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Labor Market Effects of Unemployment Insurance Design

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Abstract

With the emergence of the Great Recession unemployment insurance (UI) is once again at the heart of the policy debate. In this paper, we review the recent theoretical and empirical evidence on the labor market effects of UI design. We also discuss policy issues related to UI design, including the structure of benefits, the role of liquidity constraints and the pros and cons of a UI system in which the generosity of UI benefits is varying over the business cycle. Finally, we identify potential areas of future research.

Keywords: Unemployment insurance, unemployment dynamics, job search, labor market policy, labor market institutions
JEL-codes: J64, J65, J68

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1 Introduction

When workers lose their job for reasons outside their control they may be eligible for unemployment insurance (UI) benefits. Whether they are in fact eligible and how generous these benefits are depends on the design of the UI system. The main purpose of UI design is to provide the best balance between smoothing consumption and limiting adverse effects of incentives to work. Changes in the UI design happen quite frequently as a response to changing economic conditions or on the basis of dissatisfaction about the previous design. With the emergence of the Great Recession, the labor market effects of UI are once again at the heart of the political debate (OECD, 2010). In this discussion, both short-term and long-term perspectives of UI systems are important. The short-term perspective is related to the role of UI benefits in funding short-time work arrangements to dampen the effects of the Great Recession, while the long-term perspective is related to the role of UI benefits over the economic cycle. As usual, the level and especially the maximum duration of unemployment benefits are also elements in this discussion.

In the past decade, new theoretical and empirical studies have been published and the question is to what extent this recent literature provides novel insights into the optimal design of UI. We provide an overview of recent theoretical and empirical evidence on incentives influencing the behavior of employed workers and UI recipients and discuss its implications for UI design.[1] We focus on the two main characteristics of a UI system, the level and maximum duration of benefits, but we also discuss the role of eligibility conditions. Furthermore, we provide a discussion of a UI system in which both the level and duration of benefits are varying over the business cycle, the role of liquidity constraints in explaining job search behavior, and the rationale behind age-dependent benefits.[2]

The set-up of our paper is as follows. Section 2 presents some stylized facts of labor markets in relation to unemployment and a brief description of the UI system in various countries. In section 3, we give an overview of theoretical studies on incentives related to UI and the optimal design of UI. In section 4, we present recent empirical evidence on the effect of unemployment benefits on unemployment outflow, on unemployment inflow, and on post-unemployment outcomes. In section 5, we summarize the recent debate on the design of UI. In the last section, we provide concluding remarks on the design of the UI and we identify areas for future research.

2 Labor Markets and UI Systems

2.1 Labor Markets

Table 1 presents differences in labor market position for prime age and older individuals distinguished by gender. In 2010 unemployment rates for prime age men ranged from a low 3.0%

in Luxembourg to a high 18.1% in Spain. For prime age women the range in unemployment rates is similar, from a low 2.6% in Norway to 19.2% in Spain. For prime age men the range in employment rates is limited from a low 75.4% in Estonia to a high 92.4% in Switzerland. For prime age women the range of the employment rates is substantially larger, from 30.1 in Turkey to 82.2% in Norway.

Unemployment rates are very much the same for older and prime age individuals. The fact that unemployment rates among older workers are rather low does not necessarily mean that the UI system has no influence. Usually older employed workers have a low probability to lose their job so the fact that they have an average unemployment rate may point to unemployment duration being above average.

Among older men and women employment rates are substantially lower than among prime age individuals. The employment rate among older males in Hungary is at the low end with 39.6% and in Iceland it is at the high end of the distribution with 83.9%. Among older females employment rates are even lower with Turkey having the lowest with 17.1% and Iceland having the highest with 77.0%.

Table 1 also presents cross-country information on the percentages of long-term unemployment in overall unemployment, that is the share of unemployed with an unemployment duration of more than 1 year. Whereas the cross-country variation in unemployment rates is rather limited, the variation in the share of long-term unemployed is substantial. Korea has the shortest unemployment durations with only 1% of male unemployment and 0% of female unemployment lasting longer than one year. At the top end is the Slovak Republic with a long-term unemployment share for males of 58% and for females of 61%.

2.2 UI Systems

In this part we provide a description of the structure of UI systems, which differs between countries in a number of dimensions although there are similarities. One of the similarities is related to the eligibility conditions. These conditions include the requirements to be involuntary unemployed, to be registered at the employment office and to actively search for employment.[3] Another similarity is the existence of a qualifying period for eligibility. The qualifying period is a minimum number of weeks, months or days of employment during a specified period before entering unemployment. In a few countries there is a separate employment requirement and a contributions requirement. As shown in the first column of Table 2, the exact requirements vary a lot across countries; about 6 months of employment and contributions in the last one or one-and-a-half year in Austria, Japan, Korea, Luxembourg and Sweden; 1 year in the last 2 years in Germany, Italy, Portugal and Switzerland; 4 months in the last 2.3 years in France; 1 year in the last 3 years in Denmark and Estonia; 1 year in the last 4 years in Hungary; 1 year in the last 6 years in Spain. In the U.S., a few states require a specified number of weeks (15

or 20), while most states require minimum earnings which equal to a specified multiple of the weekly benefit amount.

A waiting period of few days for the eligible unemployed exists in a number of countries: 14 days in Canada and up to 14 days in New Zealand, 7 days in Estonia, Finland, France, Italy, Japan, Korea and U.S.; 6 days in Greece; 5 days in Sweden and Switzerland and 3 days in Ireland, Norway and the U.K.

In most countries benefits are determined by the pre-unemployment earnings. The earnings base is usually the average (gross or net) earnings in a specified pre-unemployment period, which varies from 1 month (Belgium) to 3 months (Czech Republic, Denmark, Italy, Korea, Luxembourg), 6 months (Canada, Iceland, Spain) or 1 year (Estonia, France, Hungary, Netherlands, Portugal, Slovenia). Few countries consider a reference earnings level instead of the individual earnings as the base for calculating the amount of benefits. This reference level is the national minimum wage for Greece or the state weekly average earnings in the U.S. A flat benefit exists in Australia, Greece, Ireland, New Zealand, Poland and the U.K., while most other countries impose a ceiling on the benefit amount. The payment rate, which is the level of UI benefits as a a percentage of pre-unemployment earnings, varies from 50 per cent (Estonia, Korea, Slovak Republic, Turkey, United States), to 90 per cent in Denmark. Many countries have a declining profile of the payment rate over the duration of unemployment. Such declining benefits are present in Belgium, Czech Republic, Estonia, Hungary, Italy, the Netherlands, Poland, Slovenia, Spain, Sweden, Switzerland and Turkey.

The maximum benefit duration is either fixed or depends on the insurance period and/or age. Only few countries set a fixed maximum benefit period, which is 24 months in Denmark (up to 2012 it was 48 months), 500 days in Finland, 6 months in Slovak Republic, and 26 weeks in the U.K. and the U.S. In almost all other countries the maximum benefit duration varies depending on the contribution history and in some countries also on age (Austria, France, Germany, Greece, Italy, Korea, Luxembourg, Japan, Portugal, Switzerland). The age dimension usually implies that the duration of benefits is longer for older workers. Only Germany and Portugal have a structure of benefit duration which depends on both the history of contributions and age for also younger workers. The minimum benefit duration varies between countries from around 3 months in Canada, Japan, Korea, Slovenia and Turkey, around 6 months in Estonia, Greece, Germany, Italy, Poland, 1 year in Norway and Sweden and 2 years in Portugal. The maximum benefit duration varies from 5 months in Czech Republic, 8 months in Korea, 9 months in Hungary, 10 months in Canada, 1 year in Austria, Estonia, Greece, Ireland, Italy, Slovenia, Turkey, 2 years in Germany, Norway, Spain and 72 months in Portugal. In Australia, Belgium and New Zealand there is an unlimited duration, while in three countries (Canada, Poland and the U.S.) the duration of benefits depends also on the regional (state) unemployment rate.

3 Incentives Related to Unemployment Insurance: Theory

UI provides unemployed workers with benefits in order to smooth consumption. However, at the same time UI may induce moral hazard. With UI an unemployed worker may search less intensively for a new job than she would otherwise do if no benefit was provided. The tension between insurance and incentives is at the heart of UI design.

Providing private unemployment insurance is problematic for various reasons. The first problem concerns asymmetric information. The worker has more information about her unemployment risk than the insurer. If an insurance company would establish the insurance premium on the basis of the average unemployment risk, the insurance will not be attractive for workers with a low unemployment risk. For a given insurance premium, unemployment insurance is especially attractive for workers with a high unemployment risk. This causes adverse selection of 'bad' risks; the insurance company makes losses or has to increase the insurance premium. However, if unemployment insurance becomes more expensive it is even more unattractive for low risk workers. The obvious solution to this problem is that insurance companies select workers and do not allow high risks to enter or the company differentiates insurance premiums only offering high premiums to high risk individuals. Both solutions are often unacceptable from a societal point of view. While it mimics market insurance, collective unemployment insurance deviates from actuarial principles by charging premiums that do not reflect individual risks. Furthermore, unemployment risks are correlated and difficult to predict. In a recession many workers become unemployed at the same time. If recessions would be predictable they could be accounted for when establishing the UI premiums. However, the unpredictability of correlated events requires adjustments of UI premiums to avoid UI funds going bankrupt. Only the state has the power to enforce these adjustments. For all these reasons unemployment insurance is usually a mandatory and collective arrangement.

