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Unemployment Insurance in Theory and Practice*

by
Bertil Holmlund§

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Abstract

A hallmark of modern labor economics is the close interplay between the development of theory, data sources and econometric testing. The evolution of the economic analysis of unemployment insurance provides a good illustration. New theoretical approaches, in particular job-search theory, have inspired a large amount of empirical research, some of it methodologically innovative and most of it highly relevant for economic policy. The paper presents a broad survey and an assessment of the economic analysis of unemployment insurance as it has evolved since the 1970s.

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§ Department of Economics, Uppsala University, Box 513, SE-751 20 Uppsala, Sweden
Fax: +46 471 1478: E-mail: Bertil.Holmlund@nek.uu.se

I. Introduction

Public unemployment insurance (UI) is a social institution that emerged in a number of European countries during the first couple of decades of this century. Before public policies became established in this area, UI had often been provided by the trade unions. The first union scheme was established already in 1832 by the foundry men's union in Britain. In Sweden, the first UI fund was created by the typographers' union in 1892 and by the turn of the century there were ten (out of 32) unions that run some kind of UI schemes for their unemployed members.

The emergence of *public* UI seems to have originated in the Belgian town Gent, where public support to union-administered insurance funds were introduced in 1901. An institution under which the government offers subsidies to union-affiliated UI funds with voluntary membership has become known as a 'Gent-system'. Several European countries adopted Gent systems during the period prior to World War I, including France, Germany, Britain and the Nordic countries except Sweden. The Gent system turned out to be a short lived institution in most countries, however. Compulsory UI was introduced in Britain in 1911, and a number of countries adopted compulsory UI schemes during or soon after World War I.

The political trends in the following decades were largely in favor of compulsory systems. The Gent system survived in the Nordic countries except Norway, where compulsory UI was introduced in 1938. By the 1990s, the Gent system is only practiced in the remaining four Nordic countries, namely Denmark, Finland, Sweden and Iceland. Belgium has an intermediate system with compulsory membership but union involvement in the administration of the scheme. The remaining voluntary systems are subsidized by the governments to such an extent that they in many respects are indistinguishable from the compulsory systems prevailing in most of the advanced countries.

Traditional Keynesian macroeconomics, as it was taught and practiced in the postwar period, had little to say on UI, except perhaps that it may have desirable properties as an automatic stabilizer when the economy slides into a recession. There were, however, a number of pre-Keynesian economists in the inter-war period that had many things to say about UI that ring remarkably familiar to a reader in the 1990s. The British economists A.C. Pigou, John Hicks, Edwin Cannan, Henry Clay, as well as the Swedes Eli Hecksher and Gustav Cassel, emphasized the kind of incentive effects of UI that still are the focus of contemporary discussions of UI policies. They suggested that UI may strengthen the unions' bargaining position and thereby raise wage pressure; moreover, they argued that UI benefits are likely to affect job-search behavior and unemployment duration; they also noticed that UI can affect the nature of contracts between firms and workers; finally, they argued that UI may have effects on the allocation of labor across industries if the system entails net subsidies to some industries and net taxes on others.[1]

From the early 1970s and onwards, the analysis of UI has attracted considerable attention within the economics profession. There are several plausible explanations of this development. One is related to innovations within economics as a social science, in particular the emergence of job search theory as a major framework for labor market analysis. This theoretical development has inspired a large amount of empirical research,

[1] See Hicks (1932), Pigou (1933), Cassel (1902), Heckscher (1928), and the review in Casson (1983).

some of it methodologically innovative and most of it relevant for economic policy. Indeed, a hallmark of modern labor economics is the close interplay between the development of theory, data sources and econometric testing.

The design of UI has implications for the macroeconomics of unemployment. The research devoted to UI in the past couple of decades is closely intertwined with the retreat of traditional Keynesian macroeconomics and the development of theories of the natural (or equilibrium) rate of unemployment. The natural rate framework was well suited to incorporate unemployment compensation as a policy instrument. In almost all natural rate models, there is a positive relationship between the (equilibrium) unemployment rate and the "generosity" of the UI system. In fact, in many simple models, the wage replacement rate provided by UI is often the *only* explicit exogenous variable that determines unemployment; see, for example, the survey of natural-rate models by Johnson and Layard (1986) in the *Handbook of Labor Economics*.

The stubbornly high European unemployment in the 1980s has given some prominence to the idea that the equilibrium unemployment rate has increased along with the actual rate, possibly as a result of a more generous benefit system. Many governments have taken this possibility seriously and attempted reforms of UI to make it less generous. Such policies have also been motivated by the need to offset the rise in budget deficits that has been associated with the rise in unemployment. Whatever the causes of high and persistent unemployment are, the rise itself has brought UI to the fore in policy discussions about unemployment.

The present paper offers an exposition of the development of the economic analysis of UI. The intention is not to provide an exhaustive survey, however; by and large, I take a bird’s eye view of the subject and focus on the common features of models and empirical investigations. Some issues, in particular concerning equilibrium unemployment, welfare economics and political economy, are dealt with in somewhat more detail. I take the existence of a *public* UI system as given and do not scrutinize the rationale for state intervention in this area.

The paper is concerned with what economic theory and empirical work have to say on UI. Which are the key mechanisms whereby UI affects the labor market? Are the theoretical results robust across alternative models? Are the theoretical results supported by the empirical studies? What normative conclusions, if any, can be deduced from the economic analysis of UI? I also briefly discuss some political-economy aspects of UI.

II. Job Search and Unemployment Insurance

The evolution of job-search theory has had a profound impact on labor market analysis. The theory provided economists with an analytical tool for exploring rational individual behavior during unemployment. The only pre-existing alternative was the standard model of labor-leisure choice, a model not well suited to deal with job search under imperfect information. The theoretical contributions have greatly influenced empirical work on unemployment in general, and microeconometric work on unemployment duration in particular.

Job-Search Theory

The first rigorous and detailed analysis of the impact of UI benefits on individual job-search behavior was provided by Mortensen (1977); see also Mortensen (1990) and van den Berg (1990). Mortensen derived several strong results using a model of sequential search where he incorporated some institutional features of labor markets, such as a fixed duration of benefit payments and an eligibility requirement that a certain amount of work must precede insured unemployment. Mortensen also allowed for (exogenous) layoff risks associated with accepted jobs as well as endogenous choice of search effort by the unemployed worker, in addition to the usual choice of reservation wage. The wage-offer distribution was taken as stationary and known by the unemployed searcher.

