for a lower wage relative to their desired wage. This leads to more pronounced wage losses during economic downturns. Results in this study revealed also that the steepness of wage penalties depends on the observation period following the UI reforms. While stricter UI benefit levels impose higher wage losses in the year following the UI reform, it seems that policy changes in the qualifying and base weeks, affect workers' job search decisions gradually. This may be related to the fact that UI reforms that affect workers' instant value of remaining unemployed, such as lower benefit levels, push workers to settle faster for a job below their desired wage, which is not the case when the eligibility criteria or the duration of the benefits are restricted.

These findings have some additional implications for future research. First, since it appears that UI reforms have created a two-tiered system, future research should more rigorously assess whether UI reforms lead to an increase of labor market segmentation by leaving certain occupations outside competition of groups affected by a specific restriction. To do so, future research should take a broader look by investigating the hiring decision and behavior of firms in periods of UI reforms to assess whether and how such restrictions have contributed to the increase of labor market segmentation. Second, it was beyond the scope of this study to examine monitoring measures for UI benefits. However, future research should investigate and assess more broadly between the efficiency of restricting UI reforms, and monitoring systems. This is necessary to find effective ways that on

the one hand stimulate labor market dynamics and on the other hand maintain workers from the insecurities involved with periods of unemployment.

Third, although this study assumed a proper job match to be the product of higher subsequent wages, the process of job matching and subsequent occupational mobility should be addressed more carefully in the future. Future research could pay more attention to the determinants of workers' selection and matching processes and how these are affected during periods of UI reforms. Finally, this study was limited by the size of its data set to investigate the effects of UI reforms on the re-employment wage outcomes of men and women separately. Future research is necessary to reveal more specifically how the re-employment wage outcomes of men and women are affected by such reforms, or how the dispersion of re-employment wages varies across different age groups or persons with different re-entry moments after the implementation of the UI reform.

In addition to the implications for further research, this study provides some policy directives that may be useful in the future. First, to design policies that offer an optimal balance between income-supportive and re-employment supportive arrangements it is important to keep or upgrade workers' human capital through schooling and training programs during unemployment periods. Involvement in such programs would retard the depreciation of human capital, make workers more confident and ready to work and would in turn send positive signals to employers about the productivity of workers. Second, one important result of this study was to reveal that workers' job search behavior is risk-averse to exogenous reforms. This result indicates that a combination between restrictive UI reforms with more supportive programs, such as wage subsidy programs, may be able to compensate or mitigate the wage losses of those affected. Such programs may be best offered during the first year after a restriction in the level of UI benefits, whereas in the case of restrictions in the base and qualifying periods such programs may be offered at a later phase.

Chapter 5: Conclusion and Directions for Further Research

5.1 Introduction

Unemployment is one of the most urgent issues in modern societies and for this reason one of the most widely studied topics in labor market research. Concerns about its negative effects on individual careers and wages led to a growing demand for social insurance provided by unemployment benefits since the beginning of the twentieth century (Holmlund 1998). However, this concern grew weaker when research showed that while UI benefits may alleviate the socio-economic inequalities, they may also lower the search intensities of the unemployed workers and lengthen their unemployment periods. This finding led to an impetus of policy reforms in the level, duration, and eligibility conditions of UI benefit systems in many Western European countries during the 1980s and 1990s. The negative attention on UI benefits led to the polarization of two contrasting research positions. The first position attributes unemployment to the generosity of UI benefits that reduces job search incentives, whereas the second and growing position argues the contrary by pointing at the role of UI benefits as a tool to overcome the financial aftermath of unemployment.

Although, empirical research has taken significant strides to understand how UI benefits drive or reduce unemployment rates, important questions have remained unexplored. The goal of this thesis was to build upon and extend existing literature by focusing on the employment career and wages of unemployed workers, while emphasizing the changing character of UI benefit policies. More specifically, there were two main aims at heart of this thesis. The first was a theoretical one, which was to identify elements of unemployment and policy reforms that have the potential to create employment and wage inequalities. The second aim was an empirical one, which was to understand how early life course conditions (i.e., unemployment) or restrictions (i.e., UI reforms) shape the later employment careers and wages of workers.

The overarching research question of this thesis asked: how are individuals' employment careers and wages influenced by unemployment and by changing UI benefit policies over time? This thesis has attempted to answer this

overarching research question through the discussion of three interrelated sub-questions that were answered in three separate empirical chapters. In these chapters, the theoretical strategy was to build a conceptual framework that links the literature on the socio-economic implications of unemployment with the job search literature. Drawing from this blend of theories, different explanations were developed to explain the phenomenon of unemployment scarring and the potential inequality in policy reforms. The variety but also similarity of the hypotheses asked (see Table 5.1 for an overview) enabled us to apply different hypotheses of human capital theory and of job search theory under different circumstances (e.g., changing dimensions of UI benefits and economic cycles) and across different social groups (e.g., women, low/high educated, short/long employment histories).

To address these sub-questions a twofold strategy was used. First, a longitudinal approach was adopted to trace how employment pathways and wages of workers change under influence of unemployment. Second, a quasi-experimental approach was used to disentangle whether, and how inequalities in individuals' employment careers and re-employment wages may increase as they interact with changing UI benefit policies. This thesis was about the Netherlands and different hypotheses were therefore tested within the context of this country. To empirically illustrate the hypotheses, this thesis took advantage of a range policy reforms in the policy area of UI benefits enacted during the 1980s and 1990s in the Netherlands. Longitudinal data from the OSA Labor Supply Panel with a twenty-year observation period was used to examine the specific sub-questions. The panel character of this dataset was enriched with detailed retrospective information regarding individuals' working histories, and was particularly helpful to predict the employment and wage developments within an individual worker. The panel character of the dataset enabled us to make use of different panel models, such as the fixed-effects and random-effect dynamic models that correct for unobserved heterogeneity.

This final chapter highlights some of the central findings of each empirical chapter. The implications of this research are then discussed. The chapter concludes with some suggestions for future research.

5.2 Central Findings: What Can we Learn from this Research?

While the separate chapters in this thesis have examined different facets of the unemployment process, they have commonly highlighted the existence and persistence of inequality in the subsequent employment and wages of workers that are faced with unemployment or stringent policy changes in UI benefits. In Table 2, an overview of the key findings of each separate chapter is provided, which will be highlighted further in this section.

5.2.1 Study One: The Determinants of Unemployment Scarring and the Buffering Role of Resources on Re-employment Careers and Wages

To what extent does earlier unemployment damage subsequent employment careers and wages across different social groups and over time? The analyses of chapter 2 show that the number of earlier unemployment episodes affects future employment the most. This implies that the more often workers experienced unemployment in the past, the more likely they are to experience unemployment in the future. The results also indicate that the probability of re-experiencing unemployment in the future is largely persistent and the highest among women. In addition to the scars related to the number of earlier unemployment episodes, results of chapter 2 show that a further increase in the probability of re-experiencing unemployment arises from the recency of unemployment. Further results in chapter 2 indicate that unemployment duration impacts particularly men's probability of re-experiencing unemployment. Apparently, the longer unemployment spells the more likely individuals accept jobs with poorer qualities that are more easily to be lost thereby increasing the odds of becoming unemployed again. Whether earlier unemployment damages post-unemployment wages was also investigated in this chapter. Results show a clear pattern of wage penalties among men and women that grow over time when compared to those who have remained in continuous employment. This wage penalty reaches a peak during more recent unemployment occurrences and is higher for women than men.

Whether scarring effects decay over time as they interact with buffering resources was also investigated in this chapter. Results show that the timing under which earlier unemployment occurred, determines how fast an individual recovers

from the aftermath of unemployment. In particular, results show that someone who experienced unemployment after the age of 25 has a higher odds to re-experience unemployment and suffer higher wage penalties. This effect, however, is lower for women. In addition, results in this chapter show that receiving UI benefits during unemployment periods buffers the wage penalties arising from unemployment by inflicting higher post-unemployment wages.

5.2.2 Study Two: The Unequally Distributed Effects of UI Reforms on Labor Market Outcomes

How are individuals' unemployment durations and their labor market outcomes influenced by restrictions in UI benefits? Findings in chapter 3 have uncovered that restrictive changes in the benefits level, duration, and eligibility conditions lead to distinct labor market transitions depending on one's gender and eligibility status. Swifter transitions to employment for both male and female recipients and thereby shorter unemployment durations are found after each restrictive change in UI benefits. These effects are especially higher among women and those eligible to short-term UI benefits. Findings in chapter 3 have shown that extensions of the base and qualifying period of UI benefits in better economic cycles lead to slow transitions to employment among the long-term salary-related men, but achieve an opposite effect for women.

Why do individuals' unemployment durations and their labor market outcomes vary under restrictive changes in UI benefits? Findings in chapter 3 attribute these variations to the unequal distribution of the policy effects that lead to some pronounced differences in the job finding behavior, and use of UI benefits between gender and groups with different employment histories. Especially, in times of stringent eligibility conditions, unemployed men are affected to a lesser extent, because they often have built up the higher work experience requirements needed to satisfy the eligibility criteria for the long-term salary-related benefits. Dutch women on the other hand are penalized more often by the more stringent eligibility criteria, due to career breaks for caring and the largely part-time and more patchwork careers of this group. As a result, women show other variations in unemployment durations than men. Another explanation for the profound differences in labor market transitions among men and women is attributed to the risk-perception. Women perceive stringent eligibility criteria as threats and act

risk-aversely by accepting jobs at much faster rate. Men on the other hand may be protected by higher human capital (such as education and work experience) and thus have the confidence to be more careful and restrained in their job search. Finally, this chapter has shown that incentives to leave unemployment are dynamic, with exit rates particularly higher near the end of the exhaustion of the benefit period. These incentives become stronger when UI benefits change. This finding explains why we find differences in the labor market outcomes between eligibility groups, namely men eligible for long-term benefits have other incentives to leave unemployment, related to the job quality and wage-preferences compared to men eligible for short-term benefits.

5.2.3 Study Three: The (Unintended) Stratifying Effects of UI Reforms on Re-employment Wages

To what extent do restrictions in the UI benefit level duration and eligibility conditions lead to unequal patterns of wage development across different social groups and over time? Findings in chapter 4 have showed that restrictions in the UI benefit level, duration, and eligibility criteria affect negatively workers' re-employment wages. Especially, restrictions on the qualifying conditions that are coupled with shorter benefit durations and restrictions in the base conditions impose higher re-employment wage penalties than restrictions in the level of the UI benefits. These penalties are largely persistent and particularly significant for men, high skilled and more experienced workers.

But why are social groups impacted in a different way? One explanation to the variation of UI effects may be related to the earlier predictions of the human capital theory that expected re-employment wage penalties to reflect the dislocation costs arising from UI reforms. Especially, the devaluation of industry-specific human capital may have led to these permanent and pronounced re-employment wage penalties relative to those not affected by the policy changes. Another explanation may be related to the risk-averse responses of workers and compositional effects that lead to location and concentration of affected workers into jobs with lower productivity levels and hence lower re-employment wages.

Does the negative relationship between UI reforms and individuals' re-employment wages persists or diminish over time? Following the results from this chapter, the wage penalties stemming from restrictions in the benefit duration and

eligibility conditions not only persist three years after the policy change but also widen with 0.3 and 0.2 percentage points for each ten additional months in employment. Apparently, the initial wage gap of those affected accumulates over time and fails to recover to the level of those not affected. This leads to an unintended stratification effect of UI reforms, creating a wage gap among social groups that differ only with respect to their treatment status. Evaluation of the implemented UI reforms in the light of these results suggests that restrictive policy changes may have been adequate to stimulate exit rates out of unemployment, but to have damaged workers' earnings prospects and enlarged economic inequality due to dislocation costs of unemployment and disruption of the job search process.