Numerous studies have analyzed various aspects of the functioning of the unemployment insurance system. Their findings show that thanks to its economy-wide risk-pooling, unemployment insurance enables a high degree of consumption smoothing (Gruber, 1997; Browning and Crossley, 2001), performs well under idiosyncratic, sectoral, and regional shocks, and acts as an automatic macroeconomic stabilizer.[4] But studies also find that unemployment insurance creates reemployment disincentives by prolonging unemployment duration and contributing to higher equilibrium unemployment. However, the magnitude of disincentive effects is not a firmly established parameter, and the literature is inconclusive and rather thin on important aspects. To stimulate workers to search for a job several incentive mechanisms are introduced. These mechanisms can be grouped under three headings: sequencing of benefits, monitoring and benefit sanctions, and workfare (see also Fredriksson and Holmlund, 2006a and 2006b).

We focus on the incentive mechanisms such as (i) the level and duration of unemployment

which influence the outflow from the UI system, (ii) eligibility criteria which influence the inflow into unemployment.[5]

3.1 Unemployment Outflow

3.1.1 Partial Equilibrium Model

The partial equilibrium search model has been central in studying the effect of unemployment benefits on the exit rate from unemployment.[6] Unemployed workers choose a reservation wage which balances the costs and benefits of continued search and thus determines whether they accept or reject received offers. An increase in the benefit level leads to an increase in the reservation wage, which lowers the unemployment exit rate and increases the duration of unemployment. This behavioral response to more generous benefits has been interpreted as a moral hazard effect. Allowing for search effort as an additional choice for the unemployed job-seeker does not alter the main effect of benefit receipt. An increase of the benefit level not only increases the reservation wage but it also leads to a lower search effort, both of which affects the job-finding rate negatively.

Allowing for non-stationarity, the main theoretical prediction is an increasing job finding rate over the spell of insured unemployment (see Mortensen, 1977; Van den Berg, 1990). When the UI system defines a declining profile of benefit payments or a maximum benefit duration the instantaneous income declines over time leading to a reduction in the value of unemployment. The decline in the value of unemployment over the course of the unemployment spell leads to a drop in the reservation wage, which results in a higher exit rate close to benefit exhaustion.

In most UI systems, eligibility to UI depends on previous employment experience, which is in contrast to the assumption of the basic model that all unemployed receive benefits. Typically, new entrants in the labor market and long-term unemployed are not eligible to receive unemployment insurance. Finding a job for this type of unemployed means also becoming eligible to UI in case they lose their job in the future. This increases the incentive to accept jobs for UI recipients close to benefit exhaustion and for those who are not eligible to unemployment benefits. The change in the behavior of job seekers over the spell of unemployment and the eligibility effect implies that individuals eligible to different lengths of benefit duration would behave differently.

For a given length of unemployment and for a given level of benefits, an increase in the *potential benefit duration* will lead to a higher reservation wage, and consequently to a rise in the average duration of unemployment. The effect of an increase in maximum benefit duration is expected to be largest at the previous point of benefit expiration. After the increase in maximum benefit duration the reservation wage will be significantly higher at this point where previously the reservation wage was at its lowest level.

An increase in the *benefit level* will affect unemployed workers differently depending on their elapsed unemployment duration. Contrary to an extension of the benefit duration, an increase in the replacement rate has its largest effect at the start of the unemployment spell. For a recent unemployed worker, an increase in the benefit level will lower the exit rate from unemployment as a result of a higher value of unemployment. The job seeker will demand a higher wage before accepting a job offer. For an unemployed close to benefit exhaustion, a higher benefit level will lead to a higher exit rate due to the eligibility effect.

Based on this simple version of the job search model, the overall effect of an increase in the generosity of benefits on the average duration of unemployment depends on the balance of two opposing effects. First, more generous benefits will lower the exit rate from unemployment. Second, for the non-eligible and for those close to benefit exhaustion, more generous benefits will create an incentive to find a job faster due to the eligibility effect. However, since the eligibility effect is second-order it is likely that the disincentive effect dominates so an increase in benefit generosity will lead to longer unemployment durations.

3.1.2 Equilibrium Search Model

The basic search model provides predictions of the effect of UI on unemployment duration and on individual wages through its effect on the reservation wage and search effort. The equilibrium search model instead models both workers and firms decisions and considers equilibrium wages, which are derived endogenously (see Pissarides, 2000). In the original formulation of the model wages are determined through Nash wage bargaining, which is the mechanism that shares the rents created due to frictions between workers and firms. For both firms and workers the rents are the difference between what they could obtain through forming a match and the best outside opportunity. The sum of the rents creates the surplus to be shared. In this framework, an increase of unemployment benefits increases the value of unemployment for the job-seeker, which leads to an increase in their wage in the bargaining process. Since a higher wage lowers firms' expected profits, to restore equilibrium firms lower the average cost of vacancies by reducing the number of vacancies, which lowers labor market tightness, the ratio of the number of vacancies and the number of unemployed. An increase in benefits and the corresponding drop in labor market tightness leads to an increase in the unemployment rate.

The equilibrium search model with Nash bargaining has been challenged recently. Shimer (2005) shows that the standard search and matching model cannot explain the cyclical behavior of unemployment and vacancies, which are both highly variable and strongly negatively correlated in U.S. data. In addition, the model cannot explain the strong procyclicality of the job-finding rate. The main explanation for the failure of the model to fit the data is that wages are determined by Nash bargaining, which implies that wages respond flexibly to productivity shocks that hit the economy. A positive productivity shock, for example, increases job creation

by firms opening up more vacancies, which leads to an increased job-finding rate and a lower unemployment rate. The increase in hiring, however, lowers unemployment duration raising workers' threat point in wage bargaining, which leads to a higher wage. This wage flexibility lowers employer's gain from the productivity shock eliminating the incentive for vacancy creation. As a result, fluctuations in labor productivity have little impact on the unemployment, vacancy, and job-finding rates. During recessions, the assumption of flexible wages due to wage bargaining leads to lower wages, which gives an incentive to employers to hire unemployed workers and thus leads to smaller cyclical fluctuations in unemployment than would otherwise occur.

This critique on the ability of the equilibrium search model to explain the business cyclicality of its key components (unemployment and vacancies) has led to suggestions of alternative wage determination mechanisms that generate more rigid wages. Hall (2005) offers an alternative in which real wages are determined by a social norm that does not change over the business cycle. Shimer (2005) suggests that countercyclical movements in workers' bargaining power could also allow for amplification of shocks in the economy. Pissarides (2009) has criticized the wage stickiness hypothesis based on evidence of pro-cyclical hiring wages from workers who change employers. More recently, Martins et al. (2012) find wages to be pro-cyclical for workers newly hired into specific entry jobs, suggesting that the cyclical elasticity of wages is similar to that of employment.[7]

3.2 Unemployment Inflow

Unemployment benefits may also affect the unemployment rate via a higher inflow from employment. There are different ways this might occur. First, in the equilibrium search model with an endogenous job destruction rate (see Mortensen and Pissarides, 1999) more generous unemployment benefits exert an upward pressure on wages, which makes jobs become unprofitable more quickly and be destroyed earlier.

The benefit system may also affect the inflow into unemployment by changing the participation decisions of inactive individuals. Rather than being employed or unemployed, individuals may decide not to participate at all in the labor market. When unemployment benefits are paid only to active job-seekers, that is, inactive people do not receive benefits, an increase in the generosity of benefits might increase aggregate labor force participation. The intuition is that eligibility to higher income while seeking jobs induces more people to be engaged in active job search. Thus unemployment benefits may actually increase participation.

Finally, another way in which more generous benefits might affect the inflow into unemployment is by inducing individuals to quit more easily or induce a separation and claim unemployment benefits. Moral hazard may be problematic not only for unemployed workers but also for employed workers if it reduces their effort and thus increases the probability that they will be

fired (Karni, 1999).[8]

3.3 Post-Unemployment Outcomes

Unemployment insurance may not only create disincentives in job search but may also affect post-unemployment outcomes. There are different potential mechanisms and relevant outcomes.

First, more generous benefits will have a positive effect on re-employment wages. The intuition is that with higher benefits unemployed workers become more demanding in terms of the wages they are willing to accept. Ehrenberg and Oaxaca (1976) were the first to consider this effect.

Second, in a labor market with search frictions, benefits perceived as a subsidy for the unemployed to search for a suitable job tend to reduce job mismatch. When benefits are high, unemployed workers become more selective, and only accept jobs which are less likely to dissolve. Then there is an increase in worker productivity growth (Marimon and Zilibotti, 1999). This leads to a trade-off between unemployment and mismatch, where more benefits increase the number of high-quality jobs in the labor market but unemployed workers experience higher unemployment with longer average duration. Acemoglu and Shimer (1999) show that even moderate UI encourages unemployed workers to apply for high-wage jobs with high unemployment risk and thus encourages firms to create those higher-quality jobs.

Unemployment benefits, therefore, might have an effect on job match quality through higher wages and employment stability. We discussed earlier that more generous benefits will increase the inflow into unemployment due to more firing by firms when a productivity shock reduces their profitability. To the extent that UI increases the quality of the match between workers and firms increasing their productivity, this mitigates the effect of UI on the inflow into unemployment.