The most important implications derived were the following: First, the worker's reservation wage declines as he approaches the date at which benefits expire; hence the exit rate increases over the spell of (insured) unemployment. Second, an increase in the benefit level makes it more attractive for presently non-eligible workers to accept jobs and thereby become qualified for benefits in the future; the result is thus that the exit rate from unemployment to employment *increases* for workers who are not qualified for benefits, a response known as the "entitlement effect". Third, a rise in the benefit level will cause a newly unemployed worker to *increase* his reservation wage, but induce an insured worker close to benefit exhaustion to *reduce* his reservation wage. The exit rate thus decreases for newly unemployed workers but increases for workers who have come close to benefit exhaustion. The last property follows from the fact that a higher benefit level increases both the value of continued search as unemployed and the value of accepting an offer. The immediate value of higher benefits is small for workers close to benefit exhaustion, as they are almost in the same situation as workers not qualified for UI.

Mortensen's analysis brought out some of the complexities of predicting behavioral responses to changes in UI. The rather obvious adverse-incentive effects on job acceptance decisions among those who just have become unemployed are not valid for *all* unemployed; for some workers, in particular those who are not qualified (or have ceased to be qualified), higher benefits will make work *more* attractive relative to unemployment. The effect of higher benefits on the duration of unemployment is therefore, in general, ambiguous.

Mortensen's analysis illustrates how the addition of institutional realism to the search model can generate important new result, some not immediately obvious. But the search models offend advocates of realism in other respects. One critical factor is the assumption that unemployment benefits are essentially a subsidy to leisure, possibly subject to the restriction that the maximum duration of benefit payments is fixed. Workers who reject job offers continue to live on the dole; there is thus no work-test whereby benefits can be withdrawn if workers reject job offers. It is clear that incentive effects will be unimportant if the work test is effective; however, a complete enforcement would be prohibitively costly. The mere fact that the work test is ignored in the formal analysis does not make the theory irrelevant.

Job-search theory has been developed in several directions in order to shed light on other effects of UI. For example, there has been some work on the linkages between job search and labor supply. The fact that UI benefits typically are tied to previous earnings implies that the employed worker can influence his future benefit level by his choice of work hours. Higher UI benefits may therefore increase labor supply among employed workers

(Yaniv 1982). A rise in UI benefits will probably also encourage labor force participation since it increases the relative rewards from participation compared to non-participation (Hamermesh 1980). It is conceivable that this participation effect may increase the number of effective job searchers in the labor market and hence in part offset the usual disincentive effects of UI.

Empirical Work

The development of job-search theory has bred an empirical literature that by the mid-1990s has become voluminous. This research has exploited new types of data with information on the length of individual workers' unemployment spells. Search theory has provided a very useful theoretical framework for these empirical studies. Although most of the empirical studies have been of the reduced-form rather than the structural variety, it is clear that the theory has been helpful, although perhaps not crucial, as a guide for selecting variables to be included and how the results should be interpreted. The evolution of job-search theory and its subsequent empirical applications is a good example of the close interaction between theory and empirical work that has characterized most of modern labor economics.[2]

To what extent, then, have the key predictions of the theory been supported by the empirical studies? Lancaster and Nickell (1980) reviewed some of the early empirical work and concluded that the theory was well supported: "We would regard the size of the effect of benefits (on unemployment duration) as being now a rather firmly established parameter". The review in Layard *et al* (1991) concluded (p 255) that the "basic result is that the elasticity of expected duration with respect to benefits is generally in the range 0.2 - 0.9 depending on the state of the labour market and the country concerned…."

The conclusion by Lancaster and Nickell (1980) was surely premature. The effect of benefits on unemployment duration is far from a firmly established parameter that is comparable in robustness to, say, estimates of the returns to schooling. And not all economists would subscribe to the characterization in Layard *et al*. Some of the most careful (and most well-known) studies do find significant effects on unemployment duration from higher benefits (see for example Narendranathan *et al* 1985), but there are also a number of studies which have been unable to detect significant effects (see Pedersen and Westergård Nielsen 1993 for a survey). In fact, there is as we have seen no strong theoretical reason to expect unambiguous results if the entitlement effect is non-trivial.

The impact of fixed potential duration of benefits has been much less investigated than the effects of benefit levels. The evidence here is largely in favor of the theoretical prediction: exit rates from unemployment seem to increase as unemployed insured workers approach the time when benefits are due to expire. Evidence from the United States is reported by Moffitt (1985), Meyer (1990) and Katz and Meyer (1990), evidence for Canada has been presented by Ham and Rea (1987), and Swedish evidence is given in Carling *et al* (1996). Although these results are good news for search theory, there is scope for alternative (implicit-contract) interpretations according to which employers recall laid off workers just before their benefits run out. We will return to the implications of UI in contracting models.

[2] The book by Devine and Kiefer (1991) contains a detailed survey of the empirical work of the 1970s and the 1980s. See also Atkinson and Micklewright (1991).

One intriguing result in Mortensen's theory is that workers close to benefit exhaustion will respond by *lowering* the reservation wage when benefits are increased. This prediction has typically been ignored in empirical research. It has been common to include measures of benefits or replacement rates without allowing for a different effect between those who have just entered the unemployment pool and those who are close to benefit exhaustion. If the theory is correct, the estimates of benefit effects are likely to be sensitive to the duration composition of the samples at hand. Katz and Meyer (1990) report unsuccessful attempts to test for this effect on escape rates.

The effect of UI on transitions to employment is most often thought of as working through the unemployed worker's reservation wage, possibly also through search effort. There is not much direct evidence on the importance of these potential mechanisms, however. Feldstein and Poterba (1984) provided some direct evidence on the responsiveness of the reservation wage to benefits by using information on reported reservation wages along with information on benefits and found a significantly positive effect. Qualitatively similar results are reported by Harkman *et al* (1997) in a study on Swedish data. The few available results concerning the impact of benefits on search effort do not give conclusive results. For example, Jones (1989) reports that higher benefits increase search effort among benefit recipients, whereas Harkman *et al* (1997) are unable to find any effect from benefits.

A fundamental problem in many of the microeconometric studies in this field is the lack of truly *exogenous* benefit variation across unemployed individuals. Benefits are typically tied to previous earnings, which makes it difficult to disentangle the impact of benefits from the factors that affect earnings. In the United States, researchers have been able to exploit exogenous *state-level* variation in benefits, a procedure that has not been available in other applications. In Sweden -- which has a voluntary UI system -- most studies on micro data have compared UI recipients with non-recipients, something that may be hazardous because of self-selection into UI coverage (although it is not obvious which direction the bias will take).

Studies that make use of information on policy *changes* as natural experiments are rare in this field. Björklund (1978) used time series on outflow rates from unemployment to examine the effects of extensions of the Swedish UI system and found only very weak effects. A recent study by Jones (1996) investigates the effect of changes in the Canadian UI system that took effect in 1993. This study finds, surprisingly, that the cut in wage replacement rates (from 60 to 57 percent) was associated with *longer* spells of unemployment. Harkman *et al* (1997) reports results from a similar research strategy applied to Swedish data. The study offers modest, albeit imprecisely estimated, support for the hypothesis that the cut in replacement rates from 90 to 80 percent in 1993 increased transition rates from unemployment.