When are the effects of UI reforms the most extensive? Results in this chapter showed that the magnitude of the wage penalties is related to the economic cycles, and partly to the observation period following the UI reforms. Particularly, UI reforms enacted during less favorable economic times show steeper wage penalties compared to reforms enacted in better economic times. This can be explained by the fact that during less favorable economic conditions workers often settle for a lower wage relative to their desired wage. This leads to more pronounced wage losses during economic downturns. Results in this study revealed also that the steepness of wage penalties depends on the observation period following the UI reforms. While stricter UI benefit levels impose higher wage losses in the year following the UI reform, it seems that policy changes in the qualifying and base weeks, affect workers' job search decisions gradually. This may be related to the fact that UI reforms that affect workers' instant value of remaining unemployed, such as lower benefit levels, push workers to settle faster for a job below their desired wage, which is not the case when the eligibility criteria or the duration of the benefits are restricted.

5.3 What Have we Added to Existing Literature?

This thesis has provided several contributions and innovations to this field of research. These are related to (1) theoretical explanations, (2) methodological constructs and (3) empirical examination of different aspects to understand the process of unemployment and changing UI benefits in relation to individuals' employment and wage outcomes.

5.3.1 Theoretical Contribution

The theoretical contribution of this thesis is twofold. First, by exploring variation of UI benefit effects and unemployment across different social groups and focusing on inequality over time, this thesis has added a sociological perspective to the economic approaches used so far to analyze the effects of unemployment and UI benefits. The scarring model was used to establish the basic scarring patterns arising from unemployment, but also to generate more detailed questions regarding the persistence of these effects as they interact with individual human capital and institutional resources (e.g., UI benefits) during the life course. In this way, the existence of shielding resources has been added to the scarring model. This is necessary to complement our understanding on how scarring and shielding mechanisms act but also interact over time. In addition, a longer-term vision has been added to the study of unemployment effects that have been studied in relative short-term periods. Our applications of the scarring model cover both men and women, which have been rare in existing studies. In doing so, this thesis has moved beyond the 'what' question to provide a richer view on 'how' scarring effects vary among gender and over time.

Regarding the effects of policy reforms in UI benefits, the sociological aspect in this thesis has been useful to apply hypotheses of the job search theory across different social groups (e.g., women, high/low educated, workers with different employment histories) and under different circumstances (e.g., changing dimensions of UI benefits and economic cycles) that have been rare in other studies. Elaborating on the job search model, additional questions were asked with respect to further measures that affect individuals' reservation wages such as the level, duration, and eligibility conditions of UI benefits, which have rarely been separated in earlier studies. The questions regarding job search incentives are asked from a life course perspective, while they have emphasized the diversity in individuals' demographic and human capital characteristics. Further details to the job search models have been added by invoking dynamic mechanisms and by studying how individuals react to different types of restrictions that affect their economic and time resources. Our applications of the model cover men and women, and different types of eligibility groups at different stages of their life, which was not covered earlier by the job search model.

A second theoretical contribution of this thesis is that it has integrated the theoretical insights of the two previously separated research positions on the UI benefit effects. In doing so, it has provided a framework from where short-term and long-term effects of unemployment and UI benefits are assessed in different ways. For example, while in chapter 2 we demonstrated that unemployment increases the likelihood of future unemployment and leads to lower subsequent earnings. We showed that in long run, these negative effects become weaker by receipt of UI benefits. On the other hand, adding the findings of chapter 3 and chapter 4 that study the short and long term implications of UI benefit reforms, shows that restricting UI benefits leads to higher escape rates from unemployment, but only at the cost of increasing lifetime earnings inequality and labor market withdrawal rates.

5.3.2 Methodological Contribution

The methodological contribution of this thesis is related to the estimation of the difference-in-difference (DD) method allowing for correction of possible serial correlation and endogeneity bias. According to a recent study of Bertrand et al. (2004) a vast majority[26] of papers that employ a DD approach do not address serial correlation even when they deal with fairly long time periods (> 10 periods). Ignoring the serial correlation is dangerous because it leads to estimates that overstate the t-statistics, and reject inconsistently the null hypothesis of no effect. In other words, studies may find an effect of policy changes when the effect is absent. One reason for the inconsistent estimates is related to the fact that many of the existing studies have based their estimations using ordinary least squares (OLS) models that place a parametric form on the variance-covariance matrix of the error term (Donald and Lang 2001; Moulton 1990; Bertrand 2004). In practice, however, this matrix may have a different shape and the error term may be correlated within person-year or within state-year cells.

In this thesis, we have addressed the problem of serial correlation and endogeneity in different ways. First, in both of our empirical chapters on policy evaluations we have clustered the standard errors. For example in chapter 3, we

[26] Only 5 out of 92 studies that employ a difference-in-difference approach address serial correlation (see Bertrand 2004, pp. 254)

have clustered the standard errors on respondents to deal with the possible correlation that occurs when individuals are in the sample for several periods in a row. In chapter 4, we have clustered on respondents but have allowed also for correction of endogeneity that is related to seasonal fluctuations by using the variation in the starting month of employment. Second, we have employed several robustness checks to make sure that our estimates are robust to changes in the composition of the control and treatment groups. For example to reduce heterogeneity in the sample with respect to pre-unemployment work experience we have estimated policy effects by excluding workers younger than 21 and older than 55 years old or by excluding individuals with the lowest and highest number of unemployment spells. On the other hand, to reduce the heterogeneity of the sample regarding pre-unemployment wages, individuals in the bottom and top of the wage distribution have been excluded. In addition, in chapter 3 as well as in chapter 4 we have used fixed-effect models that control for the problem of unobserved heterogeneity. As explained earlier in this thesis, these models assume that unobserved heterogeneity is person-specific and to be constant between repeated observations of an individual. The advantage of these models is that by differencing out the time-constant unobserved effects, any potential bias from our estimations is eliminated. Finally, to account for the bias that may occur when the wage or employment outcomes of individuals under study differ with respect to their measured characteristics, the Heckman selection procedure has been used. In sum, we believe that this thesis has contributed in several ways to the existing DD literature by employing different ways to correct for the biases that can over or underestimate the policy effects.

Methodological Innovation. A methodological innovation of this thesis is not only the adoption of a quasi-experimental approach, but within this is also the measurement of the treatment status. Over the past years, many studies have used UI reforms as a source to separate the of UI benefits from the effects of the past labor market history that determine the conditions for benefit entitlement (see for a review Meyer 1994; Besley and Case 1994). In this approach, the treatment variable plays a central role and reflects workers' past employment and earnings history. However, since attributes related to workers' previous employment history are difficult to measure, many studies have used age as a proxy for someone's

work duration (e.g., Katz and Meyer 1990; Roed and Zhang 2002; Lalievé et al 2004; Van Ours and Vodopivec 2005, 2007). Such a proxy misses important dimensions of workers' employment histories, including continuous or fragmented features of their careers. Therefore, this proxy may lead to an inappropriate classification of the treatment and control group, thereby underestimating UI benefit effects. Our approach to measure the treatment status is to focus on the real labor force history of individuals. Using detailed retrospective information on the starting and ending dates of employment and unemployment periods has been a basis for the construction of the treatment status. In addition, workers' last earned wages and the valid eligibility criteria at each specific policy change are used as complementary conditions for the treatment status.

Another methodological innovation is provided in chapter 4 of this thesis and is related to the question of what the treatment status measures. In previous studies, the treatment status has been a dummy variable, where 0 referred to those not affected by the policy change and 1 referred to those affected. The disadvantage of such a dummy variable is that it loses information about the cases of individuals that lie in between these two categories. As a result, the treatment effects may be underestimated. Our approach to overcome this problem was to construct a continuous measure for the treatment status that varies between the values of 0 and 1. The advantage of this continuous variable is twofold. First, by using all the available information on the affected workers it provides a more powerful measurement of the treatment effects. Second, by measuring the treatment effects continuously the research has moved beyond the question of 'whether' individuals are affected by a certain policy change, but provides richer information on the question of 'how much' they are affected by a policy reform. This is important, because it comes much closer to a real situation in which some individuals are affected more and some less.

5.3.3 Empirical Contribution

This thesis has provided several empirical contributions related to unemployment and changing UI benefit policies. First, starting with the effects of unemployment, this thesis has been one of the first studies providing evidence on unemployment scarring for the country of the Netherlands. In doing so, this thesis has provided

evidence that even in a country like the Netherlands that is characterized by a strong institutional support; early lifetime conditions such as unemployment may leave significant scars in workers' later employment or wage outcomes. In addition to this contribution, the long-term vision taken in this thesis has provided a more balanced view on the patterns of socioeconomic inequality arising from unemployment, which has not empirically shown previously in the case of the Netherlands. Third, this thesis has provided evidence on unemployment scarring separately for men and women. Evidence on the effects of unemployment on women's employment and wage outcomes has remained remarkably scarce in the literature, which has been mainly the result of the difficulty to define unemployment consistently for women (Arulampalam 2002). In this thesis, we have overcome this difficulty by applying a well-defined distinction between women who are 'out of work' and not participating the labor market and those women who are unemployed but actively searching for a job.

Other important empirical contributions in this thesis relate to its focus on policy evaluations. This thesis has provided for the first time in the Netherlands a frame that contextualizes and qualifies the significance of the changes in the Dutch UI benefit system within the employment careers and wages of the individual worker. In doing so, it has provided a detailed picture of potential inequality in policy-reforms, but also evidence-based policy recommendations to understand which changes impact which types of individuals or circumstances. A final contribution in this context is the examination of not only one type of alteration of UI benefits, but also various dimensions, including changes in the level, duration, and eligibility. This thesis is one of the few that brings together the longitudinal impact of three different policy changes that have often been studied in partial isolation from each other. This approach is important as it has allowed to compare and classify the effects of each dimension of UI benefits in relation to the re-employment and wage outcomes of the individual worker.

5.4 Policy Implications

This thesis provides several policy implications for this field of research that may reinforce already adopted policies to combat unemployment and wage inequalities in the labor market. These policy implications are summarized briefly in Table 5.2

and are related to: A) finding measures that combat unemployment; B) policy implications for UI reforms.

5.4.1 Finding Policies that Combat Unemployment

What have we learned in relation to unemployment processes and how to combat the negative effects of unemployment? Findings from this thesis have shown that general and specific skills are important shields against risks of unemployment and protect workers from falling into unemployment. Therefore, skills upgrading during an individual's work career would be a first step to avoid future spells of unemployment. Once workers are exposed to unemployment, institutional supports in the form of 'tailored-made' UI benefits are substantial to protect workers from the wage penalties of unemployment. At this stage, UI benefits are important not only to make a proper job match possible, but also to secure workers with a job match that predicts a durable and stable career. This latter is a key force, which makes negative effects from unemployment decay over time. As employment stability raises workers specific skills and productivity after an unemployment spell, more attention should be addressed to policies that support wage subsidies for employers or measures that subsidy workers on-the-job training. Such measures would not only stimulate employers to hire sooner those once unemployed, but would also raise workers' self-esteem and confidence and make them more ready to accept a job. In other words, if institutional support is well organized, supervised, and adapted to the needs of specific groups of workers, then the opportunity structure of jobs that match with pre-unemployment occupations will increase and employment stability and lower earnings inequality will be enhanced.
Women are a group that deserves special attention. Their vulnerable position in the labor market and the higher wage penalties during their work career call for gender specific policies that offer institutional support in the form of subsidies for childcare. Such institutional support not only facilitates a broader labor market attachment of women but also assures equal rewards for women in continuous employment and those who once experienced unemployment.

