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Measuring Unemployment Insurance Generosity

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Unemployment insurance policies are multidimensional objects, with variable waiting periods, eligibility duration, benefit levels, and asset tests, making intertemporal or international comparisons very difficult. Furthermore, labor market conditions, such as the likelihood and duration of unemployment, matter when assessing the generosity of different policies. In this article, we develop a new methodology to measure the generosity of unemployment insurance programs with a single metric. We build a first model with all characteristics of the complex unemployment insurance policy. Our model features heterogeneous agents that are liquidity constrained but can self-insure. We then build a second model, similar in all aspects but one: the unemployment insurance policy is one-dimensional (no waiting periods, eligibility limits, or asset tests, but constant benefits). We then determine which level of benefits in this second model makes society indifferent between both policies. We apply this measurement strategy to the unemployment insurance program of the United Kingdom.

1 Introduction

Let us face it: It is difficult to compare apples and oranges. Yet, we often do when we say, for instance, that social policies in the United States are less generous than in Norway, or that Canada's social protection is weaker under the conservatives than under the liberals.[1] The comparison of apples and oranges is vain if we focus on single characteristics, but obviously would make sense if we could account for how apples and oranges really made us feel. A child can thus rightly say: I prefer oranges (or the reverse). Or even: I prefer oranges in January and apples in October.

Much as apples and oranges, labor market policies cannot easily be compared through time and space. Their generosity is not directly captured by any known aggregate statistic. Some programs can be restrictive in their access but very supportive of those admitted, whereas others are open to all, but barely distribute pennies. To complicate matters, the generosity of labor market policies cannot be assessed independently of the economic environment in which they are applied at a given time. In a labor market with full employment, it does not really matter whether support for the

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[1] See, for example, Osberg (2009).

jobless is very restrictive. It would, however, in a world in which unemployment was significant. This suggests a strategy of measurement that goes beyond a more or less complex aggregation of program parameters. It should take into account the effect of the program on the well-being of agents and on their response to it.

In this article, we thus want to contribute to a better understanding of how generous, in an aggregate sense, some labor market policies are relative to one another. We focus on unemployment insurance (UI), but the new methodology we propose can be applied to most multidimensional social policies.

By the generosity of an unemployment insurance program, we mean how well it protects the workers from labor market shocks. Our measure is thus an index of insurance coverage. We illustrate our approach with a study of the unemployment insurance program in the United Kingdom whose substantial reform in the 1980s by the Thatcher government has sparked debates on the true effect it had on its overall generosity (see, e.g., the slightly different evaluations of Pierson [1996] and those of Clayton and Pontusson [1998]). The debate on whether social policies have indeed retreated in the 1980s has attracted many researchers in economics and political science. Yet, it is a difficult one, because of the lack of quantitative arguments. Since there are no easy ways to aggregate the numerous dimensions of generosity, a large place is left to qualitative assessments. This orange is sweeter than that apple. The danger is that ideology fills the empty space by tinting the choice of indicator to emphasize: Yes, but the apple is greener than the orange; the whole exercise, in the specific case of the 1980 unemployment insurance reform in the United Kingdom, boils down to determining, on the scale of bad to worse, where the Iron Lady really stood.

Mrs. Thatcher clearly had in mind a better unemployment insurance package, in a social sense, when she defended her reform. In a radio interview with journalist Peter Allen, who was questioning the compassion in her policy changes, she answered: "There is compassion. It's like a nurse looking after an ill patient. Which is the better nurse? The one who smothers the patient with sympathy and says 'Never mind, dear, there there, you just lie back and I'll bring you all your meals. I'll bring you all your papers. Just lie back, I'll look after you'? Or the nurse who says 'Now, come on. Shake out of it. I know you've had an operation yesterday. It's time you put your feet to the ground and took a few steps. That's right, dear, that's right. Now get back and take a few more tomorrow'... Which do you think is the better nurse?" To which Peter Allen replied: "I know which one sounds more like you, Mrs. Thatcher." An exchange she concluded with: "Which is the one most likely to get results? The one who says, come on you can do it. That's me."[2]

Back in 1963, when she was the Joint Parliamentary Secretary to the Ministry of Pensions and National Insurance, she argued against high unemployment benefits. In response to a question by a member of the House of Commons, she declared: "We do not think it right to pay more to a person when he is out of work than he could possibly earn when he is employed."[3] That vision was deeply rooted in her conception of unemployment insurance. In the early 1980s, she proposed to tax unemployment benefits, and stop indexing them. In a 1980 television interview with journalist Brian Walden, she highlighted her plan. On taxing benefits, she argued quite convincingly that "You will have to tax short-term benefits because they are part of your total income, and if earnings are taxable the amount of money you get in place of earnings ought also to be taxed." On de-indexing benefits, she was as straightforward: "Isn't it strange if all your short-term benefits go up by the amount of increase in the cost of living, but wages don't? ... I am determined that it really should pay people to work, and it should not pay them just to stay not working of choice. ... One of the great grievances, and a justifiable grievance, is that the people who are not index-linked are paying for the people who are."[4]

What did the Thatcher reform actually mean for the social protection of the unemployed? How important was the change in regime initiated by her government? All of the above calls for serious

[2]Thatcher Archive: Independent Radio Network (IRN) interview with Peter Allen at 10 Downing Street, broadcast on November 30, 1980.
[3]Thatcher Archive: House of Commons PQ, transcript of debates from June 17, 1963.
[4]Thatcher Archive: TV Interview with Brian Walden for London Weekend Television "Weekend World," broadcast on January 6, 1980.

measurement. The measurement approach we propose aims at summarizing all dimensions of an unemployment insurance policy into a single policy parameter. This methodology can be used for other countries, thus ultimately also to compare different unemployment insurance systems across the world. Clearly, this approach may also be extremely useful to those researchers who wish to calibrate models with unemployment insurance policies without accounting for all the dimensions of the actual programs.

The case of the United Kingdom is of particular interest as it has been central in the debate about the evolution of the generosity of welfare states in the past decades. A number of authors have claimed that, despite ideological opposition to generous welfare systems, conservatives, like Margaret Thatcher, have had at best limited success in rolling back the welfare state. This point is made explicitly by Pierson (1994), who claimed that welfare states were surprisingly resilient, and receives support of other authors, such as Garrett (1998), Stephens, Huber, and Ray (1999), and Huber and Stephens (2001). Generally speaking, all these studies focus on some aggregate of social spending, and often neglect the composition of this spending. Furthermore, they do not take into account how the demand for social help may have changed over time.