3.4 The Design of Unemployment Insurance

If the search effort of unemployed workers could be observed and verified then there would be no moral hazard problem and the optimal design would entail full insurance with a constant profile of benefits over the unemployment spell. In the presence of moral hazard, the design of the UI system needs to consider the trade-off between consumption smoothing through insurance and incentives to search for work.

3.4.1 Consumption Smoothing

Hansen and Imrohoroglu (1992), focusing on the consumption smoothing and the disincentive effect of UI, show that even in the presence of moral hazard optimally designed unemployment insurance programs can yield positive welfare benefits. The utility gain of a UI through con-

sumption smoothing has been empirically documented by Gruber (1997) who finds that benefit eligibility reduces the drop in consumption in the event of unemployment by one-third compared to what the drop would have been in the absence of UI.

3.4.2 Benefit Profile

A UI system with a declining sequence of benefits has been considered optimal in the presence of moral hazard because it provides stronger incentives to search (Shavell and Weiss, 1979; Hopenhayn and Nicolini, 1997; Pavoni and Violante, 2007). Most OECD countries have a system with declining benefits through a two-tiered UI system, in which workers who lose their jobs are entitled to UI benefits for a limited period after which they receive lower Unemployment Assistance (UA) benefits. The two-tiered UI system exploits the eligibility effect that was discussed above as it provides the incentive to search more actively for those who are close to benefit exhaustion and for those not-eligible to receive benefits (Fredriksson and Holmlund, 2006a).

Another mechanism to enhance the incentives to exit unemployment is to combine a declining benefits with a wage tax after reemployment, whereby the tax level depends on the duration of the unemployment spell. An increasing tax profile will encourage job finding by making prolonged search more expensive. In particular, the wage tax could be negative at the beginning of the unemployment spell representing a bonus for exiting unemployment quickly (Hopenhayn and Nicolini, 1997).

There are a number of theoretical considerations that are important regarding the optimal design of UI. When wages are determined through union-firm bargaining, a declining benefit schedule leads to wage pressure because it increases the welfare of the short-term unemployed at the expense of the long-term unemployed. When search effort is a choice of the unemployed worker, a declining sequence of benefits is needed to encourage job search but the incentive effect will be weaker due to the wage pressure effect (Cahuc and Lehmann, 2000). When the choice of effort determines not only the job finding probability through search effort but also the probability of remaining employed through the choice of work effort, then the optimal UI system might be non-monotonic. In the beginning of the unemployment spell the system should induce a large drop in consumption in order to discourage shirking. This will affect the unemployment inflow. Benefits should increase initially and then fall throughout the spell (Wang and Williamson, 1996). The initial increase is similar to the re-employment bonus of a negative wage tax of Hopenhayn and Nicolini (1997) at the beginning of the unemployment spell followed by a declining sequence of benefits. Overall, the early literature regarding the sequence of benefits suggests that a declining profile provides better incentives than a flat (or increasing) profile.

The literature discussed so far on the optimal design of UI has considered models in which the unemployment agency can affect the consumption patterns of the agents through the sequence of benefits. This rests in the assumption that the agents cannot save and borrow without constraints from the market. Recent research has allowed for borrowing and savings, which means that the employment agency cannot influence the consumption profile of the unemployed worker through a declining benefit profile (e.g. Chetty, 2008; Pavoni, 2007; Shimer and Werning, 2008). The optimal policy in this case is a constant benefit level that insures workers against unemployment risk, while their ability to dissave and borrow allows them to avoid transitory fluctuations in consumption (Shimer and Werning, 2008). Rendahl (2012) shows that the result of constant optimal benefit payments in Shimer and Werning (2008) is driven by the assumption of a Constant Absolute Risk Aversion (CARA) utility. This implies that the optimal insurance policy is independent of individual's wealth level, so is the agent's reservation wage. The implication is that the elasticity of employment hazard with respect to benefit payments is constant across the wealth distribution. Rendahl (2012) shows that, if savings and wealth are observable, optimal unemployment benefits are negatively related to an agent's wealth level and peak for borrowing-constrained individuals with zero liquid assets. Therefore, during the course of unemployment, the level of assets is decreasing, while benefit payments are increasing.

The optimality of constant benefits also rests on the assumption of homogeneous workers for whom the trade-off between insurance and incentives does not change over time. In the presence of duration dependence, when the job-finding probabilities deteriorate over the spell of unemployment, or when there is heterogeneity in the types of unemployed, the trade-off between insurance and incentives changes during the spell and the optimal benefits should also vary over time (Shimer and Werning, 2006). The exact profile of optimal benefits depends on the mechanism that drives duration dependence and on the form of heterogeneity. If job opportunities deteriorate over time because of skills depreciation, then declining benefits are optimal. This is because with constant benefits the long-term unemployed would have lower incentives to accept a job offer. If instead the unemployed receive fewer job offers over time, then increasing benefits could be optimal as the reason for remaining in unemployment is not because of an increasing reservation wage but because of lack of job opportunities. Similarly, the form of heterogeneity would dictate a different profile of benefits. A decreasing profile would be optimal if the pool of unemployed changes over time consisting of types with high value of leisure. On the other hand, benefits should rise during an unemployment spell if workers face higher uncertainty and higher variance in the wage draws they receive. This higher value of search is associated with a higher reservation wage and a longer unemployment duration, which could lead to a better job match if the unemployed is properly insured over time.

3.4.3 Tests of the Optimality of UI

Gruber (1997) uses the framework suggested by Baily (1978) to estimate the optimal level of UI benefits. The optimal level of benefits trades off the gains from consumption smoothing against the costs of search distortion. The gains are computed by the sensitivity of consumption to the replacement rate of benefits, while the costs are computed by the elasticity of the duration of unemployment with respect to balanced-budget increases in UI benefits and taxes. The findings suggest that even at very high degrees of risk aversion, the optimal replacement rate is below 50 percent, while the average replacement rate in the data used in the study is 42.6 percent. Gruber (1997) also shows that the results are very sensitive to the magnitudes of the elasticity of unemployment duration and the effect of the replacement rate on consumption smoothing.

Shimer and Werning (2007) develop a dynamic model of job search with risk aversion and find that a worker's utility while unemployed is a monotone function of her after-tax reservation wage, which implies that the objective of an optimal UI system is to choose benefits and taxes so that the after-tax reservation wage is maximized. Contrary to the consumption based optimal test proposed by Gruber (1997), the approach suggested by Shimer and Werning (2007) does not require an estimate of risk aversion or information on consumption. Instead their test uses information on how unemployment benefits affect the pre-tax reservation wage and on the elasticity of unemployment duration with respect to benefits. The drawback of this approach is that while there are many empirical studies on the elasticity of unemployment duration there is scarce evidence on the sensitivity of the reservation wage to unemployment benefits.

Chetty (2008) provides a test for the optimal UI taking into account two possible effects of unemployment benefits: the moral hazard effect and the liquidity effect.[9] He finds that the liquidity effect accounts for 60 percent of the marginal effect of UI benefits on durations in the United States. This estimate implies that a replacement rate of 50 percent and constant benefits for 6 months is near optimal. To evaluate the optimality of UI the test requires estimates of three sufficient statistics: the duration of benefit receipt, the elasticity of UI-compensated duration with respect to UI benefit level, and the moral hazard and liquidity effect of benefits. Contrary to the studies by Gruber (1997) and Shimer and Werning (2007), the optimal level of benefit does not necessarily fall with the elasticity of UI-compensated duration with respect to UI benefit level. The result depends on whether an increase of benefits leads to longer duration due to a liquidity effect (which smooths consumption) or due to a moral hazard effect (which subsidizes leisure). In other words, a higher liquidity effect would imply that increases in benefit generosity would be welfare improving.

These three different ways to test for the optimality of unemployment insurance highlight the importance of obtaining precise estimates of key parameters such as the elasticity of unemployment duration with respect to unemployment benefits, the sensitivity of the reservation

wage and consumption to benefit changes.

3.4.4 Other Design Issues

Finally, as we discussed above, workers can affect their work effort and induce quits, which will affect the unemployment inflow. In order to discourage quits and shirking, the system UI should induce a large drop in consumption at beginning of the unemployment spell. A waiting period before benefits are paid out is a way to discourage quits. Another way to discourage quits is by providing benefits only to unemployed who were laid off and not to those who voluntarily quit their jobs. Unemployed workers may look for jobs, and once employed, may quit or induce a layoff quickly in order to upgrade their benefits. To prevent such cycles of unemployment spells with short intermediate employment spells eligibility criteria are important. The optimal policy conditions the benefits paid to unemployed workers on their employment history, such that the coverage increases with the length of previous employment spells (Hopenhayn and Nicolini, 2009). As was discussed in section 2.2, in most existing UI systems eligibility criteria include a minimum employment period preceding the unemployment spell. When these criteria are not satisfied then the unemployed is either not eligible for benefits or may only receive the benefits not used in the previous unemployment spell.

4 Incentives Related to Unemployment Insurance: Empirical Evidence

In this section we review the empirical evidence concerning the effect of unemployment insurance on the behavior of unemployed workers. We start with studies focused on unemployment outflow, followed by studies on unemployment inflow, and finally we review the studies on the effect of UI on post-unemployment outcomes, in particular wages and job durations.