In the United States, a number of true social experiments of relevance for UI policies took place in the 1980s (see Meyer 1995 for a summary and an evaluation). Individuals were randomly assigned to treatment groups and control groups. The treatment groups were subject to certain programs and incentives, such as cash bonus payments for finding jobs quickly and keeping them for a given period of time. A consistent finding from these experiments was that the bonus treatments reduced the time spent on UI rolls. Meyer

(1997) concludes that "the bonus experiments should convince any hardened skeptics that monetary incentives have a substantial effect on job finding."

In conclusion, there is little doubt that the microeconomic analysis of unemployment has been substantially enriched by the insights of job-search theory. It is hard to imagine that the same amount of empirical work would have been produced if the theory had not been developed. It would be wrong, however, to characterize the empirical application of search theory as an overwhelming success story. There is a fair amount of support for the theory, but the 'benefit effect' is hardly a firmly established parameter. There are implications of the theory that rarely have been tested, such as the role of the entitlement effect among workers close to benefit exhaustion. And there are potentially important real-world features of job search that have been largely ignored in theory and empirical work. The role of borrowing and savings is a case in point in this regard; the standard model portrays job search in a setting where workers are either risk-neutral or unable to use the credit market to smooth consumption.

From a policy perspective, however, the most severe limitation of the microeconometric studies on unemployment duration is their partial equilibrium nature. This is, of course, not a criticism of the theory as such, since microeconomics naturally precedes macroeconomics. But we need to consider whether the partial-equilibrium results necessarily carry over to the general equilibrium. This is an issue to which we will return.

III. Contracts, Unions and Unemployment Insurance

There is evidence, initially pertaining to the US labor market, that a substantial fraction of unemployed workers are *rehired* by their most recent employer. Feldstein (1976) was one of the first who pointed to this feature of the labor market, estimating that as much as 75 percent of all layoffs in US manufacturing was "temporary" in the sense that the workers were rehired. For this case, job-search theory is not the most useful approach. UI still matters, but through other routes than job search.

Feldstein (1976) developed the basic implicit-contract model to examine the implications of UI with respect to the level of benefits and the financing of benefits. The model features a firm with a pool of 'attached' workers facing uncertain product demand. The firm and workers have to agree on a contract that specifies employment, wages and perhaps work hours for every possible realization of demand. For example, the contract specifies wages and employment in booms as well as slumps. The number of laid-off workers in each state of demand is simply given by the difference between the number of attached and employed workers. The model is particularly useful for investigating the role of *experience rating* in UI. In broad conformity with the system practiced in the United States, Feldstein assumed that firms that lay off workers have to finance part of the UI benefits that their workers are eligible to. The model implies that a rise in the UI subsidy -- a decline in experience rating -- causes a reduction in employment.

The general validity of Feldstein's result concerning experience rating has been questioned. For example, Burdett and Wright (1989) have relaxed the assumption of a fixed pool of workers attached to the firm and allowed the firm to choose the number of workers. This modification has important implications. It turns out that higher experience rating does

reduce layoff rates but also the number of attached workers. The intuitive explanation is that higher experience rating increases labor costs, which is bound to reduce the number of workers that the firm is willing to hire. The effect on average employment is ambiguous in general, and may plausibly be negative. Finally, it can be noted that simulations undertaken by Mortensen (1994), using the Mortensen and Pissarides (1994) equilibrium model of job creation and job destruction, suggest that full experience rating would produce a small *increase* in unemployment, a result driven by the fact that experience rating effectively discourages *hirings* by making layoffs more costly to firms. The initial claim that experience rating reduces unemployment has thus not survived later elaborations of the theory.

The early empirical work on temporary layoffs seemed to suggest a strong case for the idea that benefits were an important explanation of the prevalence of temporary layoffs in the United States. Feldstein (1978) used micro data and explained the probability of being on temporary layoff by, *inter alia*, the UI replacement rate. His results indicated strong effects: UI benefits were estimated to explain 50 percent of all temporary layoffs in the US. These results were, however, questioned by Topel (1983), who argued that one has to distinguish between whether benefits are subject to experience rating or not; it is *subsidized* UI payments that matter for layoff decisions. Topel measured the extent of UI subsidization across different states in the United States and found that subsidized UI, i.e., incomplete experience rating, accounted for around 30 percent of all spells of temporary-layoff unemployment. Nonsubsidized benefits were found to have a negligible impact on firms' layoff behavior.

The implicit-contract models considered by Feldstein and others have much in common with standard models of utility-maximizing trade unions (see Oswald 1985 and Pencavel 1991 for surveys). A popular model considers a trade union as attempting to maximize its members' expected utility, typically subject to the restriction that profit-maximizing firms determine employment. One of the implications is that the union's preferred wage is increasing in the benefit level, as a higher benefit level reduces the cost of unemployment to the members. This result for the monopoly-union case carries over to models with bargaining over wages.

Again, it is important to consider whether the implications from a partial-equilibrium analysis remain at least qualitatively intact when we turn to the general equilibrium. Some minor and plausible extensions of Feldstein's contract model have reversed a key policy conclusion concerning the financing of UI benefits. Are the implications from union models concerning benefits also fragile to minor changes in underlying assumptions? We discuss the issue by using two standard models of equilibrium unemployment, namely a union-bargaining model and a search-matching model.

IV. Equilibrium Unemployment and Unemployment Insurance

Union-Bargaining Models

A popular model of unemployment features an economy with decentralized wage negotiations between symmetric firms and unions, subject to the "right-to-manage" constraint that employment is determined by firms (see for example Nickell 1990 for details). The negotiated wage in the single union-firm bargain will be set as a markup on a measure of "outside" labor market opportunities, captured by the general wage, the

unemployment rate (a proxy for labor market tightness) and the benefit level. A higher benefit level thus increases the negotiated wage at the firm (or sectoral) level. When all union-firm pairs raise their negotiated wages, unemployment is bound to increase. Suppose that the benefit level is adjusted to the general wage through a fixed replacement rate (r) and that the worker's utility function takes the form $U = (1/s)w^s$, with $s \leq 1$. One can then derive an expression for the symmetric-equilibrium unemployment rate (u) that takes the form

$$u = \frac{ks}{1-r^s} \qquad (1)$$

k is a measure of workers' bargaining power, in a broad sense. With fixed capital, perfect competition in the product market and a constant labor share, k is constant and given as $k = b(1-g)/[(1-b)g+b]$, where g is the labor share and b is the measure of the union's power in the (Nash) bargain ($0 < b \leq 1$).