Taking a different view of the data, in the spirit of Esping-Andersen (1990), several other authors focus on what really matters to those in need of state transfers. The measurement approach centers on individual entitlements. The first step has been to look at unemployment insurance replacement rates, with a general conclusion that the past decades did see some retrenchment of the welfare state—see, for example, Castles (1998), Clayton and Pontusson (1998), Hicks (1999), Kitschelt (2001), Green-Pedersen and Haverland (2002), and Gilardi (2010). Allan and Scruggs (2004) refine this measure by including sickness insurance and accounting for the tax treatment of social benefits. Scruggs (2006) goes further by considering the marital status of the household, the qualifying waiting periods, and the duration of benefits. Allan and Scruggs (2004), as well as Scruggs (2006), find considerable benefit retrenchment in the UK, and in many other countries through 2002.[5]

The generosity index in Scruggs (2006) relies on the conditions for the distribution of benefits in eighteen advanced democracies in 1980, and assumes equal weights for each benefit component. Our measurement approach goes beyond all previous efforts. We include information about social assistance, means-tests, housing assistance, and labor market risks. Furthermore, our measure is derived from the solution of a dynamic equilibrium model, which therefore accounts for individual responses to social policies. Our results show that welfare state retrenchment in the 1980s in the UK was much stronger than other social generosity measures have suggested and that retrenchment continued throughout the 1980s and 1990s. In fact, we are able to show that a further important retrenchment took place under the Labour government of Tony Blair, where social generosity almost vanished. Part of this is due to the fact that the lower unemployment risk during the Blair years was accompanied by drops in benefits, both in the replacement rates and in the duration of benefits (the latter was cut in half). The Scruggs (2006) index for the UK would rather have reported an increase in generosity under Tony Blair.

Independently from the literature on the retrenchment or resilience of the welfare state, a series of authors have tried to measure the generosity of unemployment insurance programs. Martin (1996), for instance, summarizes a series of results from an OECD research program on UI coverages for various types of workers in different countries. Bottero et al. (2004) create a composite indicator of unemployment insurance generosity by taking an unweighted average of indices representing the required contribution period before an unemployment spell, the tax rate covering benefits, the waiting period once unemployed, and the replacement rate when eligible for benefits. Quite obviously, this remains a very crude measure of UI generosity. Allard (2005) defines a "net reservation wage" as the product of the replacement rate, the fraction of a year an agent is eligible, and an estimate of the probability of eligibility. The resulting index accounts for some difficult-to-quantify programmatic demands and sanctions in the course of an unemployment spell. Howell

[5]Kenworthy (1999) uses three different indicators (social spending share, Esping-Andersen's [1990] decommodification scale, and the social wage obtained after stopping to work) to find that increases in all three are related to decreases in poverty in a sample of fifteen countries. For more discussions on measurement issues, see the contributions in Clasen and Siegel (2007). Starke (2006) offers a recent review of the politics of welfare state retrenchment.

et al. (2007) try to gather labor market institution indicators and aggregate them into a few measures.

These measurement attempts, however, use little theory to discipline the indicators, as was pointed out by Heckman (2007) in a direct critique of Howell et al. (2007). They also ignore how local labor market conditions may matter. For example, whether the reduction of the eligibility period for UI benefits matters depends on local unemployment duration. Thus, although duration of benefits is shorter in the United States than in most European countries, it may not imply that UI programs in the United States are less generous since the duration of unemployment is also shorter. US programs may even be more generous in dimensions that matter more for local labor market.

Our approach is really one of model-based measurement. We simulate a dynamic general equilibrium model in which we confront two economies, one featuring the complete characteristics of an actual UI program (that of the United Kingdom), the other characterized by a one-dimensional UI program. This single dimension is the level of UI benefits with no time limit or eligibility criterion other than the fact of not having a job offer. The metric by which we measure the overall generosity of an unemployment insurance program is the level of benefits in the one-dimensional UI program that is socially equivalent; that is, it reaches the same aggregate welfare value and in this sense makes society indifferent between that and the actual program. Our model features heterogeneous agents and stochastic employment opportunities in the spirit of Hansen and Imrohoroğlu (1992) and Pallage and Zimmermann (2001). Agents can self-insure through asset building but face liquidity constraints. There may be moral hazard in the sense that the UI agency may not always be capable of filtering all those who fraudulently apply for benefits. We consider this possibility in our sensitivity analyses.

With this methodology, our measure of UI generosity captures the effect of possible differences in labor market conditions or UI policy, and the fact that agents endogenously adjust their behavior to these differences. Finally, our approach offers a unique way to identify the elements within the policy or the environment that affect most the generosity of unemployment insurance. Although our approach is technically and informationally more demanding, its technique can be transferred to other questions of political or economic interest.

In the next sections, we present the modeling strategy. We then calibrate our model to the economy of the United Kingdom, paying special attention to the households, the labor market, and the UI policies. We describe our solution algorithm in Section 4, perform simulations and present their results in Section 5, discuss the value-added of our measure in Section 6, and conclude in Section 7.

2 Modeling Strategy

We build two models, comparable in every element but one, the UI policy in place. In the first model, there is a detailed unemployment insurance program, with a vector of characteristics (replacement ratio, eligibility requirements, duration of benefits, etc.) that match those in place in the United Kingdom. In the second model, the unemployment insurance is the simplest possible, with a replacement ratio accessible to the jobless as long as they remain so, without any further eligibility clauses. We start by presenting the common parts of both models.

The model economies are composed of a continuum of infinitely lived individuals, each characterized by their employment status, the level of their assets, and their eligibility to unemployment insurance benefits. Time is discrete. A model period is labeled t.

We model the labor market as a system of lotteries which outcomes affect the lives of each of its participants, who choose either to accept or to reject job opportunities. The labor decision has a discrete impact on leisure: labor is modeled as a constant, indivisible period of time, $\bar{h}$, over the model period.

Individuals care about consumption, c_t, and leisure, l_t, which they choose optimally to maximize an infinite stream of expected, discounted utilities. Let $u(c_t, l_t)$ be the periodic utility an agent receives from his choice of consumption and leisure at period t. The function $u(\cdot)$ is assumed increasing in both arguments and concave. Savings, m_t, can be used to self-insure against adverse employment shocks, but there is no borrowing possibility; that is, $m_t \geq 0$.

The stochastic labor market works as follows. At the beginning of every period, agents enter an employment opportunity lottery.[6] The outcome of the lottery, k_t, for a given individual, is either o if a job offer is extended, or n if not. His likelihood to be offered a job depends on whether he had such an offer in the period before. In any case, agents may choose to accept or turn down a job opportunity. Let x_t represent this binary labor decision; that is, $x_t = 1$ if a job offer is accepted at time t, 0 if it is refused. A worker's productivity is a constant, y.[7] It is also his gross income.