4.1 Unemployment outflow

The empirical literature on how UI affects the exit rate from unemployment is very large. Reviews of the early literature are given by Atkinson and Micklewright (1991) and Pedersen and Westergard-Nielsen (1993). The early literature focused mostly on the effect of the level of benefits using cross-sectional variation at the individual level. *Benefit levels* are generally found to have significant effects in U.S. and U.K. studies, while most continental European studies find insignificant or weak effects. In most US studies the elasticity of unemployment duration with respect to benefit level is in the range 0.3 to 0.9 (Holmlund, 1998). The disincentive effect of benefit level on the exit rate from unemployment depends also on the spell duration, with higher effects for short-term unemployed (Nickell, 1979; Fallick, 1991). The research on the

effect of *potential benefit duration* (PBD) on the exit rate from unemployment is extensive both in the US and in Europe. Older studies for the US and Canada include Ham and Rea (1987), Meyer (1990) and Katz and Meyer (1990). Early studies for Europe are Hunt (1995), Carling et al. (1996) and Winter-Ebmer (1998). One common finding of most studies is a sharp increase in the exit rate close to benefit expiration.[10]

More recently, a number of U.S. and European studies have exploited policy driven changes in benefit levels. These studies examine how UI recipients react to incentives using a quasi-experimental identification of the treatment effect that allows the researchers to adopt a difference-in-differences approach. The policy change allows for a before-after comparison; the first difference. Then, there is a treatment group that is affected and a control group that is not affected; the second difference. The difference-in-differences gives the treatment effect of the policy change. Other recent studies use a regression discontinuity methodology exploiting one or more discontinuities in the relationship between benefit level or benefit duration as for example age at inflow or pre-unemployment work experience. The assumption is that individuals on either side of the discontinuity only differ slightly, except for the exposure to a different UI benefit level or benefit duration. The difference in behavior of individuals close to either side of the discontinuity then reveals how the difference in UI affects behavior. An overview of recent studies on the effects of UI on unemployment outflow is provided in the top part of Table 3. The studies are characterized in terms of country, calendar time period, sample size, treated population, the identification strategy and the effect of UI on duration using two indicators for the dose-response effects to enable a comparison between the studies.

4.1.1 Difference-in-Differences Studies

Card and Levine (2000) study an extension of UI benefits in the state of New Jersey in 1996. For political reasons unrelated to the state of the labor market UI benefits were temporarily – for a period of 26 weeks – extended with 13 weeks. The authors compare the unemployment exit rates before, during and after the benefit extension was introduced finding a decrease of the exit rates by about 15%. From simulations of the long-term effect of the benefit extension they conclude that the 13 weeks of extra benefits would raise the average duration of regular UI claims by about 1 week.

Carling et al. (2001) study the effects of a cut in Swedish replacement rates in January 1996 from a maximum of 80% to 75%. Because of a ceiling on the benefit level actual replacement rates could be lower than the maximum rates while for high earnings workers the UI replacement rate was not affected at all. The authors compare the job-finding rates of UI recipients younger than 55 years who were affected by the cut in the replacement rates with the job-finding rates of workers who were not affected. They distinguish two treatment groups, one with exact 80% replacement before the change and 75% after the change and one group with a replacement

rate between 75% and 80% before the change and 75% after the change. There is one control group with individuals for whom the cut in benefits did not apply because their earnings were always above the threshold. The authors find that the cut in UI benefits substantially increased the outflow from unemployment with an implied elasticity of the hazard rate with respect to benefits of about 1.6.

Roed and Zhang (2003) present an analysis of unemployment durations of Norwegian workers who were below 60 years of age, became unemployed during the 1990s and who were eligible for unemployment benefits. They exploit two particular features of the Norwegian benefit system. First, UI benefits depend on the entry month into unemployment because they are calculated on the basis of earnings during the previous calendar year. Second, benefits are indexed depending on the entry month. Furthermore, because there is a ceiling in earnings above which benefits remain constant, the replacement rate goes down with earnings for workers who earned more than the ceiling. These are sources of independent variation in replacement rates the authors use to estimate benefit elasticities which they find to range from 0.95 for men to 0.35 for women. This implies that a 10% reduction in benefits may cut a 10-month unemployment duration by approximately one month for men and 1-2 weeks for women.

Van Ours and Vodopivec (2006) exploit a policy change in Slovenia that involved substantial reductions in the potential duration of UI benefits for four groups of workers while there was no change in benefits for another group, which served as a natural control. The distinction between the four groups is on the pre-unemployment work experience. Depending on this experience the PBD could be reduced from 6 to 3, 9 to 6, 12 to 6 or 18 to 9 months. The effect of the reduction in maximum benefit duration on the unemployment duration depends on the size of the reduction but also on the age and gender of the worker. Based on the parameter estimates of their hazard rate models they perform simulation from which it appears that for a 30-old male worker in good health for whom the PBD was reduced from 12 to 6 months the median unemployment duration reduced with 1.1 months; for a female worker with the same characteristics the drop in median unemployment duration was 3.5 months.

Lalive et al. (2006) study a policy change in the structure of the UI benefits in Austria which affected various unemployed workers differently. A first group experienced an increase in the replacement rate, a second group experienced an extension of the PBD, a third group experienced both a higher RR and a longer PBD, and a fourth group experienced no change in the policy parameters. What happened to an individual depended on the monthly income of the worker and the work experience and age of the worker. For workers with high previous work experience PBD increased, respectively, from 30 to 39 weeks for the age group 40-49, and from 30 to 52 weeks for workers 50 and older. The sample consists of UI recipients in the age range 35 to 54. The authors estimate hazard rate models and on the basis of their parameter estimates they present simulation results. An increase in PBD from 30 to 39 weeks

leads to an increase of 0.4 week of unemployment while an increase in PBD from 30 to 52 weeks increase the unemployment duration with 2.3 weeks. The increase in the RR of 4.6 %-point leads to an increase in the unemployment duration of 0.4 weeks, implying a benefit elasticity of approximately 0.4.

4.1.2 Regression Discontinuity Studies

Card et al. (2007b) exploit a discontinuity in the relationship between work experience and UI entitlement for Austrian workers. Individuals with less than 36 months of employment in the past five years received 20 weeks of benefits, while those who worked for 36 months or more received 30 weeks of benefits. Using a sample of workers aged 20-50 the authors find that UI recipients who were eligible for 30 weeks of benefits exhibit job finding rates during the first 20 weeks who were 5-9% lower than those who were eligible for only 20 weeks of benefits.

Lalive (2008) exploits an age-specific change in the maximum benefit duration in Austria in June 1988; for workers age 50 or more the PBD was extended from 30 weeks to 209 weeks in some regions but not in others. He uses this age discontinuity in UI entitlement to establish the effect of the PBD extension on the unemployment duration. The data refer to workers aged 46 to 53. From the estimates it appears that for men the duration of job search was prolonged by about 14.8 weeks, while for women this increase was 74.8 weeks. This difference is attributed to the age distance to early retirement age. The early retirement age for women was 54 while for men it was 59. Apparently, for older Austrian women UI provided a quantitatively important pathway into early retirement.

In January 2003 unemployment benefits in Finland were increased for workers with long employment histories. The average benefit increase was 15% for the first 150 days of the unemployment spell. At the same time the severance pay system was abolished.[11] Uusitalo and Verho (2010) using this policy change to analyze the effect of the UI replacement rate on unemployment duration find that the change in the benefit structure reduced the re-employment hazards on average by 17%. The effect is largest at the beginning of the unemployment spell and disappears after the eligibility for the increased benefits expires. Based on their estimates the authors conclude that the benefit increase extended time until re-employment by 33 days or 11.9%. Given that the benefit increase was 15% this implies that the elasticity of time until re-employment with respect to the replacement rate would be about 0.8.

Finally, Schmieder et al. (2012a) implement a regression discontinuity design using German data of workers in the age range 40 to 49 entering unemployment between July 1987 and March 1999 when the UI system was stable. In this age range over the particular period of time there were three sharp age thresholds in the potential benefit duration: age 42 (12 to 18 months), age 44 (18 to 22 months), and age 49 (22 to 26 months). The authors find that for each additional month of UI durations the unemployment duration increases on average with

0.10-0.13 months.[12]

4.1.3 Discussion

The main conclusion that can be drawn on the basis of the overview of studies presented in Table 3 is that there are substantial effects on unemployment duration if the replacement rate or the potential benefit duration change. The magnitude of the effects differs for different countries and different types of policy changes, but the effects are not so much different. An extension of potential benefit duration leads to an increase in actual unemployment duration of about 20% of the original benefit duration extension. One of the exceptions is for Slovenian women, the other is for Austrian women. The first may have to do with the attachment to the labor market, the second with the nearness of early retirement benefits. The benefit elasticity seems to range between 0.4 and 1, with the Swedish findings of Carling et al. (2006) as an exception. Although the ages of the workers being investigated differ, age differences between treatment effects seem rather limited, with the exception of Austrian older women. Incentives clearly matter. The job finding behavior of unemployed workers is influenced both by the level and the duration of the UI benefits.