The unemployment rate is very sensitive to changes in the replacement rate in this model. Moreover, each percentage point increase in the replacement rate has a bigger effect on unemployment the higher the initial unemployment rate is. When workers are risk neutral (s=1) we have $d\ln u / d\ln(1-r) = -1$. If one takes this model seriously enough to simulate it, it generates very large unemployment responses to changes in replacement rates. Suppose that workers have a degree of relative risk aversion of 2 (s = -1) and choose a value of k so as to generate an unemployment rate of 8 percent when the replacement rate is 50 percent. A rise in the replacement rate from 50 to 60 percent generates an increase in the unemployment rate by almost 4 percentage points with these assumptions. A rise from 50 to 80 percent implies a rise in unemployment from 8 to 32 percent. The magnitudes of these effects seem implausibly large considering the fact that actual replacement rates do vary substantially between countries without huge differences in unemployment rates.

Equilibrium Search Models

A search-matching model of the type developed in Pissarides (1990) is usually cast in terms of risk-neutral workers, but it is straightforward to reformulate the model with risk-averse workers (so long as there is no credit market that facilitates consumption smoothing). In this model there is a constant-returns-to-scale matching function that summarizes the interactions between unemployed job searchers and vacancies. Workers are either employed or unemployed and care about the expected present value of lifetime utility. Vacancies are opened so long as they yield positive expected profits. Firms' recruitment behavior gives a relationship between the real wage cost and labor market tightness, defined as the ratio between the number of vacancies and the number of unemployed. Wages are set in decentralized bargains between workers and firms, where higher labor market tightness increases the negotiated wage. By using the zero-profit condition for firms together with the wage equation one can obtain an equation that determines the equilibrium value of labor market tightness (q). This equation takes the form

$$\frac{sb}{1-b}\left[r + f + a(q)\right]\frac{a}{q(q)} + r^s - 1 = 0 \qquad s \leq 1 \qquad (2)$$

It is assumed that UI benefits are financed by a payroll tax and that hiring costs are proportional to after-tax wage costs, with *a* being the factor of proportionality. r is the replacement rate. The two assumptions that hiring costs are indexed to wage costs and that benefits are indexed to (consumer) wages are sufficient to make equilibrium tightness independent of the payroll-tax rate. The concavity of the utility function is measured by s, b is the measure of the worker's bargaining power, *r* is the discount rate (taken as identical for workers and firms), f the exogenous separation rate, $a(.)$ the job-finding rate, and $q(.)$ the rate at which vacancies are filled. The rates at which workers find jobs and vacancies are filled are related to labor market tightness through the matching function, which implies $a'(q) > 0$ and $q'(q) < 0$.

The steady-state unemployment rate consistent with flow equilibrium is given as $u = f / (f + a(q))$, which together with (2) determine labor market tightness and unemployment for alternative values of the replacement rate. The required tax rate is obtained from the government's budget restriction once unemployment is determined. Table 1 sets out some simulation results from this model. The model has been calibrated so as to generate 8 percent unemployment with risk-neutral workers and a replacement rate of 50 percent. The effects of varying the replacement rate are given in the first column for the risk-neutral case; the remaining columns show simulated unemployment rates when workers are risk-averse. All parameters except s are kept constant across the columns.

The results from this exercise suggest a marked non-linear relationship between unemployment and the replacement rate, albeit less strong than in the bargaining model previously discussed. A rise in the replacement rate from 50 to 60 percent would by these examples increase unemployment by a little more than 1 percentage point. A rise from 80 to 90 percent would increase unemployment by 7-8 percentage points.

Table 1. Equilibrium unemployment (%) and replacement rates (%) in the search-matching model.

	σ = 1	σ = -0.1	σ = -1
Replacement rate			
20	6.1	3.8	2.3
30	6.6	4.6	3.2
40	7.2	5.5	4.2
50	8.0	6.5	5.3
60	9.1	7.8	6.8
70	10.8	9.7	8.8
80	13.6	12.7	12.0
90	20.2	19.6	19.1

Notes: The model is calibrated so as to generate an unemployment rate of 8 percent when the annual separation rate is 20 percent, s = 1 and r = 0.5. The matching function is specified as $H = 0.01295\ V^{0.6}\ U^{0.4}$, where *V* is the number of vacancies and *U* is the number of unemployed. The annual discount rate is set to 5 percent and the measure of workers' bargaining power (b) is set to 0.5. The hiring cost function is $k = aw(1+t)$, with a = 1.5.

Mortensen (1996) reports simulation results of UI policies in a parameterized version of the Mortensen and Pissarides (1994) model, which is an extended version of the Pissarides (1990) matching model to allow for endogenous job creation and job destruction. The

effects of higher UI benefits are very large in this model. A rise in the replacement rate from 30 to 40 percent would increase unemployment by at least 4 percentage points, and possibly by more than 10 percentage points, according to these simulations. The most likely reason why benefit hikes apparently have much stronger impact in Mortensen's experiments than in those reported in Table 1 is because Mortensen imputes a non-trivial value to leisure. This means that the "total" replacement rate, including the value of leisure, is much higher than the rate provided by UI. If the value of leisure is set to 40 percent of labor productivity (roughly Mortensen's assumption) in our simulations, we get results very similar to his.

Unfortunately, economists know virtually nothing about a reasonable estimate of the leisure value of unemployment. A liberal interpretation of some empirical evidence on unemployment and psychological well-being suggests that the value may well be *negative* (see for example Blanchflower and Oswald 1997). Policy simulations that hinge crucially on assumptions concerning unobservables should therefore be used with more than the usual caution as predictions of what is likely to happen if a particular policy is implemented.

Partial and General Equilibrium

Do the estimates from micro data give reliable answers to general-equilibrium questions about the effects of UI on unemployment? In general, the answer is no. There are a number of potential general-equilibrium effects that are ignored in the microeconometric studies of unemployed individuals' behavior. There can therefore be no presumption that the general-equilibrium effect is stronger -- or weaker -- than the estimated partial-equilibrium effect. The direction of the general-equilibrium effect is sensitive to the precise details of the general-equilibrium model.

Consider a search-matching model of the type sketched above. In some versions of this model there are non-trivial job search and job acceptance decisions taken by individual unemployed workers. A higher benefit level would then reduce the outflow from unemployment at a given level of labor market tightness. This is the effect captured by the partial-equilibrium studies of unemployment duration. There will also be an effect working through wage setting, however, which in general will reinforce the search effect by reducing labor market tightness. Using this model, then, the presumption is that the general-equilibrium effect of higher benefits is stronger than the partial-equilibrium effect. These conclusions may be reversed when wages are set by firms, a theme that has been developed by Albrecht and Axell (1984) and Axell and Lang (1990). The driving force behind these results is that the equilibrium wage distribution is affected by benefit hikes in a way that encourages rather than discourages job acceptance among the unemployed. Low-wage firms may find it more difficult to recruit workers and therefore increase their wage offers. When the frequency of low-wage firms declines, it takes a shorter time for job-seekers to find acceptable offers. If this effect is sufficiently strong, the final outcome may conceivably be that unemployment actually *falls* when benefits are increased. The general insight offered by these models is that the effects on the wage-offer distribution needs to taken into account in general-equilibrium evaluations of UI reforms.