A publicly financed unemployment insurance program provides some income replacement benefits to the unemployed under certain conditions that will be detailed later. The UI agency operates with a balanced budget rule. Its revenues are collected from income taxes.

Savings, m_t, from a period to the next evolve in the following way:[8]

$$m_{t+1} = m_t + y_t^d - c_t, \quad m_t \geq 0 \quad \forall t, \tag{1}$$

where y_t^d, the disposable income, can have one of three possible values, depending on the agent's labor and UI eligibility status:

$$y_t^d = \begin{cases} (1-\tau)y & \text{if employed} \\ (1-\tau)\theta y & \text{if unemployed and eligible to UI} \\ (1-\tau)\psi y & \text{if unemployed and not eligible} \end{cases}$$

with τ, the income tax rate used to raise the revenue necessary to finance the unemployment insurance program, and ψ, the possible other government transfer to which an agent is entitled when he is jobless and not eligible to the unemployment insurance program. Welfare transfers may be an example. In the model, all income is taxable, whether from actual work or from government transfers. This assumption can of course be relaxed depending on the actual program under study.[9] θ and ψ are income replacement rates; that is, the percentage of past income given out respectively to UI-eligible and ineligible unemployed.

There may be various indicators of eligibility for unemployment insurance benefits. We will call α the vector of UI parameters that will be specified for each model below. Besides replacement rates, α may also contain eligibility parameters such as a waiting period, a benefit duration, asset tests, etc. For the time being, we will say that eligibility depends on a vector of variables s_t that may follow a potentially endogenous law of motion χ; that is:

$$s_{t+1} = \chi(s_t).$$

It should be emphasized that when an agent turns down a job offer, he is immediately ineligible for UI benefits.[10]

The intertemporal problem of a typical agent can be represented by the following infinite-dimensional program:

$$\text{[P]} \quad \max E_0 \sum_{t=1}^{\infty} \beta^t u(c_t, l_t)$$

subject to budget constraint (1),

[6]The parameters of the stochastic process are taken as exogenous to the model and are calibrated below using the unemployment rate and unemployment duration from the data.

[7]As y is a constant, we do not index it by t.

[8]There is no real interest on assets. Including a small interest changes little in the model economy and very little in the comparison of the two model economies. An interest rate approaching the discount rate leads to overaccumulation of assets.

[9]Note that since gross income, y, is uniform when working, we thus distinguish the insurance aspect of UI from its redistribution aspect.

[10]In Section 5.3, we will allow for some moral hazard. Precisely, we will let shirkers face a nonzero probability of obtaining undue UI benefits.

where leisure $l_t = 1$ for someone who does not work, $l_t = 1 - \hat{h}$ for someone who works the indivisible amount of time $\hat{h}$, and $\beta \in [0, 1)$ is the discount factor, transforming the perception of future values into present ones.

The individual's problem [P] is infinitely complex. We can rewrite it down in a simpler, though equivalent, recursive form, using a Bellman equation. Bellman's (1954) optimality principle indeed allows us to transform an infinite-dimensional, dynamic problem such as [P] into a finite-dimensional one. Instead of seeking an infinite vector of optimal decisions over the entire future, it is sufficient to look for current optimal decisions and an optimal value function, V, of current state variables (m_t, s_t, k_t). The value function to be determined is unique. It is equivalent to the maximized value of [P] at any given state-of-the-world triplet (m_t, s_t, k_t). For ease of exposition, we will drop the time subscripts, and use prime-symbols to denote future states.

For an agent with an employment offer, there are two embedded decisions. The first decision to make is whether or not to accept the employment offer today. The second decision, contingent on the first one, is how much to consume/save given today's disposable income. The relevant Bellman equation is

$$V(m, s, o; \alpha) = \max_{x} x\left\{\max_{c, m'} u(c, 1 - \hat{h}) + \beta \int_{k'|o} V(m', s', k'; \alpha) d(k'|o)\right\} + (1 - x)\left\{\max_{c, m'} u(c, 1) + \beta \int_{k'|o} V(m', s', k'; \alpha) d(k'|o)\right\}$$

$$\text{subject to} \quad \begin{aligned} & m' = m + y^d(s, o, x; \alpha) - c \\ & m' \geq 0 \\ & s' = \chi(s). \end{aligned}$$

In a similar fashion, the Bellman equation for an agent without a job offer can be written as

$$V(m, s, n; \alpha) = \max_{c, m'} u(c, 1) + \beta \int_{k'|n} V(m', s', k'; \alpha) d(k'|n)$$

$$\text{subject to} \quad \begin{aligned} & m' = m + y^d(s, n, .; \alpha) - c \\ & m' \geq 0 \\ & s' = \chi(s). \end{aligned}$$

The value function, $V(.)$, to be determined has the interesting property of being a contraction in the space of real-valued functions on a compact set. It is thus possible to apply Banach's contraction mapping theorem to obtain the unique value function as a fixed point in that particular space. This is done by iterations on the value function from any arbitrary initial function within that space—see, for example, Kolmogorov and Fomin (1975).

Once the iterative process has converged to the optimal value function, we can use the corresponding optimal decision rules on labor, $x(m, s, k)$, consumption, $c(m, s, k)$, and savings, $m'(m, s, k)$, to construct the distribution of agents $f(m, s, k)$, which gives us for every state triplet, (m, s, k), the proportion of agents characterized by that particular state.

2.1 *Equilibrium*

A steady-state equilibrium, given an unemployment insurance policy α, is a choice of work, asset, and consumption for all agents, a value function $V(\cdot)$, a distribution of assets $f(\cdot)$, and a tax rate τ such that:

1. Agents solve their individual intertemporal problems, given (α, τ) and labor market characteristics;

2. The unemployment insurance agency balances its budget;[11] and
3. The distribution of agents is invariant.

Under this definition of equilibrium, agents in the model assume that the current unemployment insurance and labor market characteristics in any given period will remain unchanged forever. One may question this myopic view of the world. An alternative would be to take into account how agents may be forward-looking in these dimensions as well; that is, how they may anticipate changes in the parameters of the UI system and in the unemployment rate and duration. Modeling these expectations, however, is non-trivial. It would make the computation of equilibrium several degrees more difficult, as it would no longer be possible to rely on invariant distributions. We chose the simpler path. We do not expect, however, that such policy changes would matter much in terms of expectations, as long as the changes are not large and they are not announced long enough in advance to change significantly the accumulated assets of agents.