An important dimension in the optimal design of UI is to understand if any of the two main components of the benefit system – benefit level and benefit duration – matter more by affecting differently the behavior of unemployed workers. The existing evidence suggests that both types of increase in the generosity of the UI system lead to longer unemployment duration. Consistent with the theory, most of the effect of the increase in benefit levels takes place early in the unemployment spell, while in the case of the extension of benefit duration most of the effect arises around the dates when benefits expired. An intuitive way to compare PBD and RR is by splitting up the total increase in benefit costs into the fraction of direct costs (without behavioral changes) and the fraction of indirect costs resulting from changes in behavior. For example, an increase in RR will raise benefit payments even if individuals do not change their behavior, simply because higher benefits have to be paid for the same number of days individuals spend in unemployment. Furthermore, the RR increase will induce individuals to stay longer in unemployment, thus raising benefit payments further. Lalive et al. (2006) who perform such an exercise find that an increase in PBD induces a substantially higher share of behavioral costs than an increase in RR. In other words, individuals react strongly to the increase in benefit duration, and these behavioral changes are the main factor driving the total additional costs of the policy change. Differences in replacement rates are less important.

The finding that changes in the duration of benefits leads to stronger effects compared to changes in the level of benefits means that benefit duration is a more effective tool to influence incentives. One concern is that the quality of post-unemployment jobs is affected too. The higher exit rate from unemployment might be associated with jobs of lower quality and

with higher probability of re-entering unemployment. We discuss the empirical findings of the relationship between PBD and the quality of post-unemployment jobs in the section 4.3.

4.2 Unemployment Inflow

The empirical evidence on the inflow into unemployment is rather limited. We discuss two dimensions. The first is the effect of eligibility rules on entrance into unemployment insurance. The second is how benefit level and benefit duration affect the inflow rates.

Most empirical studies on the unemployment inflow effect of UI focus on the *eligibility rules*. The question is how eligibility for entrance into unemployment insurance affects employment duration, the decision of workers to quit and the decision of firms to fire workers. The main conclusion is that the exit rate from employment to unemployment increases substantially as soon as the workers satisfy the number of weeks worked in order to qualify for UI benefits and at the point at which individuals have qualified for the maximum possible weeks of benefit receipts (e.g. Christofides and McKenna (1995, 1996); Green and Sargent (1998), for Canada). Moreover, the evidence suggests that changes in eligibility rules for UI have a significant impact on employment durations (e.g. Green and Riddell (1997) again for Canada). Employers play an important role in the adjustment of employment durations by altering the timing of layoffs as many employment spells that just qualified under the old system are extended to just qualify under the new system. Although this literature is rather old and is mostly focused on Canadian data, recent evidence from Spain (Rebollo-Sanz, 2012) also shows that unemployment benefits favor job turnover and that both firms' and workers' decisions seem to matter. In particular, the probability of layoff increases as workers qualify for unemployment benefits. As to the effect of the structure of the benefit system, the existing evidence suggests that both the level and the maximum duration of benefits have a significant positive effect on the inflow into unemployment (e.g. Anderson and Meyer, 1997; Winter-Ebmer, 2003; Lalive and Zweimüller, 2004).

4.3 Post-Unemployment Outcomes

Unlike the evidence for the effect of UI and in particular of the effect of benefit duration on the outflow rate, the evidence on the effect on post-unemployment outcomes is mixed. Earlier studies regarding the effect of UI on wages suggest that this is weakly positive. There is, however, variation in the evidence with some studies finding no effect while others finding positive effects.[13]

Early 20^{th} century studies include Addison and Blackburn (2000) who find that more generous UI either in terms of the benefit level or longer entitlement periods hardly increase re-employment wages. The evidence on the effect of the UI system on employment duration is rather mixed. Evidence from Canada (Belzil, 2001) and the US (Centeno, 2004) suggests that jobs accepted close to benefit termination have a higher dissolution rate while higher benefit

levels increase the quality of job match measured by the duration of the employment spell.[14] An overview of recent studies on the effects of UI on post-unemployment outcomes using a dif-in-dif or regression discontinuity approach is provided in the bottom part of Table 3.

The study by Card et al. (2007b), which was discussed before, shows that extended benefits do not affect the "match quality" of subsequent jobs as measured by mean wages or the duration of subsequent jobs. Centeno and Novo (2007) exploit an age-specific change in entitlement introduced in Portugal in July 1999. For the age group 30 to 34 the maximum benefit duration was increased from 15 to 18 months, for the age group 35 to 39 it stayed 18 months. The new law appears to have had a small positive impact on reemployment wages; the 3 months benefit extension increased the wages with 2.8 percent. The increase was somewhat stronger at the bottom of the reemployment distribution. Van Ours and Vodopivec (2008) use the policy change in Slovenia which reduced the PBD for many groups of workers substantially to investigate the quality of post-unemployment jobs. They find that the reduction in the potential benefit duration did not affect the likelihood of a worker taking a temporary rather rather than a permanent job, had hardly any effect on job separation rates and did not affect post-unemployment wages.

Finally, Caliendo et al. (2012) focus on a discontinuity in the German UI system where at the age of 45 the maximum benefit duration increases by 6 months from 12 to 18 months. They investigate an inflow sample into unemployment for West-Germany from the years 2001 to 2003. Men have an age range between 44 and 46 years, women between 43.5 and 46.5 years. The authors find that the exit rate from unemployment decreases because of the extended benefit period (with 14%). The overall effect of the extended benefit duration on the exit rate from subsequent employment is negative but small and not significantly different from zero. However, the treatment effect is heterogeneous. The same applies to the post-unemployment wages. Unemployed who obtain jobs close and after the time when benefits are exhausted are significantly more likely to exit subsequent employment and receive lower wages compared to their counterparts with extended benefit duration.

Whereas in every study there is evidence of replacement rate or potential benefit duration to affect the job finding rate, the evidence on post-unemployment outcomes suggests that there are no effects on average on the quality of the post-unemployment job. However, there is some evidence that there are heterogeneous effects, which lead to zero net effects when this heterogeneity is ignored, indicating that at least some individuals might be liquidity constrained. Given this mixed evidence, it is difficult to provide a clear interpretation of these findings and their implication for the wage-setting process. The lack of evidence of post-unemployment effects may indicate that there is no UI-induced wage bargaining, as one would expect to observe an effect on re-employment wages. However, it may also be the case that wages are an imperfect indicator of the job characteristics that workers value.

5 Recent Debate on the Design of UI

5.1 Benefit Structure

5.1.1 Liquidity Constraints

The shape of the effect of benefit level and potential benefit duration depends on the extent to which individuals are liquidity constrained. In the presence of complete credit and insurance markets, where consumption can be smoothed perfectly, an increase of UI benefits operates only through moral hazard and there will be no reason for the reservation wage to vary over the course of the unemployment spell. The moral hazard interpretation of longer unemployment duration in the presence of more generous UI ignores the role of liquidity constraints. Chetty (2008) suggests that the overall effect of a change in benefits on the search effort can be decomposed to a moral hazard effect and a liquidity effect. When individuals cannot smooth consumption perfectly an increase of UI benefits allows the unemployed to search longer without the pressure to find a new job quickly, which leads to longer unemployment duration. Chetty (2008) uses variation in severance pay policies across firms in the U.S. to identify the effect of liquidity constraints. A severance payment is a lump-sum payment that does not influence the leisure-work trade-off and therefore should not have an effect on behavior unless through a liquidity constraint. Chetty's analysis is based on 2441 individuals of whom 471 (18%) report receiving a severance payment. There is no information about the size of the severance payments. From his analysis Chetty concludes that 60 percent of the increase in unemployment durations caused by UI benefits is due to a "liquidity effect" rather than distortions in marginal incentives to search – the moral hazard effect. Chetty finds two pieces of evidence. First, increases in benefits have much larger effects on durations for liquidity constrained households. Second, lump-sum severance payments increase durations substantially among constrained households.

Whereas Chetty (2008) only has a relatively small number of observations, Card et al. (2007b) have many more observations to estimate the effects of severance pay (see also Table 3). They compare the search behavior of people who were laid off just before and just after the 36-month cutoff for severance pay eligibility. They find that the lump sum severance pay has a significant effect on the duration of joblessness. The job finding rate during the first 20 weeks of unemployment (the eligibility period for regular unemployment benefits in Austria) is 8-12% lower for those who are just barely eligible for severance pay than for those who are just barely ineligible. A substantial share of the behavioral response to longer UI benefits is attributable to a liquidity effect rather than due to moral hazard.

The change in the Finish UI system exploited by Uusitalo and Verho (2010) to investigate the effect of RR on unemployment durations was not one to one (see also Table 3). The eligibility criteria for the severance pay in the old system were slightly different than the eligibility criteria

of higher daily allowance in the new system, and there were small groups of unemployed who lost the right to the severance pay without becoming eligible for the higher daily allowance (1420 individuals) or who gained higher allowance though they were not eligible for the severance pay before the reform (681 individuals). These small groups were used to disentangle the effect of the removal of severance pay and the effect of the higher RR in the early period of unemployment. The authors find that the effect of the lost severance pay is insignificantly different from zero suggesting that the effect of liquidity constraints is not important.