We may also note that surprising results may appear even in perfectly standard union-bargaining models once the possibility of multiple equilibria is entertained. Manning (1992) considers a model with increasing returns to scale in production. Increasing returns

yield an aggregate price-setting schedule that is *positively* sloped in the real wage and employment space. There will in general be two equilibria in this model (at least with a Cobb-Douglas technology), one with low employment and one with high employment. A benefit increase will produce the usual result, i.e., higher unemployment, if the economy is located in the high-employment equilibrium. If however the low-employment equilibrium obtains, the outcome of a rise in benefits (or other changes that increase wage pressure) would be *lower* unemployment. Manning's empirical work on British data finds some, albeit not overwhelming, support for this possibility.

One may ask, then, if the bottom line of this discussion is that we are bound to be lost in conflicting theoretical predictions. My own judgment is that the case for the conventional wisdom is reasonably strong: unemployment will probably increase if the benefit system is made more generous. Wage bargaining seems pervasive in most European labor markets. Firms are not typically free to set wages at their own discretion, so models of the bargaining variety seem more relevant for most of the countries than models of wage-setting firms. There is however considerable uncertainty regarding the *magnitude* of the effects.

Many equilibrium models of unemployment portray the UI system in an extremely simple way. For example, unemployment compensation is typically assumed to be available to all unemployed; benefits are paid for an infinite duration; there is no work test, i.e., no penalty to the refusal of job offers; there is no waiting period before benefits are paid, etc. These and other features of existing models are at variance with the institutional details of real-world UI systems, a point that has been forcefully made by Atkinson and Micklewright (1991). For example, most existing systems have time-limited UI benefits, a work test that involves some penalty to job rejections, and a waiting period before benefits are received. Unemployment compensation in the real world is clearly more than just a pure subsidy to leisure.

Does this apparent mismatch between models and reality mean that the stylized models are useless? This conclusion would be like throwing the baby out with the bath-water. All models are by necessity simplifications. Existing UI systems have a rich and complicated structure which it would be impossible to capture in detail in a manageable analytical model. The problem, as usual, is to strike the right balance between descriptive realism and analytical tractability. Although more detailed studies of existing UI features are needed, it seems difficult to argue that existing models have made incredible assumptions concerning UI. For example, a work test is built into most UI systems, but few would argue that it is effective enough to leave no room for individual search and acceptance decisions. UI benefits are often paid for a limited time period, but the assumption of infinite benefit duration may be innocuous for some purposes. The proof of the pudding lies in the eating, i.e., in the empirical performance of the models. The fact that some models seem to generate implausibly large unemployment responses to benefit changes may reflect weaknesses of the models that are unrelated to the treatment of unemployment compensation.

Empirical Work

How do the numbers from simulations of equilibrium models compare to available empirical results? The microeconometric studies of unemployment duration are of only limited use here, as they do not capture general-equilibrium effects. More relevant are

studies that compare *economies* with different benefit regimes, and possibly also studies that exploit time series in order to examine how unemployment in a single economy responds to changes in UI policies.

The generosity of UI benefits seems to have increased gradually since the 1960s in most OECD countries. OECD has calculated a summary measure of benefit generosity that takes into account benefit levels as well as the length of benefit periods.[3] Benefit generosity has according to these calculations doubled between the mid-1960s and the mid-1990s (see Table 2). The summary measure is a somewhat crude indicator, but the basic message is clear: unemployment benefits have become substantially more generous in most OECD-countries over the past three decades. The rising trend in benefits relative to earnings must be considered as a prime suspect in any serious attempt to explain the trend rise in unemployment in most OECD countries.

Table 2. The evolution of the summary measure of gross replacement rates (%) in OECD.

	1961	1967	1973	1979	1985	1991	1995
OECD Europe	14	16	19	25	30	32	34
Total OECD	16	16	19	24	28	29	31

Source: Martin (1996).

There have been a few attempts to use cross-country data to explain unemployment differences by unemployment benefits and other variables, the work by Layard *et al* (1991) being the best known. In a simple cross-country regression, explaining average unemployment for the period 1983-88 in 20 OECD countries, they find that the replacement rate enters with a significant coefficient of 0.17. Layard *et al* also find a significant positive effect from the maximum duration of benefit payments. Scarpetta (1996) reports results from a more ambitious study that makes use of panel data for the period 1983-93. A robust result in this study is that higher replacement rates increase unemployment; the estimated coefficient is 0.13, implying that an increase by 10 percentage points would increase unemployment by 1.3 percentage points. These results are broadly in line with the magnitudes implied by the simulation results in Table 1 for replacement rates in the range 50 to 70 percent.[4]

The empirical results from studies that use time series for single countries have produced diverse results concerning the effects of UI policies, although typically in the expected direction. Manning (1993) estimated unemployment equations for Britain and found significantly positive replacement rate effects. Forslund (1995) found similar results for

[3] OECD has computed replacement rates for three different duration categories (one year, two or three years, and four or five years of unemployment). These calculations are applied to three family situations and two different levels of previous earnings. The summary measure is an unweighted mean of 18 computed replacement rates. The net (after-tax) replacement rates are higher than the gross rates, sometimes substantially. See Martin (1996).

[4] Most equilibrium models of unemployment ignores the fact that benefits typically are paid for a limited time period rather than forever. This makes it difficult to relate the OECD summary measure to the replacement rates used in parameterized models.

Sweden. Other studies have derived positive benefit effects on unemployment via estimated real wage equations, for example Layard and Nickell (1985) and Minford (1983).

When evaluating these and similar studies, one can not easily ignore the possibility of reverse causality. Is the rise in unemployment driven by more generous UI systems? Or has the rise in unemployment increased the political pressure to make UI more generous? Benefit variables are often treated as endogenous in the empirical studies, but it is an open question whether the identification problems really have been solved.

UI and Unemployment Persistence

Most theoretical investigations of how UI affects unemployment have focused on steady states rather than the dynamic adjustment. Some recent work in the search and matching framework has suggested that UI may have important implications for how unemployment adjusts to shocks. The papers by Ljungqvist and Sargent (1996) and Millard (1996) are two examples; the recent paper by Marimon and Zilibotti (1997) is another.