5.4.2 Policy Implications for UI Reforms

Although results in this thesis provided some information for those interested in the study of the Netherlands, the implications of these results and modeling techniques are applicable to a much broader audience. In addition to providing evidence for future policy making decisions, a key contribution of this thesis are the policy implications for UI reforms. First, one of the most interesting finding of this thesis was the demonstration that individuals engage in a much more intensified search process as the end of their benefit period encroaches. This result suggests the need for flexible time-varying UI benefit levels that would go from higher to lower receipts over the unemployment duration. Lowering the benefit level as the unemployment spell continues could minimize the disincentive effects that might appear at the beginning of an unemployment period. A somewhat lower benefit level that would continue to decrease over the insured period would still balance the rapid loss in human capital and increased job search efforts as unemployment spells lengthen.

Second, our findings have demonstrated that there are some extensive differences in the job search behavior among men and women, but also among different types of eligibility groups. These differences are much more accentuated when policy changes are involved. For example, women show to be much more risk averse than men when threatened by policy changes whereas short-term eligible groups take up much sooner a job than long-term eligible workers. Results from this thesis demonstrate that the past policy changes in the Netherlands have often penalized women as well as other groups, such as youth or immigrants, who are relative newcomers to the labor market or have fragmented careers. Whereas the already more advantaged group of mid-career men have remained almost not affected by these reforms. This finding calls for the need of a more optimal UI benefit design that takes into consideration the diversity of its recipients, particularly in relation to gender and eligibility differences. Reforms should therefore be more 'tailored' and 'targeted' to match the different needs and (un)employment histories of diverse groups instead of blanket reforms that often only serve the mainstream and classic labor market experiences that generally characterize men's employment.

Third, restrictions in the benefit level discourage those who are not eligible to re-enter the labor market, creating a benefit 'trap' for a group of long-term discouraged workers. A more optimal benefit design should not worsen the labor market position of the already weak and more vulnerable groups. On the contrary, active labor market policies should also place more attention on stimulating re-entry of those not eligible for UI benefits as opposed to finding new ways to exclude them.

5.5 Suggestions for Further Research

This last subsection offers five main suggestions for future research, which are directed towards a further examination of: 1) individuals' job search behavior; 2) the process of job matching; 3) occupational trajectories under changing UI benefits; (4) active versus passive labor market programmes and (5) the effects of unemployment within households.

5.5.1 Exploring Individuals' Job Search Behavior Under Changing Benefit Policies

Despite several attempts in this thesis to touch upon some economic and sociological relevant topics, there remain issues that deserve further attention in the future research. Job search behavior is one of these issues. Although several assumptions have been made in this thesis about the job search behavior under influence of unemployment or changing labor market institutions, job search behavior has remained a black box. In this thesis, unemployment and policy reforms were assumed to trigger a behavioral change to workers' job search behavior and employers' hiring decision, which in turn predict fragmented future careers and earnings. However, it still remains unclear how individuals make their labor market choices and change their preferences under the influence of unemployment or changing labor market institutions; or how workers select jobs and which criteria they use to match jobs with each other. Knowing more about what drives certain choices and preferences is necessary to understand how individuals operate under different circumstances but also complements our understanding regarding the effects of certain labor market institutions. One limitation in the existing data sets is that there is insufficient information on the

time allocation of unemployed workers. One challenge for future research is to combine time use data with panel data from where not only daily activities and strategies can be assessed, but also shifting preferences in jobs and behavior can be revealed.

5.5.2 The Effects of (Changing) UI Benefits on the Job Matching Process

More recently, it has been theoretically recognized that one of the most beneficial effects of UI benefits accrues on the job matching quality. According to the theoretical model of Acemoglu and Shimer (2000) if individuals receive no UI benefits, they would accept faster employment at the cost of lower productivity jobs that pay less. Conversely, generous UI benefits not only lead to the creation of better jobs but also to jobs that are more likely to last longer. Although theoretically these predictions seem straightforward, they are empirically seldom tested. Future research should address more carefully the role of UI benefits during the job (mis)matching process. Especially how this process changes under the influence of UI reforms is important to complement existing literature on the match quality gains from UI benefits. In this thesis, we attempted to quantify the job match quality by looking at the post-unemployment wages. However, using post-unemployment wages as a measure of job match quality misses other dimensions related to the level of occupation or the job tenure in the post-unemployment period. Future research should therefore take these two elements more carefully in consideration. The use of longitudinal data, rather than cross-sectional data, could prove useful to overcome the problems related to the partial and short-term view regarding occupational careers addressed in earlier research.

5.5.3 Examining the Effects of UI Reforms on Occupational Trajectories

How do institutional (re)arrangements in the labor market affect unemployed workers' occupational positions and transitions? Do they lead to an increase of labor market segmentation by leaving certain occupations outside competition of social groups that are affected by such re(arrangements)? These questions have

received little attention in this thesis but contend important issues for future research. The answers to these questions are important for several reasons. First, they are important to address occupational trajectories of unemployed workers as a process that evolves over time, rather than a series of single occupational transitions. Second, they offer a frame of general trends towards workers' occupational careers after periods of policy reforms. This is important because it provides empirical evidence on whether policy reforms influence the opportunity structures in the labor market and as result widen processes of stratification in modern societies. Addressing the effects of UI reforms on occupational trajectories raises also a statistical challenge for future research, which is related with the estimation of policy effects when the treatment and control groups differ in their observable and unobservable characteristics. Using DD- matching algorithms may offer a way to deal with these problems by providing a nonparametric estimate of the causal effects (Heckman, Ichimura and Todd 1997, 1998; Imbens 2004; Winship and Sobel 2004; Dias et al. 2008). DD-matching algorithms correct for the problem of differences among the control and treatment groups by defining the causal effect that is to be estimated as the (average) difference between observed outcomes among those affected and the weighted average of observed outcomes among those not affected groups. Another advantage of this method is its usefulness to difference out any unobserved, but individually stable heterogeneity between those affected and not affected groups (Gangl 2006).

5.5.4 Active versus Passive Labor Market Programmes: What is the Best Alternative?

Since the 1980s labor market institutions are seen as culprit for the unemployment problem, however, no study has been able to identify which institution exactly matters to this problem. For a very long time, previous empirical research has referred to UI benefits as a labor market institution that kept producing unemployment. However, growing evidence becomes available which together with the findings from this thesis show how dangerous it can be to judge UI benefits only in terms of unemployment levels. Restricting UI benefits has certainly led to lower unemployment levels, but only at the cost of increasing lifetime earnings inequality and social polarization. The findings of this thesis are

clear-cut and show that workers need protection and security in periods of joblessness. This means that a closer look at other institutions and labor market institutions is necessary to come to better alternatives for an optimal balance between workers' economic enhancement and stable rates of economic growth. Some promising options may be flexicurity measures or active labor market programs (ALMP's) in terms of job search assistance and retraining (see the studies of Gorter and Kalb 1996, and Van den Berg and Van der Klauw 2006 about the job search assistance and monitoring effects in the Netherlands). Wage subsidy programs for employers that facilitate a swifter job accommodation for those once unemployed could be an additional solution. Having a closer look at other labor market institutions would therefore not only contribute to extensive analyses between institutions, workers and firms but would provide information that resembles the interaction of groups in a macro setting. This is central to complement further the unemployment debate and to understand the complex interplay of dynamics in the labor markets.

5.5.5 Effects of Unemployment within Households

More attention should be paid on how processes of unemployment not only affect workers but also their households. When unemployment occurs, it often leads to a drop in a household's incomes but it also interferes with the labor market choices and preferences of the partner or other members in the family. Such effects may cause shifts in the earnings structures within a household by forcing one partner to take up more than one (part-time) job, but also shifts in the care structure by reversing the caring roles within a household (e.g. men take care for the children). What other changes within a household does unemployment trigger? How does unemployment of parents affect children's later education and labor market outcomes? These and many other questions related to effects of unemployment within household remain important questions for future research.

5.6 Concluding Remarks

Are unemployed, scarred for life? This thesis has shown that they are, but only to a certain extent. Empirical evidence in this thesis has shown that unemployment scars later employment and wage outcomes; effects that may damage individuals'

entire employment and wage prospects. In particular, two dimensions of unemployment were identified as underlying determinants of inequalities in workers' re-employment careers and wages. First, multiple job loss (i.e. the number of earlier unemployment events), which affects the probability of re-experiencing unemployment; second, most recent unemployment occurrence, which affects the level and magnitude of re-employment wage inequality in the labor market. The combined effects of unemployment scarring intensify even further when UI reforms restrict the level, duration, and eligibility criteria of UI benefits, which result in wider employment and wage inequalities when they are enacted during depressed labor markets. Especially, older workers, higher educated and women suffer the highest penalties from unemployment and from UI benefit reforms. While this thesis has revealed that unemployment scarring differs across different social groups, it has also demonstrated that its effects become weaker over time if (a) workers experience unemployment at younger ages, and, (b) if they are institutionally supported by receipt of UI benefits during unemployment spells. In sum, although unemployment scarring may alleviate over time as it interacts with positive resources, it always damages individuals' subsequent employment and wages.

Table 5.1. The Hypothesized Effects of Unemployment and Policy Reforms in this Thesis

	Chapter 2	***Expected Sign***	***Sign Found***
1	*Unemployment occurrence hypothesis:* Those who experienced unemployment once will have a higher probability to re-experience unemployment again and will experience higher wage penalties compared to those in continuous employment.	+	+
2	*Unemployment duration hypothesis:* The longer unemployment spells last, the higher the probability to re-experience unemployment and the larger the earnings gap will be with those in continuous employment.	+	+/n.s.
3	*Unemployment incidence hypothesis:* The more often unemployed in the past, the higher the probability of re-experiencing unemployment in the future and the higher the wage penalty compared with those in continuous employment.	+	+
4	*Education hypothesis:* Better-educated workers will have a lower probability of re-experiencing unemployment and lower wage penalties in long-term compared to the lower educated.	-	-
5	*Age hypothesis:* The younger workers experience unemployment, the lower the probability of re-experiencing unemployment and the lower the wage penalties from unemployment.	-	-
6	*UI benefit hypothesis:* Receiving UI benefits during unemployment spells will lower the probability to re-experience unemployment and will lower the wage penalties compared to those who did not receive UI benefits.	-	+/-
7	*Job match hypothesis:* Workers that find employment at the same occupation level will have lower wage penalties relative to those who shift into different occupation levels.	-	-

Table 5.1. The Hypothesized Effects of Unemployment and Policy Reforms in this Thesis *(Continued)*

		Expected Sign	***Sign Found***
8	*Gender hypothesis:* Compared to men, women will have higher probabilities to re-experience unemployment and will experience higher wage penalties.	+	+
	Chapter 3		
9	*UI reform hypothesis:* A decrease in UI benefits (levels, duration and/or eligibility) will result in shorter unemployment durations and poorer labor market outcomes (remaining unemployed or exiting the labor force to non-participation). Conversely, an increase in UI benefits will result in longer unemployment durations and more favorable labor market outcomes (employment re-entry).	+	+
10	*Entitlement hypothesis:* For those who are currently not eligible for UI benefits, an increase in benefits will result in a shorter unemployment durations (i.e., higher reemployment rates), with a decrease resulting in longer unemployment durations.	-	-
11	*Human capital signaling hypothesis:* More unemployment and non-participation episodes, less employment experience and lower levels of education will result in negative 'signals' to employers and therefore longer unemployment durations and a lower likelihood of employment re-entry.	-	-
12	*Sensitivity hypothesis (a):* Short-term benefit recipients will be more sensitive to decreases in UI benefits and demonstrate shorter unemployment durations.	+	+
	Sensitivity hypothesis (b): Long-term salary-related recipients will be less sensitive to policy changes and have longer unemployment durations.	-	-

Table 5.1. The Hypothesized Effects of Unemployment and Policy Reforms in this Thesis *(Continued)*