Basten et al. (2012) investigate the effect of severance payments on job search in Norway. Contrary to the case of the U.S. and Austria, Norway's regular unemployment benefits are much more generous, replacing 62% of prior income for up to 2 years. By exploiting a discontinuity in eligibility at age 50, they find that a severance payment worth 1.2 months' earnings at the median increases average non-employment duration by just below a month, and lowers the fraction re-employed after a year by six percentage points, which corresponds to a relative reduction of about 10 percent. This evidence suggests the presence of liquidity constraints even in environments with relatively more generous unemployment benefit systems.

Overall, both the theoretical and the empirical literature suggests the importance of liquidity constraints, but the magnitude of liquidity effects is still an open issue.

5.1.2 Age-Dependent Benefits

In most countries the maximum benefit duration is age-dependent, either directly (especially in Europe) or through entitlement criteria that relate the maximum duration of benefits to previous work experience. The rationale behind age-dependent unemployment insurance is twofold. The first is related to the labor market position of older workers who once unemployed might face worse employment prospects. The second is related to the fact that young and older workers are characterized by different expected horizons in the labor market.

To the extent that the labor market position of older workers is weak the insurance component in the trade-off between providing insurance and reducing moral hazard is larger. However, unconditional extension of benefits to older workers might reduce their re-employment incentives. Recent evidence suggests that, in countries in which UI can be used as a pathway to early retirement, unemployment for older workers is an absorbing state (e.g. Lalive, 2008; Tatsiramos, 2010).

The proximity to retirement might also modify the trade-off between insurance and incentives. For instance, the declining profile of benefits that we observe in a number of countries might not be effective in introducing incentives to exit from unemployment when retirement is near. As discussed in Section 3.4.2, the theory of optimal UI suggests that employment taxes can be combined with a declining profile of benefits in order to create incentives for exiting unemployment. For older workers incentives to search and find a job may be increased by

providing employment subsidies. However, if the time horizon is too short this will not work either. Shortly before retirement – up to a couple of years – older unemployed workers may stop searching for a job altogether irrespective of the structure of benefits and taxes or subsidies on employment. Combining the UI system and pension system may revitalize search of older unemployed workers, for example by taxing pensions in proportion to the length of the unemployment spells (Hairault et al., 2010). Providing age-dependent benefits in the form of longer benefit durations for older workers in combination with a tax on pensions will provide more insurance and at the same time introduce incentives to search for employment.

5.2 UI Design over the Business Cycle

There are two ways business cycles affect unemployment. The first, which is a direct one, is related to an increase in layoffs and reduction of hirings by firms in the case of a recession. The second, which is indirect, is related to a change in the composition of unemployed workers. For instance, during a recession more older workers and higher educated workers enter the unemployment pool. To the extent that the direct effect of the recession on the unemployment rate and the compositional change are large, there is scope for labor market policies to adjust.[15]

The occurrence of longer unemployment duration during recessions may call for more generous benefits since the trade-off between consumption smoothing and moral hazard may be different than in a booming labor market with low unemployment. In particular, with a weaker labor demand during a recession, unemployed workers may face difficulties to find a new job, which makes the consumption smoothing purpose of UI more important. On the other hand, cyclical adjustment of the maximum benefit duration might also affect incentives for UI recipients reinforcing moral hazard problems. These disincentives may be more pronounced for low income workers because the gains from working decline with benefits generosity. However, these workers might be more liquidity constrained (Browning and Crossley, 2001) and benefit more from more generous UI through consumption smoothing.

5.2.1 Theoretical Studies

There are a few recent studies on the optimal UI over the business cycle. Andersen and Svarer (2010) and Landais et al. (2010) find countercyclical optimal benefits. In Andersen and Svarer (2010) the government uses UI to smooth consumption over the business cycle facing an intertemporal budget constraint. Landais et al. (2010), instead, impose a balanced budget in each period so UI cannot be used for consumption smoothing. In their paper, there is a distinction between two sources of unemployment, matching frictions (in booms) and job rationing (in recessions). In recessions, the moral hazard problem is smaller than in booms because of the limited number of jobs available, while the value of consumption smoothing remains constant

over the cycle. Due to job rationing the individual effort to find a job creates a negative externality to other job seekers. In this setting, the optimal UI rule implies more generous benefits in recessions than in expansions, which correct the negative externality by reducing job search effort. Mitman and Rabinovich (2011) study the optimal provision of UI over the business cycle using a general equilibrium search model in which they allow for aggregate productivity shocks. They also consider the optimal design of both level and duration of benefits. They find that the optimal path of benefits is pro-cyclical. The main difference with the previous studies is that instead of assuming rigid wages they allow for wage bargaining, which implies that UI benefit changes affect wages.

5.2.2 Empirical Evidence

There are a few countries in which the UI structure depends on the business cycle conditions and in particular on the regional unemployment rate (Canada, Poland and the U.S.). In the case of the U.S., through the Extended Benefits program there is an extension of up to 20 weeks to the regular benefit duration of 26 weeks. This extension is provided to those unemployed who lost their job in states in which the level and the change in the state's unemployment rate exceeds a certain threshold. Although the thresholds vary across states, the typical lower threshold is 6.5 percent for extensions of 13 weeks and 8 percent for extensions of 20 weeks. Another condition for Extended Benefits periods to be triggered is that the unemployment rate in the preceding 13 weeks equalled or exceeded 120 percent of the average unemployment rate in the same 13 weeks period of the preceding two calendar years. This system has been present for decades (Kiley, 2003). As a response to the Great Recession of 2008/2009 there were four additional extensions of unemployment benefit duration on top of the automatic extension of 20 weeks. Maximum UI durations in the U.S. were extended to as long as 99 weeks. The U.S. system of cyclical variation in UI benefit generosity is relatively unusual for other OECD countries.

There is some recent empirical evidence in support of cyclical variations in UI benefit generosity. Kroft and Notowidigdo (2010) show for the U.S. that the elasticity of unemployment duration with respect to the UI benefit level varies with the unemployment rate. Theoretically, the duration elasticity depends on the relative importance of search effort and reservation wage. Through the reservation wage, there is a positive correlation between the duration elasticity and the unemployment rate, while through search effort there may be a negative correlation. Empirically there is a negative correlation between the duration elasticity and the unemployment rate. This implies that moral hazard is lower when unemployment is high. Schmieder et al. (2012a) find similar results for Germany. These findings suggest that extensions of UI duration during recessions can be welfare enhancing. Rothstein (2011) concludes on the basis of an analysis of data from the Current Population Survey that the effects on unemployment exits of the benefit extensions during the Great Recession in the U.S. have been rather limited.

He attributes 0.1 to 0.5 percentage point of the unemployment rate to the extended benefit durations.

6 Concluding Remarks

UI provides unemployed workers with benefits in order to smooth consumption. UI also creates disincentives for employed workers to retain their jobs and unemployed workers to find new jobs. The design of UI needs to consider the trade-off between insurance and incentives. Benefit structure and eligibility conditions are the most important elements for the design of UI. The benefit structure determines the replacement rate and the duration of benefit receipt, which shape the incentives to search for a job and, therefore, the unemployment outflow. The eligibility conditions, which affect the unemployment inflow, specify the requirements in order to be eligible for UI. These include general conditions of being available for work and actively searching for a job, the qualifying period that is required to be employed in order to be eligible for benefits, the waiting period that is required before the benefits are available for the unemployed and the condition to be laid off.

There is a lot of cross-country and within-country variation in the structure of UI systems. The cross-country differences are hard to exploit in empirical studies because there are many other differences between countries that influence labor market behavior. The within-country variation in UI because of discontinuities in rules or because of calender time changes in the UI structure allow researchers to establish the effects of replacement rates and maximum benefit durations on labor market outcomes. In the overview of empirical studies we find that the differences in magnitude of the effects of replacement rate and benefit duration are not so big despite differences in research design, sample and UI structure. Apparently, the behavior of unemployed workers is affected by the two main characteristics of UI systems in a similar way despite the obvious differences between these systems and other differences in labor market institutions such as employment protection legislation, minimum wages and active labor market policies.

We identify four main issues for future research on UI design: personal versus public provision, the importance of liquidity constraints, behavioral biases, and the optimality of adjustment of the UI system over the business cycle. In all these issues the common element is the extent to which moral hazard affects individual behavior.

In the discussion on public versus private provision of UI there is sometimes a reference to mandatory UI savings accounts. Individual savings accounts can combine consumption smoothing in the case of job loss without introducing moral hazard effects. This is an interesting combination but as yet there is little experience with its practical operation or possible effects in a transition period.[16]

The importance of liquidity constraints needs further research. The available evidence is based on a few studies only. Yet, from a policy point of view it is very important whether the positive correlation between generosity of benefits and unemployment duration has to do with adverse effects on search behavior or with liquidity constraints which restrict unemployed workers in their search for better jobs. To disentangle these two sources of prolonged unemployment duration a better understanding is needed of the way unemployed search and how this changes over time. This understanding will also shed light on the existence of spikes in the job finding rates, which are associated with worse job matches.