Ljungqvist and Sargent (1996) develop a model where workers experience stochastic accumulation and depreciation of skills. Unemployed workers face a risk of skill loss and their UI benefits are based on the wage in the most recent job. The model is used to simulate the dynamic behavior of two economies, referred to as a "laissez faire" and "welfare state". The welfare state features a benefit replacement rate of 70 percent of previous earnings, whereas there are no benefits in the laissez-faire economy. It turns out that the steady state of the two economies are very similar, but their dynamic responses to shocks differ substantially. A transient economic shock causes a prolonged period of long-term unemployment in the welfare state while adjustment is fast in the laissez faire-economy. The reason for this difference appears to be that the unemployed in the welfare state adjust their reservation wages more slowly, and search less intensively, than the unemployed in the corresponding laissez-faire economy without benefits. The two economies also differ markedly with respect to their responses to an increase in a measure of "economic turbulence". Unemployment in the laissez-faire economy stays roughly constant whereas unemployment in the welfare state increases sharply as more workers experience large skill losses while being entitled to 70 percent of their previous earnings.

Millard (1996) applies a calibrated version of the Mortensen and Pissarides (1994) model of job creation and job destruction to study the dynamics of unemployment. A basic finding is that the average unemployment rate as well as the degree of unemployment persistence are increasing in the replacement rate. An adverse but transient productivity shock leads to prolonged unemployment when replacement rates are high, a result very similar to what Ljungqvist and Sargent (1996) report.

The above-mentioned papers have identified effects of UI that have been largely ignored in the previous literature. The possibility that generous benefits can cause severe unemployment persistence has not been modeled carefully in earlier research.[5] And the observation that technological shocks may interact with generous UI to produce high unemployment is novel. In general, the simulations of parameterized search and matching models are very useful as exercises to identify effects that are not easily derived from

[5] There is some empirical evidence that long-term benefits magnify the increase in unemployment following disinflationary policies; see Ball (1996).

simpler analytical models, but there is much more to be done before they can be used to confidently predict how an economy will respond to UI policies. For example, it is disturbing that some results depend heavily on assumptions made concerning unobservables, such as the value of leisure. Many of these models are also seriously incomplete as guides to how policies *should* be undertaken, the reason being that they feature risk-neutral agents and thereby ignore the benefits from income insurance as a means to smooth consumption.

V. The Welfare Economics of Unemployment Insurance

The economics of UI has first and foremost been concerned with positive analysis of the effects of various UI policies. Much less attention has been devoted to the normative issue: what is the *optimal* level of UI benefit in an economy with risk-averse workers? Despite the moral-hazard problems related to wage setting and job search incentives, the optimal UI policy may well involve quite high replacement rates if workers are risk averse and do not have access to credit markets. To illustrate this claim we can again make use of a parameterized version of the search-matching model.

Optimal Unemployment Insurance in a Search-Matching Model

In this model one can derive the expected lifetime utility of being employed (W^e) and unemployed (W^u) as a function of the replacement rate, the real wage, the transition rates and the discount rate. The corresponding flow values of being employed and unemployed take the form:

$$rW^e = \left[\frac{r + fr^s + a(q)}{r + f + a(q)}\right]\frac{w^s}{s} \qquad (3)$$

$$rW^u = \left[\frac{(r + f)r^s + a(q)}{r + f + a(q)}\right]\frac{w^s}{s} \qquad (4)$$

With positive discounting (r>0), we have $rW^e > rW^u$. As the discount rates approaches zero, rW^e approaches rW^u and the limiting value is simply given by the worker's expected steady-state utility:

$$rW = (1-u)\frac{w^s}{s} + u\frac{(rw)^s}{s} \qquad (5)$$

The budget restriction, absent administration costs, is given as $t(1-u) = ru$, where t is the payroll-tax rate. Eq. (2) determines labor market tightness for any given replacement rate, unemployment is obtained from the flow-equilibrium equation, and the tax rate follows from the budget restriction. To determine the optimal replacement rate we need to consider the effect on the consumer wage. Let y denote labor productivity. Labor cost, $w_c \equiv w(1+t)$, is related to labor market tightness through the free-entry condition. This takes the form

$$w_c(q) = \frac{yq(q)}{q(q) + fa} \qquad (6)$$

when the discount rate approaches zero. Labor productivity must exceed wage costs so as to cover expected vacancy costs; the per-period cost of holding a vacancy is aw_c, with $a>0$. The expression for steady-state utility can then be written as

$$rW = \frac{1}{s}\left(\frac{w_c(q)}{1+t(.)}\right)^s \left[1-u(q)+u(q)\,r^s\right] \qquad (7)$$

The tax rate is a function of labor market tightness as well as the replacement rate, $t = t(q, r)$. Tightness is determined by (2) as a function of the replacement rate, i.e., $q = q(r)$.

Holding tightness constant, an increase in the replacement rate has a direct positive welfare effect associated with higher consumption when unemployed and a direct negative welfare effect due to the higher tax rate that has to be paid. In addition there are indirect effects operating through the reduction in tightness (increase in unemployment). If the indirect effects are ignored, the optimum with risk-averse workers involves full insurance (r=1), as is easily established by differentiating (7) while holding tightness (and hence labor cost) constant. Full insurance is not optimal under moral hazard, however.

From inspection of eqs. (6) and (7) it is clear that the level of productivity does not influence the optimal replacement rate. Table 3 shows optimal replacement rates implied by a parameterized version of the model. The optimal rates are calculated for three separation rates and two utility functions. By varying the separation rate we get variations in the equilibrium unemployment rate for any given replacement rate. The exercises illustrate that the optimal replacement rate can be quite high, around 50 percent, despite the adverse effects on unemployment. Of course, these numbers will be sensitive to the assumptions concerning

Table 3. Optimal replacement rates (%) in the search-matching model.

	Annual separation rate (%)		
	10	20	30
σ = -0.1	47	46	46
	(3.1)	(5.9)	(8.9)
σ = -1.0	57	56	56
	(3.1)	(5.8)	(9.0)

Notes: See notes to Table 1. The discount rate is set to zero. Unemployment rates at the optimum solutions are shown in the parentheses.

the leisure value of unemployment (which is ignored here). Another critical assumption is the lack of capital markets. If workers could engage in precautionary savings the case for generous UI would probably be weaker. Some recent papers, for example Costain (1997) and Valdivia (1996), have addressed this issue using calibrated search-equilibrium models with precautionary savings. Costain reports that optimal replacement rates in the range 30

to 40 percent seem to arise very easily, and Valdivia's results are similar. Gruber (1997) applies the model of Baily (1978) together with new empirical estimates of the consumption smoothing effect of UI in the United States; he finds that the optimal replacement rate is below 0.5 even at very high levels of risk aversion.

The Optimal Time Profile of Benefits

The early contributions to the welfare economics of UI include papers by Baily (1978), Flemming (1978), and Shavell and Weiss (1979). An issue investigated concerned the optimal time profile of UI benefits. Should UI compensation be paid indefinitely at a fixed rate or should it decrease (or increase) over the worker's spell of unemployment? One formulation of the problem portrays a government with a given amount of resources to spend on UI payments. The unemployed worker chooses search effort and a reservation wage to maximize expected utility. The problem is to find the optimal time profile of unemployment compensation, defined as the profile that maximizes the unemployed worker's expected utility.