		Expected Sign	***Sign Found***
13	*Gender hypothesis (a):* Women will only have the ability to meet the criteria for short-term UI benefits, have shorter unemployment durations and higher exits to non-participation.	+	+
	Gender hypothesis (b): Conversely, men will have a higher chance of eligibility for long-term salary-related benefits, resulting in longer unemployment durations and higher entries to employment.	-	+/-
14	*Labor-demand hypothesis (a):* Unemployment durations will be shorter during the third (1995) UI reform implemented in a time of low unemployment rates and higher vacancy stocks.	+	+
	Labor-demand hypothesis (b): Unemployment durations will be longer during times of high unemployment and a low stock of vacancies after the first and second reform in the mid- and late 1980s.	-	-
	Chapter 4		
15	*Hypothesis of UI reforms:* Compared to those not affected workers, UI reforms will impose re-employment wage losses on those affected workers.	-	-
16	*Hypothesis of anticipatory behavior:* Compared to reforms that restrict the eligibility and durations of UI benefits, reforms that restrict the level of UI benefits will lead to higher re-employment wage penalties during recent periods after the policy change.	+	+
17	*Wage gap hypothesis:* Compared to those not affected, re-employment wage losses of those affected workers will increase over time, due to the job mismatch involved with UI reforms.	−	−
18	*Human capital hypothesis:* Compared to those lower educated, UI reforms will impose higher re-employment wage penalties to those with higher human capital.	−	−

Table 5.1. The Hypothesized Effects of Unemployment and Policy Reforms in this Thesis *(Continued)*

		Expected Sign	***Sign Found***
19	*Gender hypothesis:* Women affected by UI reforms will more often enter jobs with fewer working hours thereby receiving lower wages than men do.	−	+/−
20	*Economic cycle hypothesis:* UI reforms enacted during periods of depressed economic cycles such at the time of the 1985 and 1987 UI reforms inflict more extensive wage losses relative to UI reforms enacted in better economic times such as the 1995 UI reform.	−	−

Table 5.2. An Overview of Findings and Implications of each Empirical Chapter

Chapter	***Builds upon the following theories:***	***Key insights from these theories***	***Key insights from current study***	***Implications***
2	* Human capital theory; Job search theory and Signaling theory * Cumulative advantage/dis-advantage concept	* Unemployment leads to human capital depreciation * The socio-economic gaps between those who have and those who have not experienced unemployment widen with the passage of time	* Key driving force of recurrent patterns of unemployment are multiple job losses. * Low pay circles are driven by most recent unemployment occurrence * Negative effects from unemployment stronger among women * Age and receipt of UI benefits act as compensatory mechanisms that buffer the negative effects of unemployment	* 'Prevention is better than cure', which means continuous skill upgrading during the work career to prevent from falling into unemployment * Application of wage-subsidy measures to stimulate positively workers job search behavior and employers hiring decisions * Design of gender specific measures in terms of institutional or financial support for the childcare
3	* Job search theory * Signaling theory * Human Capital theory	* Job seekers have access to imperfect information about job offers and require time and money to cover the search costs * Employers use workers past unemployment history as a screening device	* All types of UI restrictions lead to higher exit rates from unemployment for both male and female * Labor market outcomes are divers among men and women, but also among eligibility groups * Long term unemployed men and women have higher probability to withdrawal labor market	* Application of flexible time-varying benefits levels from higher to lower receipt during unemployment * Design of 'tailor-made' UI benefits that match the needs of different groups in the labor market * More attention towards unemployed, and not eligible groups for UI benefits

Table 5.2. An Overview of Findings and Implications of each Empirical Chapter *(Continued)*

Chapter	***Builds upon the following theories:***	***Key insights from these theories***	***Key insights from current study***	***Implications***
4	* Job search theory * Human capital theory	* Workers job search strategy is to set up a reservation wage, which is the function of the perceived wage distribution and the value of remaining unemployed * Human's capital consists of general skills, which reflect years of attained education; and specific skills that reflect years of working experience	* Restrictions in the UI benefit level, duration, and eligibility criteria affect negatively workers' re-employment wages. * Restrictions on the qualifying conditions that are coupled with shorter benefit durations impose higher re-employment wage penalties. * The wage penalties are largely persistent and particularly significant for women, high skilled and more experienced workers. * UI reforms implemented during better economic times inflict lower wage penalties than UI reforms enacted during economic downturns	* Using a supporting system rather than a punishing system to get unemployed back to work * Active policies towards job finding for high-educated and older workers may be more effective to enhance a swift re-employment and stable wages * Programs of job search assistance and guidance should go hand-in-hand with restrictions in labor market institutions

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Appendix A to Chapter 1

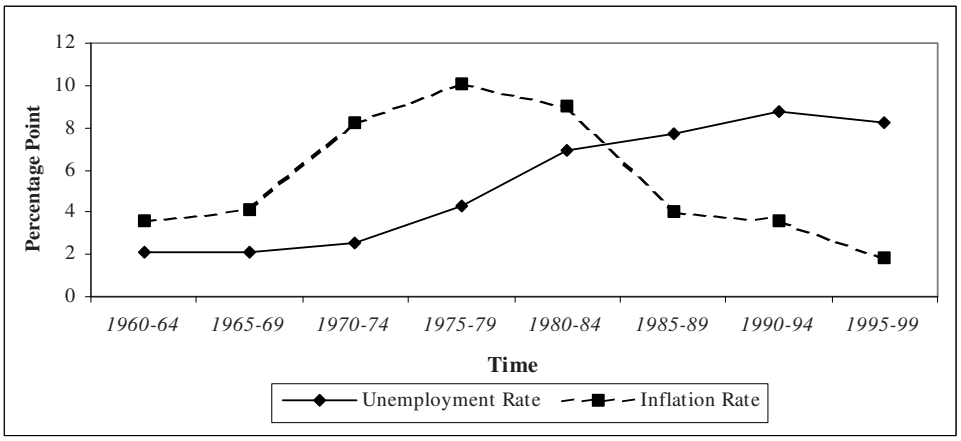
A Brief Literature Review of the Evolution of the Unemployment Debate

The relative importance of unemployment as a gate to social exclusion has challenged both sociologists and economists to study what drives unemployment. In this part of this thesis, a brief overview of the evolution of the unemployment debate will be provided, which is based on the earlier work of Blanchard (2005).

The 1970s: Initial rise of unemployment

To the end of the 1960s, European unemployment was very low, but it started to increase during the 1970s. The rising unemployment figures during this period were attributed to two major oil-crises that took place in 1973-1974 (the Arab oil embargo) and 1980 (the Iran-Irak war). During these years the unemployment debate was concentrated around the level of 'natural rate of unemployment'. This rate described the baseline rate of unemployment, given the fact that some unemployment would always be present in a free labor market (Friedman 1968). At that time research was focused on determination of the natural rate of unemployment, which consistent to a constant inflation rate was determined outside macroeconomic shocks (Broer et al. 2000). Research during that period linked the rising patterns of unemployment with inflation trends. According to that framework, the change in inflation was taken as an indicator to determine how far each economy was away from its natural rate of unemployment. Figure A1 offers some insights about the relationship between unemployment and inflation.

Figure A1. Unemployment and Inflation Trends for OECD Countries, 1960-2000



SOURCE: Baker et al. (2002)

As noted in Figure A1, there appears to be a clear pattern between rising unemployment rates and inflation until the end of 1970s. However, the continued high unemployment rates thereafter were unexpected and attributed to the heterogeneity of macroeconomic developments across different European countries rather than rising inflation figures (Baker et al. 2002; Blanchard 2005; Broer et al. 2000).

The 1980s: The role of collective bargaining and search models to explain sources of unemployment

Although research before the 1980s was successful in determining the levels of unemployment, it failed to explain why unemployment kept increasing. In the first half of the 1980s the unemployment debate and academic research shifted towards unraveling causes of unemployment by formulating union wage bargaining models and search models of unemployment (see Katz 1988 for an overview; Broer et al. 2000). Two lines of research on causes of unemployment evolved during that period. The first line of research linked rising unemployment rates to the levels of wages and explained why and how initial economic shocks from the past oil-crises were delayed during the 1970s leading to persisting unemployment figures in the years thereafter (Hellwig and Neuman 1987; Layard et al 1991; Blanchard 1997). The second line of research related structures of wage bargaining and the

strengthening of worker's position to higher unemployment rates (Mankiw 1985; Blanchard and Summers 1986; Blanchflower and Oswald 1994; Blanchard and Katz 1997). Although both lines of research made a substantial contribution and a major progress to explain the causes of the upswing in unemployment during the 70s, the persisting unemployment levels during the 80s remained a puzzle and deserved further investigation.

The 1990s: Persisting unemployment levels: The role of labor market institutions

During the 1990s, the attention of research shifted towards the role of labor market institutions on creation of unemployment. During that period labor market deregulation and wage flexibility were seen as key factors to economic success (Freeman 2005). Many governments were advised to weaken labor market institutions in exchange to labor market driven solutions. Driven by these calls many Western European countries exercised substantial cutbacks in the social security and in the structure of unemployment benefits. Especially, the level and duration of unemployment benefits were thought to inhibit worker's job search process (OECD 1994). On the other hand employment protection and active labor market policies were seen as sources that produced unemployment by increasing labor market rigidities (OECD 1994). Although this new shift in the unemployment debate was useful to explain how and why unemployment rates differed across European countries, research was mixed in its findings about the role of unemployment benefits on the creation of unemployment. Two contrasting research views evolved during that period. The first line of research focused on the effects of unemployment benefits on exit rates out of unemployment and concerned with the decreasing search intensity during periods of unemployment (Abbring Van den Berg and Van Ours 2005; Arulampalam et al. 2000; Narendranathan and Elias 1993). The second line of research was concerned with the role of unemployment benefits on the growth of worker's labor market productivity by encouraging them to seek better and higher productivity jobs (Acemoglu and Shimer 2000; Belzil 1995; Burgess and Kingston 1976; DiPrete 2002; DiPrete and McManus 1996; Gangl 2004).

The 2000s: Current research: Which way to go?

Now, three decades of research later, the literature on unemployment dynamics has evolved and major progress has been made. To recapitulate, by the end of the 1970s a working model of the natural rate of unemployment was achieved, whereas by the end of the 1980s the focus towards monetary policy and wage bargaining complemented our understanding about sources of unemployment even more. At the end of 1990s a better framework was created to understand the role of labor institutions on the heterogeneity of unemployment figures. Despite the progress in research by attempting to solve the unemployment puzzle, a lot of work still needs to be done and many other questions remain to be answered. Taking into account the vertical and hierarchical lines through which labor market institutions operate and the way they interact with different historical and social settings is one future direction that may help come closer to the unemployment puzzle. Exploring the joint behavior of labor market dynamics, in terms of flows in and out employment, capital, and wages might be another way to understand unemployment dynamics (Blanchard 2005).

Appendix B to Chapter 2

Table B1. Consecutive Wage Observations of Workers in the Sample, The Netherlands 1985-2000

Nr. of times person-biannual wage observations recorded in consecutive waves	***Biannual-year wage observations***
Two consecutive wage observations	4,091
Three consecutive wage observations	2,573
Four consecutive wage observations	2,093
Five consecutive wage observations	1,944
Six consecutive wage observation	1,713
Seven consecutive wage observations	1,582
Eight consecutive wage observations	1,257
Nine consecutive wage observations	1,407
Total wage observations	16,655

SOURCE: - Author's calculations using data from the OSA Supply Panels, 1985-2000.