Recently, researchers have begun to investigate to what extent behavioral biases affect job search. UI recipients may be "impatient", i.e. they assign a lower value to future benefits of job search and therefore exert less effort to find a job. In addition to this, welfare recipients may have so-called hyperbolic time preferences, i.e. they are "present biased" in the sense that in the short run they discount highly while in the long run they discount less. Paserman (2008) introduces hyperbolic discounting in job search decisions. Della Vigna and Paserman (2005) investigate the relevance of impatience and hyperbolic discounting in job search decisions. They find that the effect of impatience on search effort is negative and sizable while the effect of impatience on reservation wages and re-employment wages is essentially zero. Clearly, the way individuals discount the future, understand the rules of the game and are influenced by the behavior of others are likely to explain the observed behavior and provide insights for policy changes that will increase welfare without reducing efficiency. Alternatively, different type of data may be used to investigate the effects of UI on behavior. Krueger and Mueller (2010) for example exploit time-use data to investigate the behavioral response to UI finding evidence of liquidity-constraints to have an impact on job seekers.

Finally, the Great Recession served as a tough "stress test" to the social safety-nets in OECD countries. Many OECD countries took crisis-related measures to reinforce the insurance part mainly by expanding benefit coverage to previously ineligible groups of workers. The OECD (2011) concludes that overall benefit generosity has hardly increased so that the expansion of the coverage did not reduce incentives to find a job. Whether a UI system is generous not only depends on the level and maximum duration of the UI benefits but also on the actual duration of unemployment. If the actual duration of unemployment is short it is not very important that the maximum benefit duration is short too. If the maximum benefit duration is long but the actual unemployment duration is even longer benefits are not very generous. A further complication is that both durations are not independent. A long maximum duration may cause a long actual duration of unemployment.

Recent theoretical studies show that the optimal UI depends on the state of the labor market such that in recessions more generous benefits may be provided. In addition, to the extent to which individual heterogeneity and duration dependence varies over the business cycle, UI that

varies with the business-cycle might be relevant. During a recession more generous benefits can be provided since the trade-off between consumption smoothing and moral hazard is different than in a labor market with high unemployment. Whether the cyclical sensitivity of optimal UI implies that a UI system should have automatic adjustments in terms of generosity is a different matter. This also depends on the costs of such automatic adjustments in terms of behavioral responses. If unemployed workers anticipate a recession they may try to postpone becoming unemployed until the economy is in a recession. Once in a recession the lower search effort might prolong the recession. In other words, the magnitude and duration of a recession may not be exogenous to labor market behavior of unemployed workers.

A major characteristic of UI systems is that they are constantly changing. Apparently it is difficult to implement the optimal design. To some extent this has to do with changes in the economy and changing political preferences. However, changes in UI systems are also a matter of trial and error, which result from limited understanding of individual behavioral responses to the introduction of new policies. It is only after evaluating these policies that we can learn about their effectiveness. Optimal UI design can only be implemented if the behavior of unemployed and employer workers is better understood.

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Notes

[1]Previous overview studies are at least a decade old; see Atkinson and Micklewright (1991), Holmlund (1998), Karni (1999) and Krueger and Meyer (2002). To some extent Fredriksson and Holmlund (2006a and 2006b) also provide an overview but their study is much more limited in scope when it comes to UI benefits and much wider in range since they also discuss benefit sanctions and workfare policies.

[2]By focusing on the labor market effects of UI design we do not address the interactions between UI and other labor market institutions. See Arpaia and Mourre (2012) for a recent discussion on labor market institutions and performance of European labor markets.

[3]In some countries voluntarily unemployed or those who are laid off for cause are eligible to UI although there is typically a waiting period of several weeks.

[4]Dolls et al. (2012) find that in the presence of an unemployment shock the benefit system absorbs 48 percent of the shock in the EU, compared to 34 percent in the U.S.

[5]We ignore issues such as monitoring and benefit sanctions and active labor market policies. Van der Klaauw and Van Ours (2012) provide an overview over studies on the effectiveness of benefit sanctions and reemployment bonuses. Kluve (2010) presents a meta-analysis of 137 ALMP evaluation studies in Europe finding that simple non-expensive programs with clear incentives for unemployed workers work best. Card et al. (2010) also present a meta-analysis of ALMP evaluations with similar findings but emphasizing that longer-term evaluations generally tend to be more favorable than short-term evaluations.

[6]The Discussion Paper version of our paper provides an appendix that discusses the modeling of unemployment benefits in job search and equilibrium search models (Tatsiramos and Van Ours, 2012). Rogerson et al. (2005) provide a comprehensive review of search models.

[7]For a review of equilibrium search models with an emphasis on business cycle fluctuations see also Rogerson and Shimer (2011).

[8]Of course, if there is a direct relationship between shirking and dismissal the dismissed worker will not be entitled to UI benefits, but in practice it may be difficult to establish such a direct relationship. A mechanism to reduce the incentive for workers to quit their job in the presence of unemployment benefits is the imposition of a tax upon entering unemployment. This tax is typically in the form of a waiting period during which workers do not receive benefits. Additionally, the *eligibility criteria* for receiving benefits may be used to control the inflow into unemployment. Specifying a minimum employment period to contribute to the unemployment insurance fund is a way to avoid repeated cycles of short employment followed by receipt of unemployment benefits.

[9]The liquidity effect refers to the situation when individuals cannot smooth consumption perfectly because they are liquidity constrained. In this case an increase of UI benefits allows the unemployed to search longer without the pressure to find a new job quickly. See also section 5.1.1.

[10]Card et al. (2007a) find that close to benefit expiration the unemployment exit rate increases much more than the re-employment hazard rate does. From this they conclude that the spike in unemployment-exit rates is to a large extent due to measurement error when using data on UI benefits only. However, Katz and Meyer (1990) show that for UI recipients in the week of

benefit expiration the job finding rate is about 80% higher than before, while such spikes are not present for UI non-recipients. Furthermore, using administrative data, Roed and Zhang (2003) for Norway, Lalive et al. (2006) for Austria, Van Ours and Vodopivec (2006) for Slovenia and Caliendo et al. (2012) for Germany also find evidence for the presence of end-of-benefit spikes. Clearly, the end-of-benefit spike cannot simply be discarded as a statistical artifact. Boone and Van Ours (2012) suggest that end-of-benefit spikes in job finding rates are related to optimizing behavior of unemployed workers who rationally assume that employers will accept delays in the starting date of a new job, especially if these jobs are permanent. This gives some workers an incentive to not immediately start working after they have found a job. Instead they wait until their benefits expire.

[11]The increase in benefits was calculated so that in absence of behavioral effects the expected direct cost for the UI funds would be unchanged.

[12]In Schmieder et al. (2012b), the authors replicate their results using only the threshold at age 42, finding a marginal effect of 0.20, which goes down to 0.15 if nonemployment over 5 years – after the start of the initial spell – is taken into account.

[13]See Ehrenberg and Oaxaca (1976), Burgess and Kingston (1976), Hoelen (1977), Blau and Robins (1986). Classen (1977) finds no relationship between the level of UI benefits and re-employment wages.

[14]Tatsiramos (2009) uses ECHP data to investigate the effect of UI on unemployment duration and subsequent employment stability for eight European countries. He finds that benefit recipients experience longer unemployment spells but UI also has a positive effect on subsequent employment stability. The effect of UI on employment stability is more pronounced in countries with relatively more generous UI systems such as Denmark, Germany, France and Spain when compared to countries such as Greece and Italy in which the UI system is underdeveloped.

[15]Most of the existing empirical evidence, however, suggests that the compositional changes are rather limited. See for example Imbens and Lynch (2006), Abbring, Van den Berg and Van Ours (2001), Van den Berg and Van der Klaauw (2001) who find a small compositional effect. Mueller (2011), however, documents that in recessions the pool of unemployed shifts towards workers with high wages in their previous job.

[16]In a couple of Latin-American countries UI savings accounts have been introduced. A rare example of an empirical study investigating the labor market effects of these accounts is Reyes et al. (2011).

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Table 1: Unemployment rates and employment rates prime age (age 25-54) and older individuals (age 55-64); long term unemployment; 2010