2.2 *The Simplified UI Program*

We need to specify α, the rules that govern the simple UI program, its generosity and eligibility criteria. For the simplified UI program, we assume that unemployment benefits can be obtained immediately and that unemployed households stay eligible as long as they remain without a job offer. If eligible, they receive every period the same proportion θ of their income. An agent becomes ineligible as soon as he turns down a job offer. In that case, he receives a fraction ψ of past income, which takes into account welfare transfers and all other transfers to which an agent in this situation is eligible.

This simple UI program thus has the following vector of parameters to which we want to map the detailed UI program:

$$\alpha = (\theta, \psi).$$

2.3 *The Detailed UI Program*

Next, we want to describe the rules of a real-world unemployment insurance policy in as many details as computationally feasible. Such policy typically has the following components:

1. A waiting period a, before the end of which unemployed agents are not eligible for full benefits, although there may be partial benefits in the meantime.
2. The duration of eligibility z; that is, the number of periods an unemployed agent is entitled to receive benefits.
3. The proportion of past income that unemployed agents obtain as benefits, $\theta(j)$, which may vary through the unemployment spell, including the waiting period ($j = 1, ..., z$).
4. The proportion of income unemployed agents may receive after losing eligibility, ψ, for example through other social programs.

The vector of policy parameters we need to calibrate from the data is therefore given by

$$\alpha = (a, z, \{\theta(j)\}_{j=1, ..., z}, \psi).$$

We can now turn to finding those policy parameters for the economy of interest.

[11] In reality, an unemployment insurance agency does not necessarily balance its budget. But as the shortfall must come from some general budget that is funded by taxation, the tax distortion ends up being equivalent to that of a balanced budget.

3 Parameterization to the United Kingdom

We focus on the generosity of unemployment insurance in the United Kingdom from the 1970s onward. We want to see how the generosity of the UI program, as summarized by θ in the simplified setup, may change through time. For this purpose, we use the characteristics of α for the United Kingdom for every year, along with the relevant labor market data to parameterize the job-opportunity lottery.

The unemployment benefit system in the UK is summarized in Figs. 1 and 2. The details of this system can be confusing because the conditions—and even the names—of its constituent programs have changed several times over the years. Appendix A provides a brief overview.[12]

In Figs. 1 and 2, "UI benefits" refer to the combined flat-rate and earnings-related replacement rates for 1972–1981. The "income security" replacement rate in Figs. 1 and 2 is the social assistance benefit. All of the parameters in Figs. 1–3 are based on the actual policies in force for the years in question. All figures except for social assistance benefit replacement rates were taken from the summary data set of the Comparative Welfare State Entitlement Data set (see Scruggs 2004). Benefit replacement rates were computed assuming a single-person household with net, in-work wages equal to the average production worker (APW) in the year in which benefits were computed. Benefit rates were based on those in place on April 15 of the relevant year. Benefit replacement rates assume a six-month unemployment spell, with the six-month total benefit annualized and divided by the net annual wage of the APW.[13] Social assistance replacement rates are taken from the UK's Department of Work and Pensions as reported by the Institute for Fiscal Studies (2006). Weekly assistance rates (which are not taxable) were simply multiplied by 52 and divided by the net APW wage.

The asset test measure is represented as the ratio (in percents) of the maximum assets allowed to qualify for means-tested transfers to the APW wage net of taxes in each year. Early years are held constant due to lack of data. When reading Fig. 1, one can see that during the first years of the sample having an asset worth 110% or less of the average wage did not bar you from means-tested transfers. In 1980, as a central element of the Thatcher reform, an asset worth 25% of the average wage was sufficient to make its owner ineligible to means-tested transfers.

It is important to bear in mind that, in addition to the phasing out of earnings-related benefits in 1982, UI benefits in the UK became taxable in 1983.[14] As suggested by Fig. 1, making UI benefits taxable made insurance benefits less generous than income support benefits. Note that for this analysis, we used the effective labor income tax rates published by Mendoza, Razin, and Tesar (1994), where we complement the published numbers until 1996 with the update available on Enrique Mendoza's webpage. After 1996, we assume no change in the tax rate. One can reasonably argue that these tax rates are too high for our exercise: they are defined as economy-wide average rates, and unemployed workers most likely pay lower tax rates, as their income is lower when unemployed and their base income is lower than average. Thus, we want to take the parameterizations with and without tax considerations as upper and lower bounds in our measure of UI generosity.[15]

To calibrate the job market lottery in our model, we make use of the fact that in a binomial Markov process, the probability of receiving a job offer while unemployed is the inverse of the unemployment duration. Furthermore, together with the probability of getting a job offer while employed, it determines the unemployment rate. Thus, we use time series for the unemployment rate and unemployment duration to parameterize the odds of the lottery in every year.

While the unemployment rate is easily available from the UK's Office of National Statistics (ONS), obtaining duration data is another matter. We use data on inflows and outflows of UI claimants, again from the ONS, but available only starting in 1989. For the earlier years, we use the

[12] A useful summary of the benefit conditions prior to the early 1980s is provided in Atkinson and Micklewright (1985), Chapter 2.

[13] Annualization facilitates the computation of income tax burdens.

[14] Means-tested support benefits, however, are not taxable.

[15] Note that due to the endogenous response in self-insurance, tax benefits may lower our measure of generosity in some circumstances.