The design of optimal UI policy in this framework involves a tradeoff between, on the one hand, the desirability of smoothing consumption and, on the other hand, the positive incentive effect arising from a scheme where benefits decline over the spell of unemployment. One (unsurprising) result from this analysis is that a constant time profile of benefits is optimal if job search is effectively monitored by the UI administration so that the moral-hazard problems are eliminated. The more the job searcher can affect the job-finding probability, and the more sensitive the job-finding probability is with respect to the benefit level, the stronger the case for a declining time profile (possibly including a lump-sum severance payment). Allowing for private savings may overturn some results from models without credit markets. Shavell and Weiss (1979) show that the optimal solution may include an introductory period with a rising benefit level, followed by a declining time profile.

Some recent papers have reexamined the question of the optimal sequencing of benefits by using equilibrium models of unemployment. Davidson and Woodbury (1997) ask whether benefits should be paid indefinitely or for a fixed number of weeks. The analysis exploits a search-matching framework with endogenous search effort among the unemployed, although wages and the number of jobs are taken as exogenous. Davidson and Woodbury argue that the optimal UI program should entail *indefinite* potential duration of UI payments for risk-averse workers. Their result is driven by a comparison between two extremes, i.e., a program with indefinite potential duration of a fixed level of compensation and a program where benefits drop to zero after a certain number of weeks. Cahuc and Lehmann (1977) also investigate the effects of the time sequence of UI benefits. Their model ignores job search but allow for endogenous wage determination through union-firm bargaining. They find that a constant time sequence yields lower unemployment than a program with a declining time profile. The reason is that a declining benefit schedule increases the welfare of the short-term unemployed at the expense of the long-term unemployed, which raises wage pressure. A third paper on the same theme is Fredriksson and Holmlund (1997), who develop an equilibrium search-matching model with endogenous wage determination as well as endogenous search effort. Their key result is that a socially optimal UI policy implies a declining sequence of unemployment compensation over the spell of unemployment. This result is driven by a version of the 'entitlement effect', i.e., the fact that an increase in benefits will raise search effort among

those not presently qualified for benefits. A declining time sequence provides incentives for active search among workers who have lost their initial high benefit level.

VI. The Political Economy of Unemployment Insurance

There are a number of reasons why the preferences over UI policies may differ in the population. Heterogeneity in unemployment risks is an obvious possibility, which has been explored in detail by Wright (1986) in a model without moral hazard. UI preferences may also differ among intrinsically identical individuals because their current labor market status will differ; some will be employed and others unemployed at each point in time. The *timing* of spells of employment and unemployment matters for the preferred UI compensation so long as the discount rate is positive.

In the context of the search-matching model that we have made use of, a positive discount factor generates a difference between the value of employment and the value of unemployment, as given by (3) and (4); with positive discounting we have $rW^e > rW^u$. The unemployed have more to gain immediately from a rise in benefits than the employed; they receive the higher benefits now whereas the employed get the increase if they become unemployed in the future.

We have computed replacement rates preferred by employed and unemployed workers for a parameterized version of the search-matching model, setting the annual discount rate to 5 percent. These calculations maximize the steady state present values of being employed and unemployed, respectively. As one might expect, the unemployed worker prefers a higher replacement rate than the employed according to these simulations. The differences in preferred compensation are however relatively small, ranging from 2 to 6 percentage points depending on the specific assumptions regarding the separation rate and the degree of risk aversion. The political outcome is plausibly determined by the employed voter, so the political equilibrium would in these examples generate lower replacement rates than a procedure where the individuals voted on the UI policy *before* they knew their current labor force status.

It is easily verified that the politically chosen replacement rate is independent of labor productivity in this model, something that seems to be in accordance with the facts. Benefit levels are typically adjusted upwards as real wages increase.

Benefit Generosity and Bargaining Structure

The model that we have considered presupposes decentralized wage bargaining, the outcome of which is taken into account by the median (employed) voter. However, if the employed workers were able to choose wages as well as replacement rates, the optimum solution would be different. Suppose that the worker has access to an encompassing monopoly union. The worker's wage choice would then effectively determine labor market tightness in the economy. By making use of a "labor demand" relationship analogous to eq. (6) as well as the government's budget restriction, we can write the worker's objective as a function of the replacement rate and labor market tightness, i.e.,

$$rW^e = \Psi\big(r, q, w(q, t(q, r))\big) = \Psi\big(r, q, w(q, r)\big) \quad (8)$$

where $q = q(r)$. The choice of replacement rate could then be made without considering the impact on labor market tightness, by the envelope theorem.[6] The solution to this problem would then seem to imply full insurance (r=1), exactly as in the case where incentive considerations are ignored altogether.

There are at least two caveats to this conclusion, however. A minor one is that the employed worker will not prefer full insurance in a model with positive discounting, as can be verified by differentiating (3) while holding labor market tightness constant, subject to the budget-balance condition and the relationship between the consumer wage and the producer wage, i.e., $w = w_c / (1+t)$. Full insurance is the outcome only with zero discounting. The higher the discount rate, the lower the preferred replacement rate, taking labor market conditions as given.[7] The other caveat is that centralized wage setting may easily lead to full employment. A requirement for an interior solution is that it must be possible to increase the consumer wage through a reduction in aggregate employment. In fact, a condition for an interior maximum with full insurance is that the labor demand elasticity is smaller than unity, which is a quite restrictive condition.[8] However, interior solutions with r<1 and e>1 are possible.
The "envelope argument" suggesting that very high replacement rates should be observed in labor markets where the median voter can exercise unilateral wage setting power is thus somewhat fragile, since it only works for relatively low labor demand elasticities. Of course, it is also questionable because it presupposes that employers have no influence over wages, an implausible assumption. We will nevertheless take a brief look at the data to see if there is anything that can confirm the idea. Are replacement rates higher in countries where unions are strong and wage bargaining centralized?

A frequently used measure of union power is the "coverage rate", i.e., the number of employees covered by collective agreements as a percentage of the total number of employees. There is a positive and relatively strong correlation between benefit generosity and coverage rates in cross-country data for the early 1990s (R=0.70). Figure 1 shows a scatter plot between benefit generosity and coverage rates for 17 countries. The benefit variable is the summary measure calculated by OECD, expressed as an average replacement rate (Martin 1996). The slope of the estimated relationship is 0.29 with a *t*-value of 3.78. The correlation between benefit generosity and union density is much weaker (R=0.40). Table 5 presents several regressions which all confirm the positive and significant association between replacement rates (*RRATE*) and coverage rates (*COV*).[9]

Is there then any evidence suggesting that benefits are more generous where bargaining is more centralized, as the envelope argument would suggest? Table 4 reports the results of including a dummy (*CEN*) for countries with relatively centralized wage bargaining; the

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[6] The first-order condition for optimal tightness is $\Psi_q + \Psi_w w_q = 0$. The first-order condition for the optimal replacement rate is then given as $\Psi_r + \Psi_w w_r = 0$, where the envelope theorem is invoked.