	Men				Women				Long term Unemployment (%)	
	Unemployment rate (%)		Employment rate (%)		Unemployment rate (%)		Employment rate (%)			
	25-54	55-64	25-54	55-64	25-54	55-64	25-54	55-64	Men	Women
Australia	3.7	3.7	87.2	68.6	4.4	2.6	71.9	52.8	20	16
Austria	4.2	2.5	88.7	51.6	3.8	1.6	79.7	39.7	28	22
Belgium	7.2	4.2	85.5	45.6	7.5	5.2	74.4	29.2	50	48
Canada	7.3	7.5	83.9	63.3	6.4	5.6	77.0	53.5	13	11
Czech Republic	5.2	6.5	90.5	58.4	8.0	6.5	73.4	35.5	43	43
Denmark	7.1	6.8	85.9	62.7	5.9	4.6	80.6	52.5	21	17
Estonia	17.6	19.0	75.4	52.2	12.9	14.1	73.9	54.9	48	41
Finland	7.4	7.3	83.9	55.6	6.3	5.8	79.1	56.9	27	19
France	7.1	6.9	87.1	42.1	8.5	6.4	76.7	37.5	42	39
Germany	7.1	8.1	86.5	65.0	6.2	7.3	76.3	50.5	48	46
Greece	9.4	6.2	85.3	56.5	15.5	6.5	61.1	28.9	39	50
Hungary	10.6	8.2	77.9	39.6	10.1	7.3	67.1	30.1	51	50
Iceland	7.0	5.1	86.9	83.9	5.6	3.5	80.6	77.0	23	19
Ireland	15.9	10.5	75.6	58.4	8.5	5.0	66.0	43.0	54	38
Italy	6.6	3.9	83.5	47.7	8.9	3.0	58.7	26.2	47	50
Japan	4.9	6.1	91.4	78.8	4.8	3.3	68.2	52.1	45	25
Korea	3.8	3.4	86.8	75.1	2.9	2.2	60.3	47.1	1	0
Luxembourg	3.0	2.4	92.0	47.7	5.0	2.2	72.6	31.3	32	26
Netherlands	3.6	4.1	90.0	64.8	3.6	3.7	79.3	43.3	28	27
New Zealand	4.4	3.8	87.8	79.6	5.4	2.9	72.8	67.2	9	9
Norway	3.5	1.8	87.1	72.2	2.6	0.9	82.2	65.0	11	8
Poland	7.9	7.5	82.6	45.2	8.7	6.5	71.7	24.2	25	26
Portugal	9.3	10.0	83.9	55.6	12.2	7.6	74.6	43.5	52	53
Slovak Republic	12.4	9.6	81.4	54.1	13.3	11.0	70.1	28.8	58	61
Slovenia	7.1	4.2	85.2	45.5	6.8	3.6	82.1	24.5	45	41
Spain	18.1	14.3	75.7	54.7	19.2	13.8	63.2	33.2	45	41
Sweden	6.0	6.2	88.0	74.3	6.3	4.4	82.0	66.8	18	15
Switzerland	3.4	3.7	92.4	77.9	4.7	3.5	79.4	58.8	28	40
Turkey	10.1	7.5	89.5	46.1	11.4	1.5	30.1	17.1	25	37
United Kingdom	6.7	6.3	85.3	64.9	5.4	3.0	74.4	48.9	37	26
United States	9.3	8.0	81.0	64.4	7.8	6.2	69.3	56.4	30	28

Employment rate = employment as a share of the population;
Unemployment rate = unemployment as a share of the labor force (= employment + unemployment);
Long-term unemployment as percentage of total unemployment.

Source: OECD Employment Outlook, 2011

Table 2: Cross-country differences in UI benefit rules

	Qualifying Conditions (Employment and/or Contributions)	Waiting period (days)	Payment Rate (%)	Earnings Base	Declining Profile	Maximum duration (months, weeks, days)	PBD depends on: Insurance period	Age
Australia	None	7	Flat	A$417.70-601.30		No limit		x
Austria	28 weeks in 1 year	0	55	Net earnings		20 to 52 weeks	x	x
Belgium	Depending on age: 312- 624 days in 18-36 months	0	60	Last monthly gross earnings	x	No limit		
Canada	420 to 700 hrs in 1 year	14	55	Last 26 weeks avg.		14 to 45 weeks	x	
Czech Republic	12 months in 3 years	0	65	Last 3 months net monthly avg.	x	up to 5 months		x
Denmark	52 weeks in 3 years and 12 months membership fee	0	90	Last 12 weeks gross avg. less 8% ssc.		24 months		
Estonia	12 months in last 36 months	7	50	Last 12 months avg.	x	180 to 360 days	x	
Finland	43 weeks in 28 months and 10 months membership fee	7	55	Daily wage-basic benefit		500 days		
France	4 months in 28 months	7	57-75	Last 12 months avg.		36 months	x	x
Germany	12 months employment and 12 months in 2 years contributions	0	60-67	Net earnings		6 to 24 months	x	x
Greece	125 days in 14 months or 200 days in 2 years	6	Flat	-		5 to 12 months	x	x
Hungary	1 year in 4 years	0	60	Last year gross avg.	x	270 days	x	
Iceland	10 weeks in 12 months	0	70	Last 6 months gross avg.		3 years		
Ireland	104 weeks with 39 weeks in 1 year	3	Flat	-		9-12 months	x	
Italy	52 weeks in 2 years	7	60	Last 3 months daily avg.	x	6 to 12 months	x	x
Japan	6 months in 1 year	7	50 to 80	Last 6 months daily gross avg.		90 to 330 days	x	x
Korea	6 months in 18 months	7	50	Last 3 months gross daily avg.		90 to 240 days	x	x
Luxembourg	26 weeks in 12 months	0	80	Last 3 months avg. gross earnings		Up to 365 days in 2 years		x
Netherlands	26 in 36 weeks plus 52 days in 4 of 5 years	0	75	Last 12 months gross avg.	x	38 months	x	
New Zealand	None	7-14	Flat	NZ$194.2-278.04 (net a week)		No limit		
Norway	Earnings in previous year 1.5 times a base amount	3	0.24	Annual Income per day		52 to 104 weeks	x	
Poland	12 months in 18 months and earnings > min. wage	0	Flat	573.60 Zlotys	x	6 to 18 months		
Portugal	450 days in 2 years	0	65	Last year gross avg.		24 to 72 months	x	x
Slovak Republic	3 years in 4 years	0	50	Last 3 years gross avg.		6 months		
Slovenia	12 months in 18 months	0	70	Last 12 months gross avg.	x	3 to 12 months	x	
Spain	360 days in 6 years	0	70	Last 6 months gross avg.	x	120 to 720 days	x	
Sweden	6 months in last year and 12 months membership fee	5	80	Gross previous Income	x	300 to 450 days		
Switzerland	12 months in 2 years	5	80	Insured earnings	x	260 to 520 days	x	x
Turkey	600 days in 3 years and 120 days before unempl.	0	50	Last 4 months avg. daily wage	x	100 to 300 days	x	
United Kingdom	12 months in 2 years	3	Flat	65.45 ppw		26 weeks		
United States	20 weeks plus minimum earnings	7	53	Highest quarter of earnings		Up to 26 weeks		

Note: The qualifying conditions refer to employment and/or contribution to the UI system. Payment rate in percentage of earnings base; Sources: OECD and "Social Security Programs Throughout the World" (2010), U.S. Social Security Administration.

Table 3: Overview of recent empirical studies of the effects of UI on unemployment duration and post-unemployment outcomes

a. Unemployment duration	Country	Period	Sample size	Treated Population	Identification – Treatment	Effect of PBD [a]	Benefit elasticity [b]
1. Card and Levine (2000)	U.S. (New Jersey)	1995-1997	56,262	Age 18-65	13 weeks PBD ↑ Calendar time variation	0.08	
2. Carling et al. (2001)	Sweden	1994-1996	18,429	Age below 55	Income dependent cut in RR from 80% to 75%		1.6
3. Roed and Zhang (2003)	Norway	1990s	100,499	Age below 55	Exogenous variation in RR		Men: 0.95 Women: 0.35
4. Van Ours van Vodopivec (2006)	Slovenia	1997-1999	20,049	Age 19-43	Experience related 3-9 months PBD ↓	Men: 0.18 [c] Women: 0.58 [c]	
5. Lalive et al. (2006)	Austria	1987-1991	225,821	Age 35-54	Age related extension of PBD 9 (22) weeks ↑ & RR ↑	0.04 – 0.10	0.4
6. Card et al. (2007)	Austria	1981-2001	650,922	Age 20-50	Experience related extension of PBD 20 to 30 weeks	0.10-0.18 [d]	
7. Lalive (2008)	Austria	1986-1998	27,555	Age 46-53	Age related extension PBD from 30 to 209 weeks	Men: 0.08 Women: 0.42	
8. Uusitalo and Verho (2010)	Finland	2002-2004	17,783	Age below 55	Experience related increase RR with 15% [e]		0.8
9. Schmieder et al. (2012)	Germany	1987-1999	329,680	Age 40-49	Age related extension of PBD – various durations	0.10-0.13	

b. Post-unemployment outcomes	Country	Period	Sample size	Treated Population	Extension of PBD based on	Effect of PBD extension on Earnings	Job stability
1. Card et al. (2007)	Austria	1981-2001	650,922	Age 20-50	Experience; 20 to 30 months	No	No
2. Centeno and Novo (2007)	Portugal	1998-2004	9,675	Age 30-39	Age; 15 to 18 months	Small	–
3. Van Ours and Vodopivec (2008)	Slovenia	1997-1999	17,701 [f]	Age 19-43	Experience; various	No	No
4. Caliendo et al. (2012)	Germany	2001-2006	7,216	Men 44-46 Women 43.5-46.5	Age; 12 to 18 months	No [g]	No [g]

[a] Marginal effect: change in actual unemployment duration / change in potential benefit duration.
[b] Benefit elasticity = percentage increase in unemployment duration in response to a one percentage-point increase in benefit replacement rate; absolute values.
[c] Based on simulations for a median worker 30-years old in good health, with vocational school education, 10-15 years of work experience and no dependent family members who was confronted with a drop in PBD from 12 to 6 months.
[d] First 20 weeks; calculated on the basis of the reported increase in job finding rate of 5%-9% as a consequence of an increase in PBD of 50%.
[e] The experience related increase in the RR was over the first 150 days of unemployment in compensation for severance pay being abolished.
[f] For the wage estimates 8,393 observations are used.
[g] Unemployed who obtain jobs close and after the time when benefits are exhausted are significantly more likely to exit subsequent employment and receive lower wages compared to their counterparts with extended benefit duration.