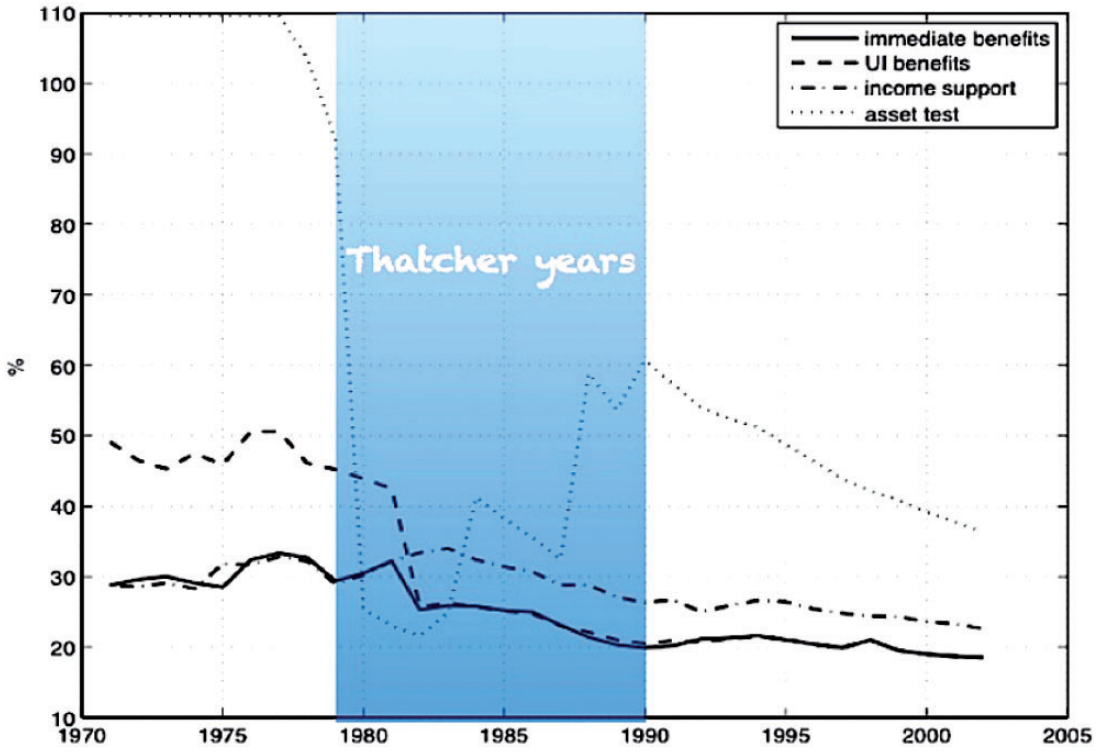

Fig. 1 Program benefit parameters, as percent of average income, with tax benefits.

numbers published by Layard, Nickell, and Jackman (1991, 224). Clearly, we would prefer having durations for all unemployed workers. However, using the unemployment rate along with claimant flows gives us durations that should not lie too far from the truth. Atkinson and Micklewright (1985) present evidence for the period 1972–1977 that doing so presents no significant bias, with unemployment duration averaging at 33.4 weeks, while claimant duration is 31.7 weeks. The unemployment rate and duration are presented in Fig. 3.

The remaining parameters and functional forms are standard in the literature. Following Hansen and Imrohoroğlu (1992) and the literature that ensued, we let the utility function be defined as a typical constant elasticity of substitution (CES) function:

$$u(c, l) = \frac{(c^{1-\sigma} l^{\sigma})^{1-\gamma}}{1-\gamma} - 1,$$

with $\sigma = 0.67$ and $\gamma = 2.5$. Leisure l is one when unemployed and 0.55 when working. A worker thus spends 45% of his time allowance at work. Also, we set the discount factor β in such a way that it corresponds to a discount rate of 4% per year. When running the simulations, we consider the time frequency to be weekly. Such a high frequency is necessary to capture key features of the UK's UI policy. The eligibility waiting period, for instance, is one week for part of our sample.

4 Computations

Our solution algorithm is as follows. We start by solving numerically the model with the detailed UI program for each year in the sample. This is performed by transforming the state space, in particular assets, m, into a grid, then using discrete dynamic programming techniques to obtain a solution through iterations on the value function. Given the resulting value function, we can extract households' decisions and infer the invariant distribution of agents' types, f. It is then possible to compute the expected value of a UI program; that is, the average utility of agents under this program, call it W.

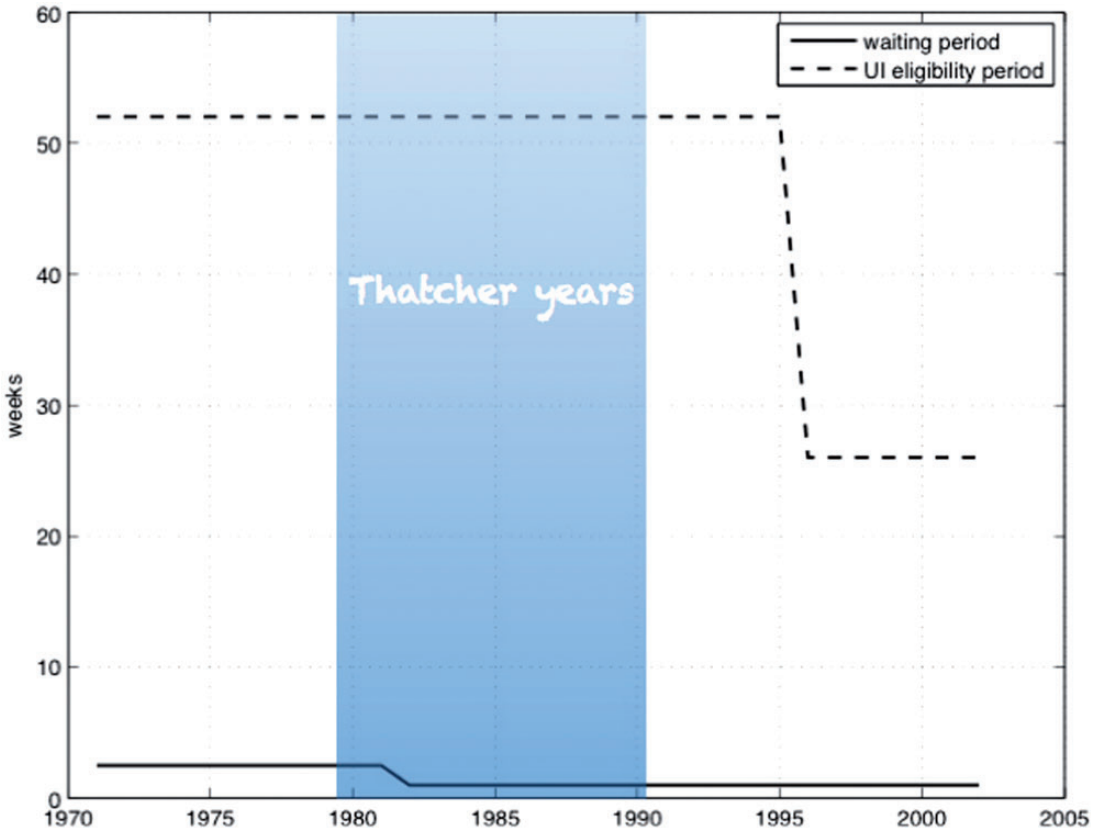

Fig. 2 Program eligibility parameters, in weeks.