Table B2: Summary Statistics of the Dependent and Independent Variables

	Mean	***SD***
Dependent Variables		
Unemployed at time of interview	0.09	0.28
Log of hourly wages	6.64	0.44
Scarring Measures		
Unemployment occupancy one wave ago	0.05	0.30
Unemployment occupancy two waves ago	0.03	0.31
Most recent unemployment duration (in months)	11.6	11.7
Unemployment Incidence > 1 time	0.06	0.12
Labor market and Individual-level characteristics		
Men	0.61	0.39
Married/cohabiting	0.78	0.40
Age (in years)	38.9	10.0
Education (in years)	12.0	3.37
Work Experience (in years)	21.0	10.5
Employment spell after job loss (in months)	18.2	11.9
Employed in previous wave	0.67	0.46
ISEI occupational position	46.7	15.3
Continuous employed (no change in occupation)	0.46	0.50
Δ ISEI within same occupational level	0.05	0.21
Δ ISEI position lower than in pre-unemployment period	0.39	0.48
Δ ISEI position higher than in pre-unemployment period	0.11	0.31
Received UI benefits during unemployment spell	0.54	0.49
Unemployment observations at date of interview	3,653	
Person-Biannual year wage observation for those employed at date of interview	16,655	

SOURCE: - Author's calculations using data from the OSA Supply Panels, 1985-2000.

Table B3. Definition and Construction of Variables

Variable Definition	*Variable Construction*
Dependent Variables	
Unemployment Re-occurrence	Respondents' unemployment status at the time of interview, where 1 = unemployed and 0 in continuous employment.
Log of hourly wages	Self-reported monthly net wage/ (Weekly hours worked * 4.4 weeks).
Scarring Measures	
Unemployment occupancy one wave ago	Respondents' unemployment status one wave earlier, where 1 = unemployed one wave earlier and 0 = otherwise.
Unemployment occupancy two waves ago	Respondents' unemployment status two waves earlier, where 1 = unemployed two waves earlier and 0 = otherwise.
Most recent unemployment duration (in months)	Elapsed time of unemployment duration, constructed as: Ending date of unemployment – Start date of unemployment + 1, by respondent.
Unemployment Incidence > 1 time	Number of time unemployed, constructed as the sum of all earlier unemployment states, by respondent.
Explanatory Measures	
Gender	Respondents' gender; a dummy variable, where 0 = men and 1 = women.
Age (16-65)	Respondents' age at the moment of interview; continuous time varying variable: 16-65 years old.
Married/Cohabiting	Respondents' marital status at the moment of interview, where 1= those married/cohabiting and 0 otherwise.

Table B3. Definition and Construction of Variables *(Continued)*

Education (in years)	Respondent's years of education, where 9 = the low education category; 12 = those with at most a higher intermediate school completed and 18 > those with college and university degree completed.
Work Experience (in years)	Continuous variable, for total years of attained work experience, constructed as: age – years of education – 6 – unemployment and non-employment spells.
Employment spell after job loss (in months)	Elapsed time of employment duration after unemployment (Ending date of employment – Start date of employment +1), by respondent.
Employed in previous wave	Lagged variable for previous employment status.
Occupational job shifts	Respondents' occupational status at the time of interview with four categories, where 0 = no job shift; 1 = job shift in the same occupation (previous ISEI status = current ISEI status); 2= job shift with lower status (previous ISEI status > current ISEI status); 3 = job shift with higher occupational status (previous ISEI status < current ISEI status).
Received UI benefits during unemployment spell	Respondents' self reported UI benefit receipt, a dummy variable where 1 = received UI benefits during unemployment and 0 otherwise.

Appendix C to Chapter 3

Table C1. Summary Statistics of the Control Variables

	Mean	*SD*
Treatment Groups		
Entitled to UI benefits in 1985	0.754	0.430
Control group in 1985	0.246	0.430
Entitled to long-term benefits in 1987	0.315	0.498
Entitled to short-term benefits in 1987	0.539	0.464
Control group in 1987	0.145	0.352
Entitled to long-term benefits in 1995	0.351	0.476
Entitled to short-term benefits in 1995	0.478	0.499
Control group in 1995	0.171	0.383
Demographic Variables		
Men (n=2,359)	0.535	0.500
Women (n= 2,044)	0.464	0.500
Age (years)	30.23	21.69
Birth cohort 1965-1969	0.042	0.202
Birth cohort 1940-1950	0.249	0.432
Birth cohort 1930-1940	0.180	0.384
Birth cohort 1920-1930	0.113	0.317
Education and Labor Market History Variables		
Elementary school	0.110	0.313
Lower intermediate school	0.300	0.458
Upper intermediate school	0.361	0.480
College	0.144	0.352
University degree	0.043	0.203
Received UI benefits during spell	0.763	0.425
Relative number of employment experiences	2.945	2.085
Relative number of unemployment experiences	0.911	1.008
N spells (unweighted)	4,399	

SOURCE: - Author's calculations using data from the OSA Supply Panels, 1985-2000.
NOTE: - UI = unemployment insurance.

Table C2. Definition and Construction of Variables

Variable Definition	*Variable Construction*
Dependent Variable	
Unemployment duration	Elapsed time of unemployment duration (Ending date of unemployment – Start date of unemployment + 1) that end with transitions to dependent employment or non-participation, by respondent.
Treatment Groups	
Entitled to UI benefits 1985	Time-dependent dummy variable set to 1 for individuals who had worked for at least during 13 weeks, prior to becoming unemployed and 0 otherwise.
Entitled to UI benefits 1987	Time-dependent categorical variable, with three categories: 0= those who were not affected by the cut; 1= for salary-related recipients, who had worked for at least 26 weeks out of the 52 weeks immediately prior to becoming unemployed. Finally, 2= for short-term recipients, who had worked between the 13 and 26 weeks out of the last 52 weeks prior to becoming unemployed.
Entitled to UI benefits 1995	Time-dependent categorical variable with three categories 0= those not affected by the policy change, i.e. those having worked equal to the new ceiling of the base weeks; 1 = salary-related recipients, who had worked for at least 26 weeks out of the 39 weeks immediately prior to becoming unemployed. Finally, 2= for those who had worked between 13 and 26 weeks out of the last 39 weeks but could not satisfy the criteria for extension.
Post-reform Period, 1985	Period dummy where, 0 refers to the period prior to October 1985 and 1 to the period between 1985-1987.
Post-reform Period, 1987	Period dummy where, 0 refers to the period prior to January 1987 and 1 to the period between 1987-1988.
Post-reform Period, 1995	Period dummy where, 0 refers to the period prior to March 1995 and 1 to the period between 1995-1997.

Table C2. Definition and Construction of Variables *(Continued)*

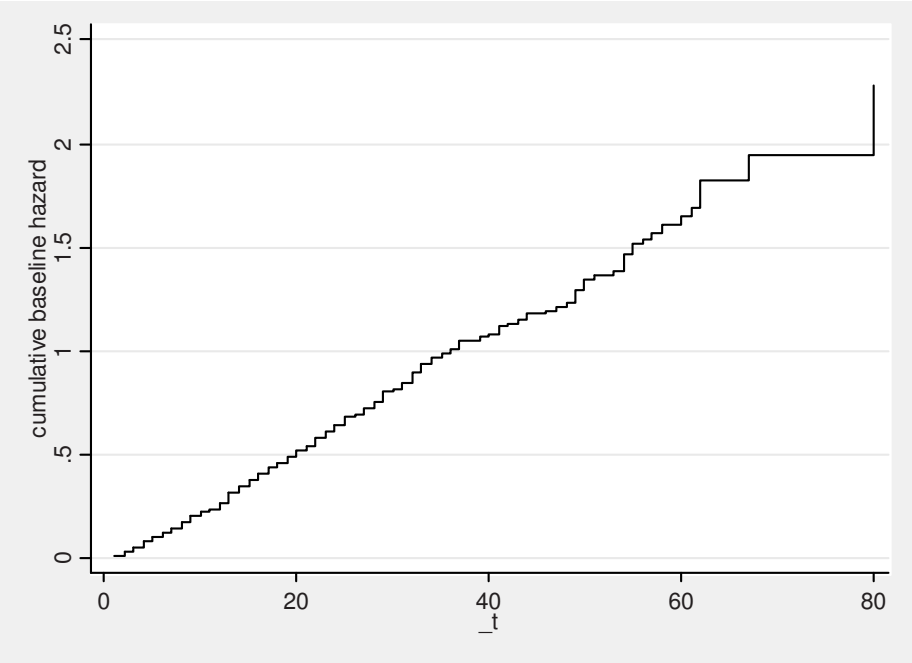
Demographic Variables	
Sex	Respondent's gender (1= Male; 2= Female).
Age	Respondents' age at the moment of interview; (continuous time varying variable: 16-65 years old).
Birth cohort 1965-1969	Respondents' birth cohort (1=birth cohort 1965-1969 and 0 otherwise).
Birth cohort 1940-1950	Respondents' birth cohort (1=birth cohort 1940-1950 and 0 otherwise).
Birth cohort 1930-1940	Respondents' birth cohort (1=birth cohort 1930-1940 and 0 otherwise).
Birth cohort 1920-1930	Respondents' birth cohort (1=birth cohort 1920-1930 and 0 otherwise).
Education and Labor Market History Variables	
Education-level	A categorical variable distinguishing between five categories: (1) elementary school (BO); (2) lower intermediate school (LBO-MAVO-VMBO); (3) upper intermediate school (HAVO-VWO-MBO); (4) college (HBO) and (5) university degree (WO).
Received UI benefits during unemployment spell	A dummy variable for receipt of UI benefits during unemployment spell (1=received UI benefits; 0= did not receive UI benefits).
Relative number of unemployment experiences	The sum of all earlier unemployment frequencies, by respondent.
Relative number of employment experiences	The sum of all earlier employment frequencies, by respondent.

Table C3. Summary of Sample Characteristics for the Treatment and Control Groups Before the UI Reforms

	1985 UI Reform		***1987 UI Reform***			***1995 UI Reform***		
	C	T	C	T-Long	T-short	C	T-Long	T-short
Age (years)	24.5	44.3	42.4	38.1	35.5	47.2	41.5	38.3
Marital Status	0.56	0.85	0.82	0.79	0.72	0.83	0.80	0.79
Elementary school	0.12	0.11	0.12	0.12	0.11	0.11	0.12	0.11
Lower intermediate school	0.35	0.34	0.36	0.35	0.32	0.35	0.37	0.32
Upper intermediate school	0.36	0.34	0.32	0.36	0.36	0.35	0.32	0.37
College	0.12	0.13	0.12	0.12	0.13	0.11	0.12	0.13
University degree	0.03	0.03	0.02	0.03	0.03	0.03	0.02	0.03
Months in unemployment	19.4	11.1	8.9	11.1	11.7	8.1	10.4	11.8
# Unemployment spells	1.33	0.80	0.96	0.66	1.16	1.18	0.67	0.94
Nr. of Men	141	830	151	273	441	116	182	225
Nr. of Women	275	446	96	263	477	65	169	253
Total nr. of individuals	416	1276	247	536	918	171	351	478

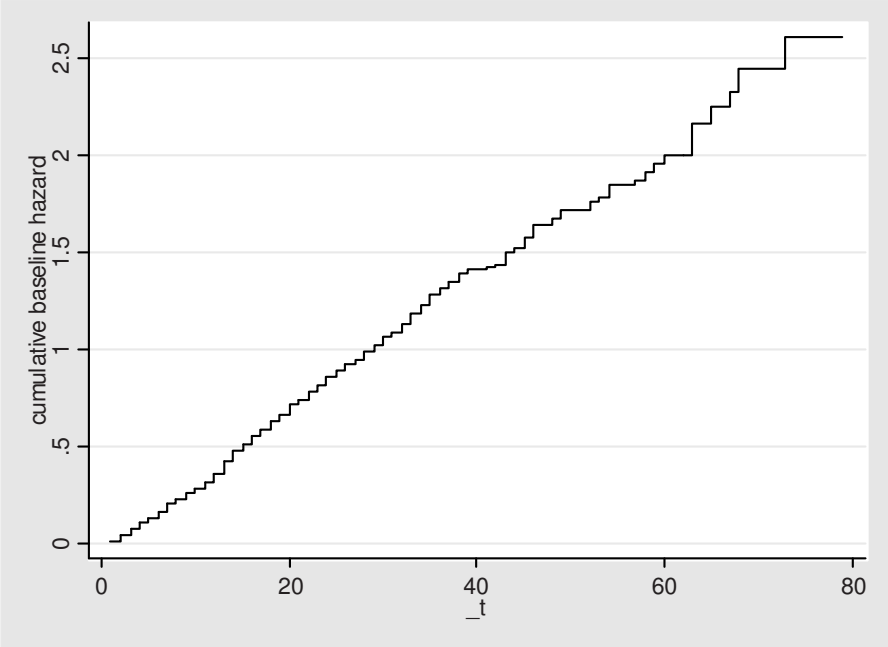
SOURCE: - Author's calculations using data from the OSA Supply Panels, 1985-2000.
NOTE: - C = Control group; T = Treated; T-Long = Long-term treated; T-Short = Short-term treated.