[7] Similar results appear in Wright (1986), Saint-Paul (1996) and Hassler and Rodriguez Mora (1996).

[8] Differentiation of the consumer wage with respect to the producer wage and recognizing the labor demand relationship as well as the government's budget restriction verifies the claim.

[9] Saint-Paul (1996) finds a positive correlation between union density and another measure of benefit generosity, namely the share of GDP devoted to unemployment compensation divided by the unemployment rate. This measure is equal to the average benefit payment relative to average labor productivity.

variable is a somewhat arbitrary dichotomization of the rankings in Calmfors and Driffill (1988). The centralization dummy has never a significant effect on the replacement rate.

If one takes the political-economy perspective seriously, it will have consequences for empirical work on unemployment and unemployment compensation. Unemployment and benefit generosity would both be endogenous variables, and the identification issues would have to be addressed. Many studies include measures of benefit generosity in unemployment

Figure 1. Benefit generosity and coverage rates in the OECD

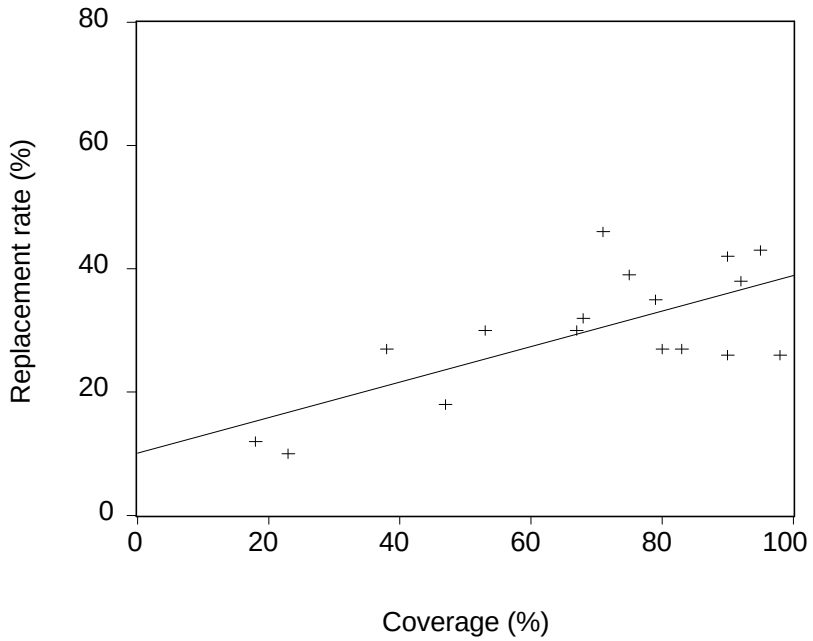

Table 4. Benefit generosity and bargaining structure.

	Dep. variable: *RRATE*		Dep. variable: ln *RRATE*	
Constant	10.09	10.90	0.424	0.420
	(1.82)	(1.79)	(0.82)	(0.69)
COV	0.288	0.266		
	(3.78)	(2.70)		
ln *COV*			0.701	0.703
			(5.65)	(4.60)
CEN		1.837		-0.002
		(0.38)		(0.01)
$\bar{R}^2$	0.454	0.421	0.659	0.634

Notes: *RRATE* is a summary measure of benefit generosity (%) in the mid-1990s (Martin 1996). *COV* is the coverage rate (%) in 1990 (OECD 1994). *CEN* is a dummy for centralized wage bargaining based on the rankings in Calmfors and Drifffill (1988). *CEN*=1 for Austria, Belgium, Finland, Germany, Netherlands, Norway and Sweden; *CEN*=0 for the other countries. The 17 countries included in the regressions are: Australia, Austria, Belgium, Canada, Finland, France, Germany, Japan, Netherlands, New Zealand, Norway,

Portugal, Spain, Sweden, Switzerland, United Kingdom and the United States. Absolute *t*-values in parentheses.

equations. Other authors have included unemployment among the variables explaining benefit generosity (Di Tella and Mac Culloch 1995, Saint-Paul 1996). It is difficult, however, to think of theoretically satisfactory exclusion restrictions that would achieve identification in this case; all variables affecting unemployment would in general influence the policy decision.

VII. Concluding Remarks

The economics of unemployment insurance has been a very active research area within labor economics over the past 25 years or so. What have we learned? A lot, surely, at least at the conceptual and theoretical level. The numerous theoretical studies have identified many routes whereby the design of UI may affect the operation of labor markets. Compared to where we were around 1970, this is a major achievement. Economists have in the late 1990s access to many more tools to systematically examine UI policies than they had around 1970.

A notable feature of the economic analysis of UI is the close interplay between theory and empirical testing. Search theory, in particular, has had a major impact on how we think about labor market statistics and how we undertake econometric investigations. It would be tempting, therefore, to characterize the past research on UI as an overwhelming success story. I hesitate, however, to make such an unqualified claim. If a success story is characterized by repeated empirical confirmation of theoretical predictions, with reasonably robust parameter estimates, the economics of UI do not quite measure up to the requirements. The weight of the evidence suggests that increased benefit generosity causes longer spells of unemployment and probably higher overall unemployment as well. But there remains a considerable degree of uncertainty regarding the magnitudes of these effects.

There are also various fine details of UI policies, such as the choice between a change in benefit levels and a change in benefit duration, where we have little empirical ground for making predictions as guides to policy makers. What would happen to unemployment (duration) if, say, benefit levels were increased while benefit durations were shortened by a prescribed amount? Although there have been attempts to answer such questions in some empirical studies (Katz and Meyer 1990), we are a long way from a situation where economists with any confidence can provide policy makers with reliable menus for choice among key UI parameters.

A recurrent theme of the paper has been that policy prescriptions require an equilibrium framework; partial-equilibrium results rarely carry over unaltered to the general equilibrium. Policy prescriptions should also recognize the ultimate rationale for UI, namely its provision of income insurance to risk-averse individuals. It is only recently, however, that equilibrium approaches to unemployment have taken the insurance motive for UI seriously. Simply looking at changes in unemployment is not sufficient to gauge the welfare effects of UI policies.

The nature of capital market imperfections plays a crucial role for the appropriate design of UI policies. If workers can self-insure through saving and borrowing, the case for

(generous) public UI is weakened. Other forms of self-insurance are conceivable in a family context: a reduction in household income due to one family member's job loss can to some extent be offset through increased labor supply of another family member. These are areas where little research has been undertaken so far. Much more needs to be done, theoretically and empirically, in order to deepen our understanding of the interactions between private self-insurance and public unemployment insurance.

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