The next step implies solving the model with the simplified UI program using the same technique. We search through various values of θ until we find the one that provides the expected value closest to W, call it $\theta^{\star}$. This $\theta^{\star}$ is precisely the measure of generosity that we seek; that is, that which makes society indifferent between the simple and the complex systems and can therefore be qualified as socially equivalent.[16] This procedure is performed for every year in our 1972–2002 sample, thereby giving us the path of UI generosity over time.[17]

It is important to note that the average value function of the simplified economy is non-monotonic in the replacement ratio, θ. Indeed, with $\theta = 0$, individuals must bear their employment risk completely and need to self-insure through asset accumulation, which is costly. With $\theta = 1$, income is completely insured, but because agents also value leisure the average agent would tend to prefer a slightly lower replacement ratio to preserve the incentives to work and maintain the tax rate reasonably low for those who do.

Consequently, there is an optimal θ in the simplified economy somewhere in between, and there is no reason why this optimal θ should correspond to the socially equivalent one, $\theta^{\star}$, which we find in the simulation. This means that for any value W that we try to match in the complex economy, there are always two corresponding $\theta^{\star}$ in the simple one, except in the unlikely case in which we end up at the optimum. See Fig. 4 for a simple representation of this. This result, analogous to a Laffer curve result, is possibly problematic. In our simulations, however, one of those two

[16]Note that we consider here the average expected value of all agents in the model economy. This gives us an idea of how well they perceive the existence of the current system, including its costs (taxes) and potentially perverse incentive. One could also measure the drop in welfare for those hit by unemployment, but this would limit the analysis to a subgroup of the population and would neglect the costs borne by others.

[17]All codes and data necessary to replicate our results can be found at http://hdl.handle.net/1902.1/21425.

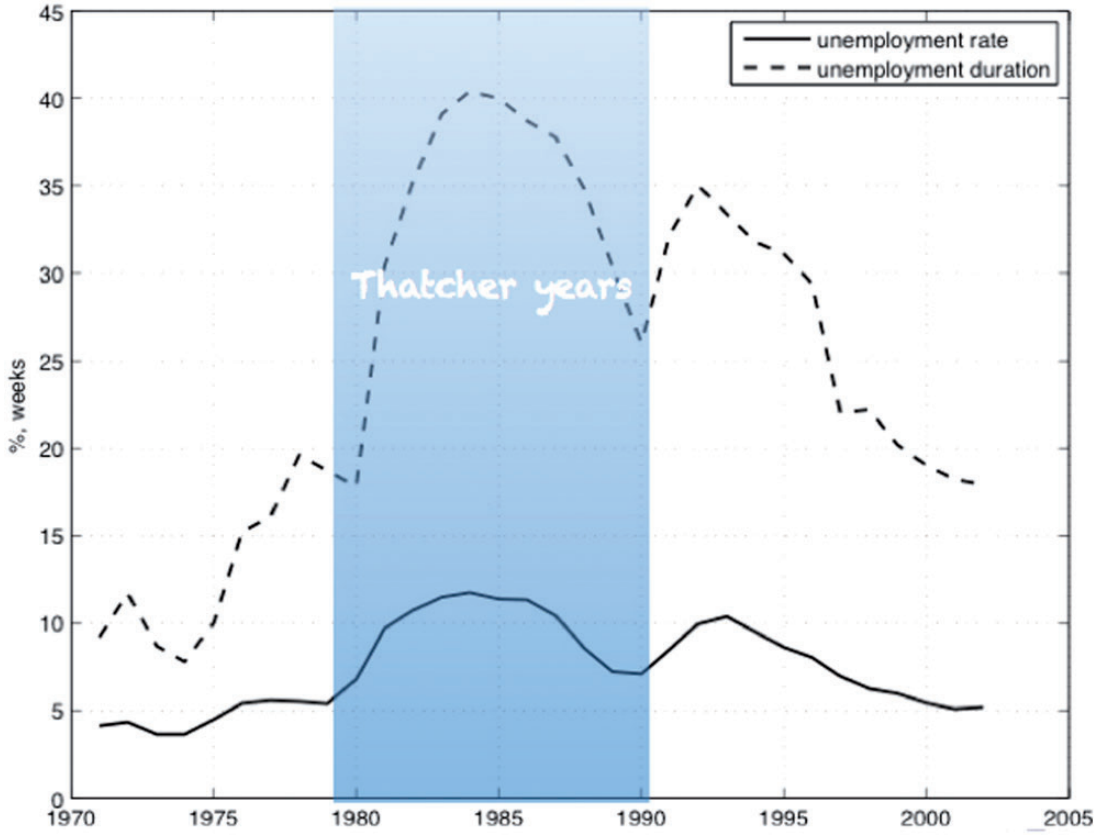

Fig. 3 Labor market parameters.

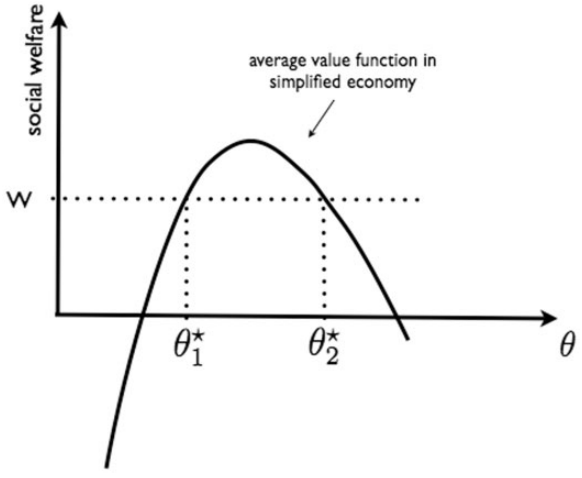

Fig. 4 Possible multiplicity of replacement ratio in simplified economy.

replacement rates has always had an unreasonable value (i.e., above 100%).[18] We have picked the reasonable one.

It is also theoretically possible for the complex economy to attain a value that is unreachable by the simple one; for example, if the complex economy has features like those described in

[18]A negative value is not inconceivable for low UI benefits and tight asset tests for various benefits, due to the endogenous response in asset accumulation.

Shavell and Weiss (1979) or Hopenhayn and Nicolini (1997), where benefits are optimized as they vary over the unemployment spell or thereafter. While in our experience so far it has not been a problem, it could become one in more generous UI systems than the one studied here.

5 Results

5.1 *Generosity of UI in the United Kingdom*

How generous was UI in the United Kingdom during the past few decades? In particular, how did Lady Thatcher's UI reform in the 1980s affect UI generosity?