Figure C1. The Cumulative Baseline Hazard for Exits to Employment (for Women)



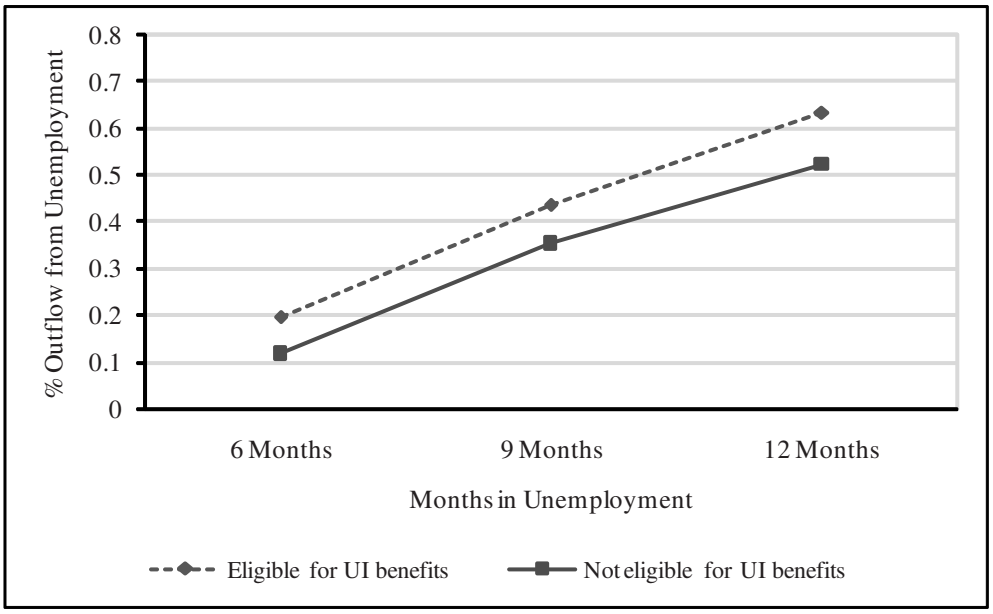
SOURCE: - Author's calculations using data from the OSA Supply Panels, 1985-2000.

Figure C2. The Cumulative Baseline Hazard for Exits to Employment (for Men)



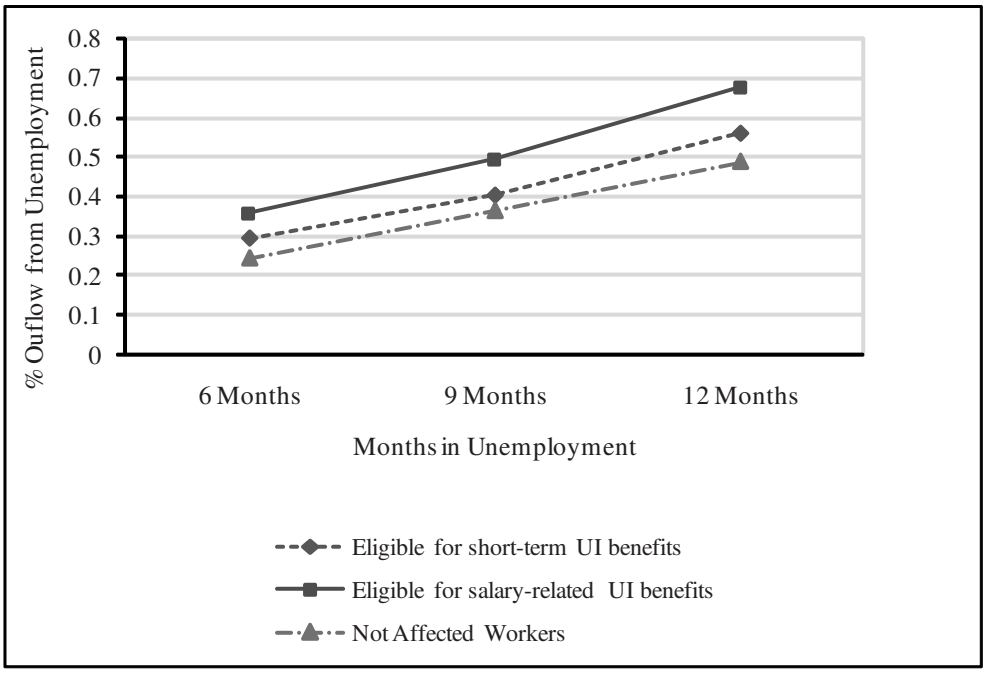
SOURCE: - Author's calculations using data from the OSA Supply Panels, 1985-2000.

Figure C3. The Outflow of the Treatment and Control Groups Before the First 1985 UI Reform



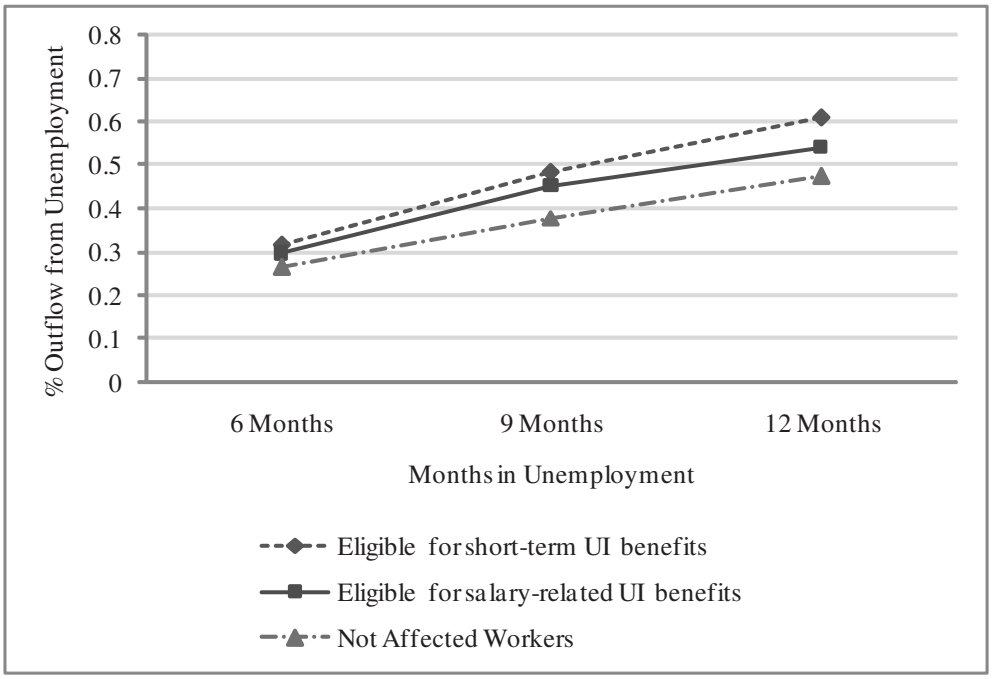
SOURCE: - Author's calculations using data from the OSA Supply Panels, 1985-2000.

Figure C4. The Outflow of the Treatment and Control Groups Before the Second 1987 UI Reform



SOURCE: - Author's calculations using data from the OSA Supply Panels, 1985-2000.

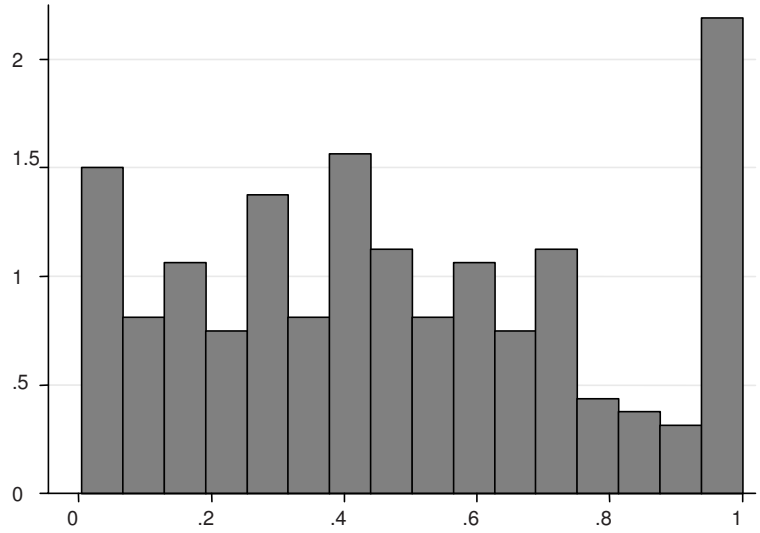
Figure C5. The Outflow of the Treatment and Control Groups Before the Third 1995 UI Reform



SOURCE: - Author's calculations using data from the OSA Supply Panels, 1985-2000.

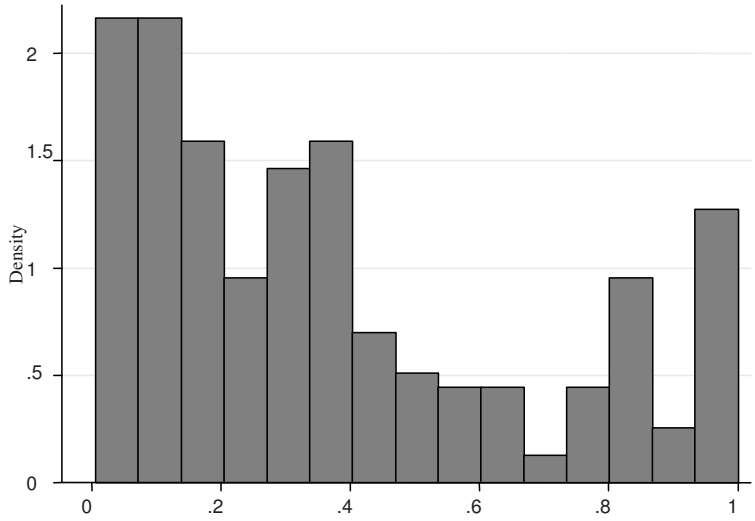
Appendix D to Chapter 4

Figure D1. Distribution of the 0..1 Treatment Variable in 1985



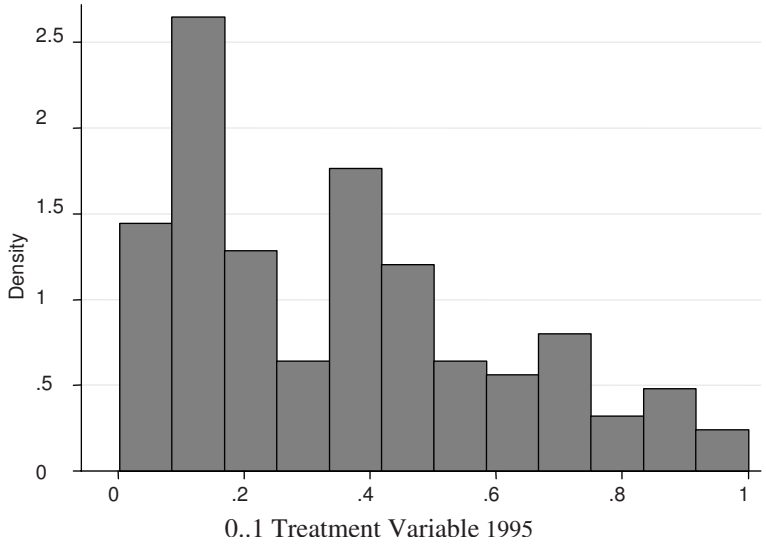
SOURCE: - Author's calculations using data from the OSA Supply Panels, 1985-2000.