$\theta^{\star}$, the generosity measure we obtain from our simulations, is presented in Fig. 5 together with actual UI benefits. The figure shows that unemployment insurance in the UK became dramatically less generous in the early 1980s and that this trend has continued ever since. Such a result is not self-evident from the parametrization. Although program benefits did decline in a sharp way, the waiting period was reduced and the eligibility to UI was de facto lengthened during the Thatcher years. It turns out that the latter is inconsequential: The Thatcher reform reduced the waiting period for earnings-related benefits, which she rapidly drove to zero. Importantly, the Thatcher reform was implemented at a time in which both the unemployment rate and the unemployment duration in the United Kingdom were exploding (see Fig. 3).

We can also notice in Fig. 5 that our simulated benefits lie most of the time significantly below the program UI benefits. The full effect of the Thatcher reform, for instance, according to our measure of UI generosity is equivalent to a replacement rate of about 12% in 1982 (a drop of 27 percentage points from the 1979 generosity, when the Iron Lady took office). The actual replacement rate in 1982 was 26%, a drop of merely 10 percentage points from 1979. The wage replacement rate used in many studies as an indicator of UI generosity simply does not capture the scope of the retrenchment in UI generosity behind the Thatcher reform. The restrictions to eligibility thus have a significant weight on the generosity of the program.

Interestingly, while the John Major years are rather characterized by a positive trend in UI generosity, the Tony Blair years witness a further significant retrenchment, with a resulting generosity socially equivalent to a 7% replacement rate in 2001. Again, this could not have been concluded from a look at actual replacement rates.

Finally, as can be seen in Fig. 5, simulated benefits are much more variable than actual replacement rates. The reason is that the simulated benefits are perturbated by many factors beyond the program UI benefits, such as the other program parameters and labor market conditions, as we demonstrate further in the text. The sensitivity of the response of the simulated benefits to these perturbations has also changed through time. Indeed, although the volatility of simulated benefits is similar across the sample years, it is markedly lower for program parameters in the earlier years. The reason for the higher sensitivity in those years lies in the fact the UI program specifics were much closer to the social optimum as determined by the model. Smoothness properties of the value function imply that its slope becomes flatter as one moves closer to the optimum. Consequently, one needs to change θ^{*} farther away for the same change in value, which explains the variability.

These various influences will be disentangled in the coming pages, but it is important, for the sake of comparison, that we first have a look at an alternative, quite intuitive measure of generosity.

5.2 *A Naive Alternative*

A "naive" and much simpler way to proceed would be to compute the present value of benefits under the current system and identify the corresponding "permanent income," $\tilde{\theta}$:

$$\sum_{t=1}^{a} \beta^{t-1}\theta_t + \sum_{t=a+1}^{a+z} \beta^{t-1}\theta_t + \sum_{t=a+z+1}^{\infty} \beta^{t-1}\psi = \frac{1}{1-\beta}\tilde{\theta}. \tag{2}$$

On the left-hand side of this equation, we compute the present value of transfers, over an infinite horizon, accruing to an unemployed agent under the existing UI policy. It is composed of three terms. The first computes the benefits received during the waiting periods (from $t=1$ to $t=a$),

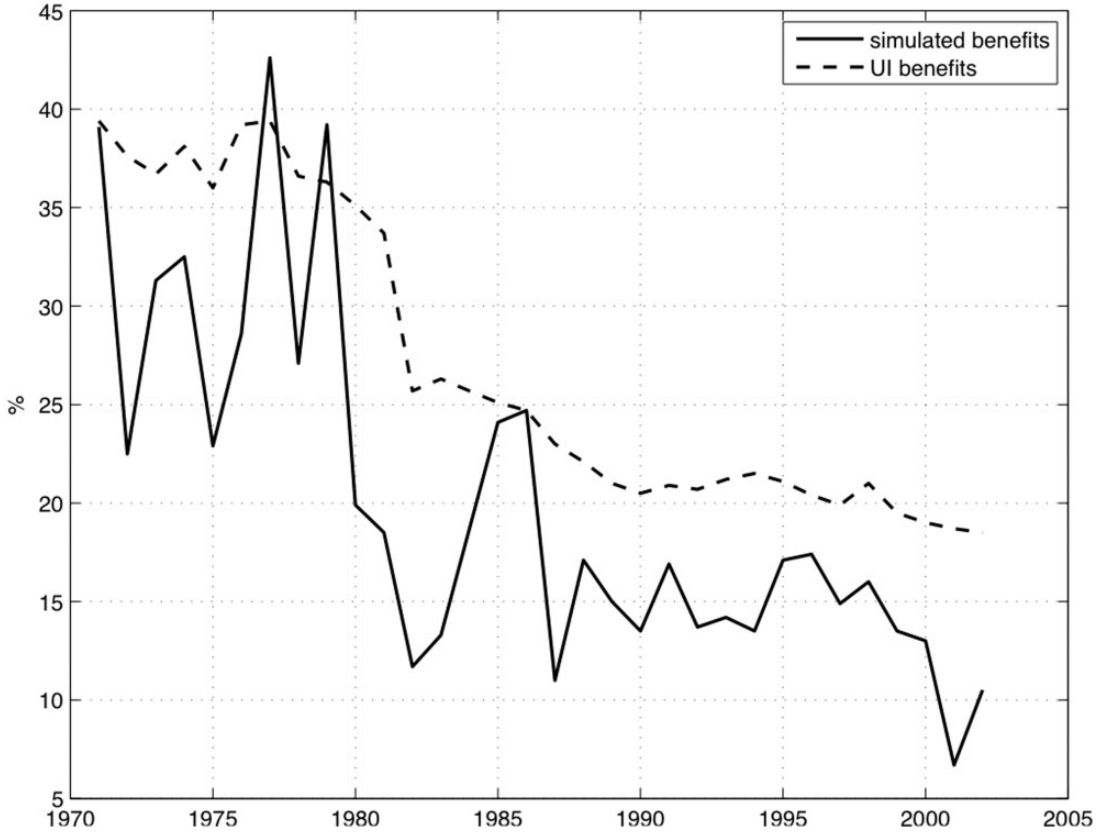

Fig. 5 Effective UI coverage in simulated economies.

weighted by the discount factor with the corresponding power. The second term similarly computes the benefits while eligible (z periods starting at $t = a + 1$). The last term computes transfers received after eligibility ends. This purely accounting sum of transfers can be equated to the present value of receiving a constant benefit, $\tilde{\theta}$, forever (the right-hand side of this equation). $\tilde{\theta}$ can be seen as an alternative, uni-dimensional index of UI generosity that could be highly appealing for its simplicity.