Figure D2. Distribution of the 0..1 Treatment Variable in 1987



SOURCE: - Author's calculations using data from the OSA Supply Panels, 1985-2000.

Figure D3. Distribution of the 0..1 Treatment Variable in 1995



SOURCE: - Author's calculations using data from the OSA Supply Panels, 1985-2000.

Table D1. Means and Standard Deviations of Summary Statistics

	Mean	***SD***
Dependent Variable		
Log of Hourly Wages in Guilders	6.621	0.433
Treatment Groups		
Treatment group in 1985 (n= 937)	0.68	0.330
Control group in 1985 (n = 465)	0.32	0.613
Treatment group in 1987 (n = 556)	0.70	0.232
Control group in 1987 (n= 232)	0.29	0.701
Treatment group in 1995 (n = 717)	0.53	0.472
Control group in 1995 (n = 641)	0.47	0.527
Labor Market History Measures		
Most recent unemployment spell (in months)	12.80	12.40
Most recent unemployment spell squared	31.78	
Cumulated unemployment spells (in months)	24.55	20.95
Employment duration after unemployment (in months)	12.08	11.99
Cumulated employment duration after unemployment (in months)	34.48	35.22
Human Capital Measures		
Attained years of education	11.72	3.24
Work experience (in yrs)	24.72	11.61
Demographic Measures		
Age (16-65)	41.23	10.52
Married/Cohabiting	0.832	0.212
Person biannual wage observations	2,887	
Number of workers observed	1,151	

SOURCE: - Author's calculations using data from the OSA Supply Panels, 1985-2000.

Table D2. Definition and Construction of Variables

Variable Definition	*Variable Construction*
Dependent Variable	
Log Hourly Wages in Guilders	Self-reported monthly net wage/ (Weekly hours worked * 4.4 weeks)
Treatment Groups	
Treatment and Control Group in 1985	Continuous variable, where treatment = maximum daily wages in the interval between 91 and 300, and 0 = those who continued to receive a maximum daily wage of 91 Guilders or less in 1985. *0..1 variable*: [(Maximum daily wage received – lowest received daily wage)/ Δ highest and lowest received daily wage] .
Treatment and Control Group in 1987	Continuous variable where treatment = those who had worked between 13 and 26 weeks of the last 52 weeks prior to becoming unemployed and before January 1987, and 0 = those who had already worked more than 26 weeks of the 52 weeks in the 3 out of 5 years prior to becoming unemployed and before January 1987. *0..1 variable*: [(Maximum working weeks before unemployment – lowest worked weeks before unemployment)/ Δ highest and lowest worked weeks before unemployment].
Treatment and Control Group in 1995	Continuous variable, where treatment = those who had worked less than 26 out of the 39 last weeks prior to becoming unemployed and before March 1995, and 0 = those who had worked more than 26 weeks of the 39 weeks in the 4 out of 5 years prior to becoming unemployed and before March 1995. *0..1 variable*: [(Maximum working weeks before unemployment – lowest worked weeks before unemployment)/ Δ highest and lowest worked weeks before unemployment].
Period Variables	
Post-reform Period, 1985	Time-varying period-dummy variable, where = 0 the period prior to October 1985 and 1 to the period between 1985-1988, thus after the first UI reform.

Table D2. Definition and Construction of Variables *(Continued)*

Post-reform Period, 1987	Time-varying period-dummy variable, where 0 = the period prior to January 1987 and 1 to the period between 1987-1990, thus after the second UI reform.
Post-reform Period, 1995	Time-varying period-dummy variable, where 0 = the period prior to March 1995 and 1 to the period between 1995-1998, thus after the third UI reform.
Labor Market History Variables	
Most recent unemployment spell, (in months)	Elapsed time of unemployment duration, constructed as: Ending date of unemployment – Start date of unemployment + 1, by respondent.
Cumulated unemployment spells, (in months)	Cumulated unemployment spells, constructed as: the sum of all earlier unemployment spells, by respondent.
Employment duration after unemployment	Elapsed time of employment duration after unemployment (Ending date of employment – Start date of employment +1), by respondent.
Cumulated employment duration after unemployment	Cumulated employment spells, constructed as: the sum of all employment spells after unemployment, by respondent.
Lagged unemployment duration	Lagged variable for previous duration in unemployment.
Age at employment	Respondent's age at the moment of employment (continuous time varying variable: 16-65 years old).
Human Capital Variables	
Attained years of education	Categorical variable that represents respondent's years of education, with 1 = 9 years of education, if elementary school completed (BO); 2 = 12 years of education, if lower and upper intermediate secondary school was completed (LBO-MAVO-VMBO-HAVO-VWO-MBO); 3 = 18 years of education if college or university degree was completed (HBO-WO).

Table D2. Definition and Construction of Variables *(Continued)*

Work experience	Continuous variable, for total years of attained work experience, constructed as: age – years of education – 6 – unemployment and non-employment spells.
Demographic Measures	
Age (16-65)	Respondents' age at the moment of interview; (continuous time varying variable: 16-65 years old).
Married/Cohabiting	Respondents' marital status at the moment of interview, where 1= those married/cohabiting and 0 otherwise.

Table D3. The Two-Step Heckman Selection Procedure

In the first step of the Heckman procedure, the selection process, which is responsible for selection bias problems, is studied with the so-called selection model. In our case the bias is caused by observing selectively the dependent variable (the re-employment wages) of those previously eligible for UI benefits with at least two wage observations. Therefore a model needs to account for the probability that a worker has been previously eligible to UI benefits and has at least two wage observations, conditional on observable characteristics. This probability is specified as a latent variable model:

$$P^* = \beta X + U \qquad (1)$$

with the probability of participating the treatment group, given by:

$$P = \begin{cases} 1 \text{ if individuals have been previously eligible to UI benefits, and have at least two wage observations} \\ 0 \text{ otherwise} \end{cases}$$

where, P* is a latent variable for the probability to participate the treatment group after a UI reform and prior a wage observation. The value X is a set of all observed factors that may account for eligibility of UI benefits, and U is a random error term, which is assumed to be normally distributed and to take account of unobserved factors that influence the probability of participating in the treatment group. In the Heckman procedure, the residuals of the selection equation are used to construct a selection bias control factor, which is called Lambda (λ) and which is equivalent to the Inverse Mill's Ratio[27]. The Lambda yields the following formula:

$$E[Y \mid X > c] = \mu + \sigma \frac{\varphi(z)}{1 - \Phi(z)} \qquad \text{if truncation is } x > a$$

$$E[Y \mid X > c] = \mu - \sigma \frac{\varphi(z)}{\Phi(z)} \qquad \text{if truncation is } x < a$$

where Φ represents the cumulative normal distribution, (z) represents the height of the probability density function (φ)[28], which is given by the ordinates of the standard normal density and σ is the standard deviation of the residuals in the probit equation. In estimating Lambda (λ) we are summarizing a measure, which reflects the effects of all unmeasured characteristics that are related to treatment. The value of this lambda for each of the

respondents is saved and added to the data file as an additional variable. In the second step of the Heckman procedure a regression analysis is performed of the effects of treatment status on re-employment wages using the additional Lambda (λ) variable. As we now have a control factor in the analysis for the effect of the re-employment wages related to unmeasured characteristics, which are also related to the entitlement participation, the model is freed from the sample selection bias.

The Identification problem

An important condition for the use of Heckman procedure is that the selection equation contains at least one variable, which is not related to the dependent variable in the substantial equation. If such a variable is not present, there may arise severe problems of multi-collinearity and addition of the correction factor to the substantial equation may lead to estimation difficulties and unreliable coefficients. To strengthen identification, our model uses the variables marital status, having had kids and prior spells of unemployment at longer lags (UNt-4). This latter variable looks back at the occurrence of unemployment in the past. Theoretically, the occurrence of unemployment four or six years ago (UNt-4 and UNt-6) shows to be an important variable that determines the assignment of a respondent to a specific treatment group. However, it is not expected to affect current re-employment wage outcomes. This is, however, the case with more recent unemployment spells. In the literature variables that involve lagging of endogenous variables are referred to in the literature as pre-determined variables (Judge et al. 1989). In other words, creating pre-determined variables involves lags that directly affect the re-employment wages, but also lags that lose their correlation with the re-employment wages, since they lie too far back in the past[29].

Table D4. Cross-Sectional Probit Estimates for the Probability of Being Eligible for UI Benefits and Having More than One Wage Observations, by Separate UI Reforms, The Netherlands 1980-2000

	1985 UI Reform	***1987 UI Reform***	***1995 UI Reform***
	Model 1	Model 2	Model 3
Period after UI reforms	0.069	0.063	-0.154
	(0.200)	(0.179)	(0.121)
Employment duration after unemployment (in months)	0.027***	0.086***	0.041***
	(0.005)	(0.005)	(0.006)
Most recent unemployment spell (in months)	0.057***	-0.010	-0.008
	(0.007)	(0.010)	(0.011)
Cumulative employment duration after unemployment (in months)	0.007***	0.002	0.002
	(0.002)	(0.003)	(0.003)
Cumulative unemployment duration after unemployment (in months)	-0.000	-0.000	0.000
	(0.002)	(0.002)	(0.002)
Attained years of education	0.079***	0.073***	-0.006
	(0.015)	(0.016)	(0.018)
Work experience (in years)	0.000	0.028***	-0.040***
	(0.005)	(0.005)	(0.006)
Unemployed one wave earlier (T-2)	-0.018	-0.028	-0.018
	(0.022)	(0.028)	(0.024)
Additional Variables in the Selection Equation			
Unemployed two waves earlier (T-4)	-0.004	-0.004	-0.013*
	(0.005)	(0.006)	(0.007)
Married	0.000	-0.367***	-0.560***
	(0.129)	(0.129)	(0.139)
Temporary job in post-unemployment	0.752***	0.952***	0.988***
	(0.221)	(0.241)	(0.231)
Constant	-2.014***	-1.709***	-1.022**
	(0.373)	(0.400)	(0.411)
Observations	1,216	1,216	1,216
Log Likelihood	-487.81	-434.39	-301.538
Chi-2	162.01	393.34	180.47
Pseudo-R2	0.1424	0.3116	0.2303

SOURCE: - Author's calculations using data from the OSA Supply Panels, 1985-2000.
NOTE: - Robust standard errors in parentheses; *** $p < .001$; ** $p < .05$; * $p < .1$; two-tailed tests.

Nederlandse Samenvatting

Voor het Leven Getekend door Werkloosheid?

In hoeverre beïnvloeden werkloosheid en beperkingen in het werkloosheidsverzekeringstelsel de toekomstige carrière en lonen? Ondanks veel empirisch onderzoek blijft deze vraag nog steeds niet goed beantwoord. In dit proefschrift proberen we deze vraag te beantwoorden door sociologische en economische invalshoeken te gebruiken om hypothesen te formuleren over de effecten van werkloosheid op de latere carrière en loonvorming. In drie afzonderlijke hoofdstukken analyseren we verschillende aspecten van die ene, algemene vraagstelling:

(1) In hoeverre beïnvloeden duur en frequentie van werkloosheid de waarschijnlijkheid om opnieuw werkloos te worden en welk effect hebben die factoren op het inkomen na werkloosheid? (hoofdstuk 2)

(2) Wat is het effect van de hoogte en duur van de werkloosheidsuitkering op de snelheid en de wijze waarop herintreding in de arbeidsmarkt plaatsvindt en hoe worden die variabelen beïnvloed door de aard van de criteria om voor uitkering in aanmerking te komen (de "acceptatiecriteria")? (hoofdstuk 3)

(3) Hoe beïnvloeden de hoogte en de duur van de uitkering en beperkingen van de acceptatiecriteria loonontwikkelingen binnen verschillende sociale groepen en verschillende tijdvakken? (hoofdstuk 4)

De onderzoeksstrategie

Om te achterhalen hoe werkloosheid en de aard van de werkloosheidsverzekering (acceptatiecriteria, duur en niveau) latere carrières en lonen van individuen beïnvloeden, is voor een longitudinale aanpak gekozen. Dit is een aanpak waarin aan dezelfde groep personen dezelfde vragen worden gesteld op verschillende tijdstippen zodat veranderingen bij afzonderlijke individuen kunnen worden vastgesteld.

Om de centrale vraag in dit proefschrift te beantwoorden is er gebruik gemaakt van de longitudinale data van het Organisatie voor Strategisch Arbeidsmarktonderzoek (OSA) met negen bevragingsgolven tussen 1985 en 2000.

Het gegevensbestand van de OSA bevat ongeveer 13.000 respondenten die herhaald zijn ondervraagd in de periode tussen 1985 en 2000 en is gebaseerd op een steekproef die representatief is op het niveau van het individu. In de vraagstelling komt een breed scala van sociaal-economische thema's aan bod: demografische gegevens, samenstelling van huishoudens, opleiding van individuen, beroepsactiviteiten en inkomensgerelateerde onderwerpen. Deze data zijn verrijkt met retrospectieve vragen over arbeidshistories die bijzonder nuttig zijn om de carrières en loonontwikkelingen van een individuele werknemer te voorspellen.

Om op individueel niveau de effecten van beleidsveranderingen te meten, is in dit proefschrift gebruik gemaakt van hervormingen van de werkloosheidsverzekeringen die gedurende de jaren '80 en '90 in Nederland plaatsvonden. Deze hervormingen transformeerden Nederland van een land met een zeer genereus sociaal systeem naar een land met een van de meest strikte systemen in de wereld. De diversiteit van deze hervormingen wat betreft de duur, de hoogte en de toegangseisen van de WW, hebben als een natuurlijk experiment gewerkt en maken Nederland een leerzaam geval om zowel positieve als negatieve effecten van beleidshervorming te achterhalen.

Samenvatting van de resultaten

Terwijl de drie afzonderlijke studies verschillende facetten van het werkloosheidsproces analyseren, laten ze gezamenlijk zien dat ongelijkheden in de arbeidsmarktcarrières en lonen van individuen voort kunnen blijven bestaan. Hieronder volgt een korte samenvatting van de resultaten van elk hoofdstuk.

Hoe beschadigend is werkloosheid?

In Hoofdstuk 2 onderzoeken we in hoeverre de duur en frequentie van eerdere werkloosheidsperioden de waarschijnlijkheid om weer werkloos te worden en de lonen in de periode na werkloosheid beïnvloeden. Hierbij wordt een conceptueel raamwerk gebouwd waarbinnen de effecten van de afzonderlijke dimensies van werkloosheid onderzocht worden voor zowel mannen als vrouwen. Analyses uit dit hoofdstuk laten zien dat de frequentie en recentheid van eerdere werkloosheid de meest bepalende factoren zijn voor de mate waarin individuen opnieuw werkloos worden. Deze twee factoren verhogen het risico om opnieuw werkloos te worden

en blijven vier jaar na herintreding op de arbeidsmarkt nog steeds zichtbaar en vooral hoog bij vrouwen. Dit negatieve effect werkt ook door op het loon: twee jaar na herintreding verdienen mannen en vrouwen, respectievelijk 8 en 13 procent minder dan werknemers die nooit werkloos zijn geweest. De omvang van dit verlies is groter wanneer werkloosheid recenter is opgetreden en ook hardnekkiger van aard bij vrouwen. Tevens is er in dit hoofdstuk onderzocht of de negatieve effecten van werkloosheid verminderen wanneer individuen institutioneel gesteund worden door middel van werkloosheidsuitkeringen (WW) of zelfs op den duur verdwijnen door toename van ervaring en leeftijd. De resultaten laten zien dat de leeftijd waarop iemand werkloos wordt bepalend is voor de mate waarin en snelheid waarmee mensen zich kunnen herstellen van de schadelijke gevolgen van werkloosheid. Zo geldt dat vooral mannen die na hun 25ste werkloos worden, een hogere risico hebben om opnieuw werkloos te worden en meer inkomensverlies leiden. Verder laten de resultaten zien dat het ontvangen van een WW uitkering tijdens periodes van werkloosheid de negatieve effecten van werkloosheid kan verminderen.

Samenvattend kan er gesteld worden dat werkloosheid wel degelijk schade aanricht aan de loopbaan en het inkomen van individuen, vooral wanneer die individuen op latere leeftijd werkloos worden en gedurende die perioden niet institutioneel worden ondersteund

WW-uitkeringen: de weg naar blijvende werkloosheid of een brug naar werk?

In hoofdstuk 3 onderzoeken we in hoeverre beperkingen in het niveau, de duur en de acceptatiecriteria van werkloosheidsverzekeringen het tempo van herintreding beïnvloeden. Hierbij wordt het "job search model" niet alleen uitgebreid met persoonlijke kenmerken van individuen die bepalend zijn voor het zoekgedrag op de arbeidsmarkt, maar ook de effecten van de verschillende aspecten van de werkloosheidsverzekering – acceptatiecriteria, niveau en duur – op dat zoekgedrag. De analyses uit dit hoofdstuk laten zien dat beperkingen van de verzekering de prikkel om een baan te zoeken verhogen en daarmee de werkloosheidsduur verkorten. De mate waarin individuen op deze prikkel reageren, hangt in hoge mate samen met het geslacht en arbeidsverleden van de WW-ontvangers. Het is opvallend dat deze effecten bij vrouwen sterker zijn dan bij mannen. Bovendien laten de resultaten zien dat mannen met een langdurige uitkering tijdens een

gunstige conjunctuur later herintreden terwijl vrouwen juist het tegengestelde gedrag vertonen.

Maar wat betekent herintreding precies? In deze studie merken wij op dat mannen met een kortdurende uitkering een lager risico hebben om werkloos te worden, terwijl dit risico veel hoger ligt bij mannen met een langdurige uitkering. Ook vrouwen met een korter durende uitkering laten treden sneller weer in, terwijl vrouwen met een langer durende uitkering dat trager of helemaal niet meer doen. Verdere resultaten in dit hoofdstuk laten zien dat prikkels om werkloosheid te verlaten dynamisch van aard zijn met hogere uitstromingspercentages aan het einde van de uitkeringsperiode. Dit resultaat kan een verklaring bieden voor de verschillen tussen herintreding van mannen met kortdurende en mannen met langdurende WW-uitkeringen: mannen die loongerelateerde WW-uitkeringen genieten worden in hun zoekgedrag en keuze meer geleid door kwaliteitsprikkels en loonvoorkeuren; aspecten die een andere rol spelen bij ontvangers van kortdurende uitkeringen.

Hoe kunnen wij deze verschillen in herintreding na werkloosheid verklaren? Resultaten in hoofdstuk 3 wijten deze verschillen aan de ongelijke distributie van beleidseffecten onder mannen, vrouwen en groepen met verschillende loopbanen. De beleidshervormingen hebben bepaalde groepen meer getroffen dan andere groepen waardoor verschillende prikkels en daarmee verschillende herintredingsprocessen zijn waargenomen. Bijvoorbeeld, tijdens de hervormingen van 1987 en 1995, die de duur van de WW beperkten en de acceptatiecriteria strenger maakten, werden mannen minder hard getroffen omdat ze vaak een langer arbeidsverleden hadden opgebouwd en daarmee beter aan de acceptatiecriteria konden voldoen dan vrouwen. Een tweede verklaring voor deze verschillen kan gezocht worden in de mate van risicoperceptie tussen mannen en vrouwen. Het is goed mogelijk dat vrouwen hervormingen in het stelsel als bedreigend ervaren en daarom risico mijden door sneller een baan te accepteren. Mannen echter gedragen zich veel rationeler in het zoekproces doordat ze beter beschermd worden door de langere duur van hun arbeidsverleden en hun hogere opleiding. Een definitieve verklaring vereist echter meer onderzoek.

Beïnvloeden stelselhervormingen toekomstige loonvorming?

In hoofdstuk 4 is onderzocht in hoeverre beperkingen van de verschillende aspecten van werkloosheidsverzekeringen tot verschillende loonontwikkelingen leiden in verschillende sociale groepen en verschillende tijdvakken? Hier is het model van de "job search theory" toegepast onder contextspecifieke factoren die gerelateerd zijn aan beleidshervormingen De in dit hoofdstuk gepresenteerde resultaten laten zien dat stelselhervormingen de toekomstige lonen van individuen negatief kunnen beïnvloeden. Vooral strengere acceptatiecriteria die gepaard gaan met een kortere uitkeringsduur leiden tot lagere lonen dan wanneer de hoogte van de uitkering beperkt wordt. Deze loonderving blijft meetbaar tot drie jaar na de stelselhervormingen en is vooral hoog bij de meer ervaren werknemers.

Waarom worden lonen van individuen op verschillende manieren beïnvloed? Een verklaring kan gezocht worden in de voorspellingen van de "human capital theory" die stelt dat inkomstenverliezen een weerspiegeling zijn van de kosten die gepaard gaan met een suboptimale afstemming tussen individuele capaciteiten en de aard van de baan bij herintreding. Vooral het verlies van branche-specifieke kennis kan tot blijvend loonverlies leiden bij mensen die door de hervormingen getroffen worden. Een andere verklaring kan gevonden worden in de compositie-effecten die ten grondslag liggen aan de stelselhervormingen. Het is goed mogelijk dat mensen die door hervormingen getroffen worden, vooral in banen terechtkomen die gekenmerkt worden door lage productiviteitsniveaus met als gevolg een lager loon. Blijven deze negatieve effecten op lonen bestaan of verdwijnen ze over tijd? In deze studie zien we inkomensderving tot drie jaar na de hervormingen. Bovendien zien we dat tijdens de hervormingen van 1987 en 1995 de inkomensverschillen met 0.3% en 0.2% toenamen ten opzichte van individuen die niet door hervormingen werden beïnvloed. Blijkbaar is het in de praktijk moeilijk om, zelfs na langere tijd, inkomensderving teniet te doen. Dit resultaat suggereert dat stelselhervormingen tot (onbedoelde) ongelijkheden in lonen hebben geleid tussen sociale groepen die alleen verschillen doordat ze wel of niet beïnvloed zijn geweest.

Wanneer zijn de effecten van WW hervormingen het hoogst? De resultaten in dit hoofdstuk laten zien dat de grootte van het loonverlies sterk samenhangt met de fase van economische cyclus waarin een hervorming heeft plaats gevonden en met het type hervorming.

Conclusie

Zijn werklozen voor het leven getekend? Dit proefschrift heeft laten zien dat dit tot op zekere hoogte wel degelijk het geval is. We laten in dit proefschrift zien dat werkloosheid latere carrières en lonen negatief beïnvloedt; zozeer dat het gehele loopbaanperspectief van het individu blijvend wordt ondermijnd. De recentheid en frequentie van werkloosheid blijken twee versterkende factoren te zijn voor ongelijkheden in carrières en lonen. Verder worden deze negatieve effecten van werkloosheid versterkt wanneer stelselhervormingen worden ingevoerd. Deze negatieve effecten zijn vooral significant bij vrouwen, hoog opgeleide en ervaren individuen en worden sterker wanneer die hervormingen worden ingevoerd tijdens een laagconjunctuur.

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