If we compare this naive index, $\tilde{\theta}$, to our simulated $\theta^{\star}$, we can see in Fig. 6 how different a portrait of UI generosity we would have drawn. While the naive $\tilde{\theta}$ would have recorded an overall decline in UI generosity between 1970 and 2000, it would have in no way registered the huge decrease in the early eighties. In fact, it would even have suggested an increase in generosity of a few percentage points following the Thatcher reform. Several factors contribute to this mismeasurement: The naive measure is a simple accounting measure. As such, it does not take into account changes in the labor market, it ignores means tests, and it does not factor in how workers' behavior changed in terms of self-insurance and refusal of job offers. In particular, the naive measure displays even less of a decline than the program UI benefits. This, we think, speaks loudly in favor of using an equilibrium-based measure such as the one we present here.

5.3 *Identifying Relevant Factors of UI Generosity*

What shapes our generosity measure? There are two ways to find an answer to this question: first, by regressing $\theta^{\star}$ on its determinants; second, by performing counterfactual analyses.

Table 1 displays the results of the regression. Obviously, this exercise is full of flaws, starting with the fact that we face a small sample and the likelihood of correlated explanatory variables. We would thus not like the reader to take the results too seriously, but we can still learn a few things from such an exercise. For example, the fact that the interval around the coefficients is very large

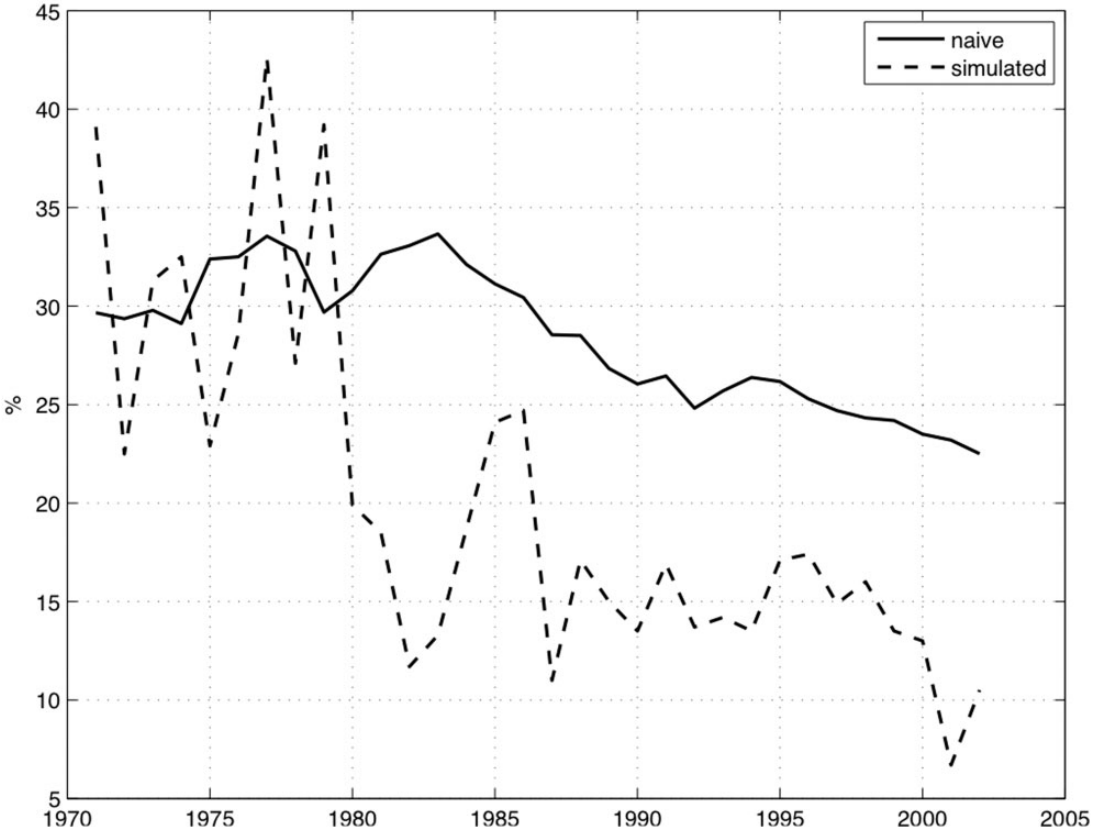

Fig. 6 Comparison of simulated and effective UI coverage with tax benefits.

suggests that the relationships may not be linear: variables may in fact interact in ways that are impossible to capture with such a sample size. Also, the regression indicates that some variables could have a large impact.

The last column of Table 1 describes the effect on our generosity measure of a change in the relevant variable, corresponding to the difference between the highest and lowest values in the sample period. We see that, quite expectedly, program UI benefits have a strong impact on our measure. Indeed, UI benefits are the core program parameter on which policymakers and the general public focus most. But waiting times appear to have quite an impact as well, despite the fact that they are rather short. Finally, the two labor market variables, the unemployment rate and the unemployment duration, could also have a noticeable impact on the program generosity as the same UI program can be felt differently at different times in a business cycle. As we will see below from counterfactual analyses, these results can be misleading. One needs a more thorough investigation to disentangle the many interactions, and simulating the general equilibrium model under various assumptions can do that for us.

We believe indeed that we can have a much better idea of the various influences using the technology that we have just built. In the coming lines, we evaluate the impact of the program variables and the labor market conditions through counterfactuals using our model. The idea is to run the same simulations as before, keeping one variable constant. In Figs. 7–14, any difference with the benchmark simulation is due to variations in the variable at hand, variations that incorporate the endogenous responses of the model households.

In Fig. 7, for instance, the unemployment rate is set for the whole sample period to its average value of 7.46%. Although the unemployment rate does not seem to affect the general downward trend of generosity, it seems to affect some of its variability, in particular in the later sample period.

Table 1 Regression of simulated $\theta^{\star}$ on parameters

Parameter	*Coefficient*	*95% interval*		*Impact on* θ
Constant	0.370	−0.104	0.844	0.000
Immediate benefit	−0.475	−3.295	2.345	−0.070
UI benefit	2.624	0.668	4.580	0.842
Income support	−0.628	−2.716	1.459	−0.072
Asset test	0.058	−0.091	0.208	0.051
Wait time	−0.243	−0.472	−0.013	−0.364
UI duration	−0.002	−0.006	0.001	−0.058
Unemployment rate	−2.023	−5.880	1.834	−0.164
Unemployment duration	−0.010	−0.001	−0.021	0.326
Tax	−1.307	−3.713	1.099	−0.073

Note. The table presents the results of a regression of the generosity parameter $\theta^{\star}$ on policy variables and labor market conditions. The last column presents the effect on $\theta^{\star}$ of a change in the relevant variable corresponding to the difference between its highest and its lowest values in the sample period.

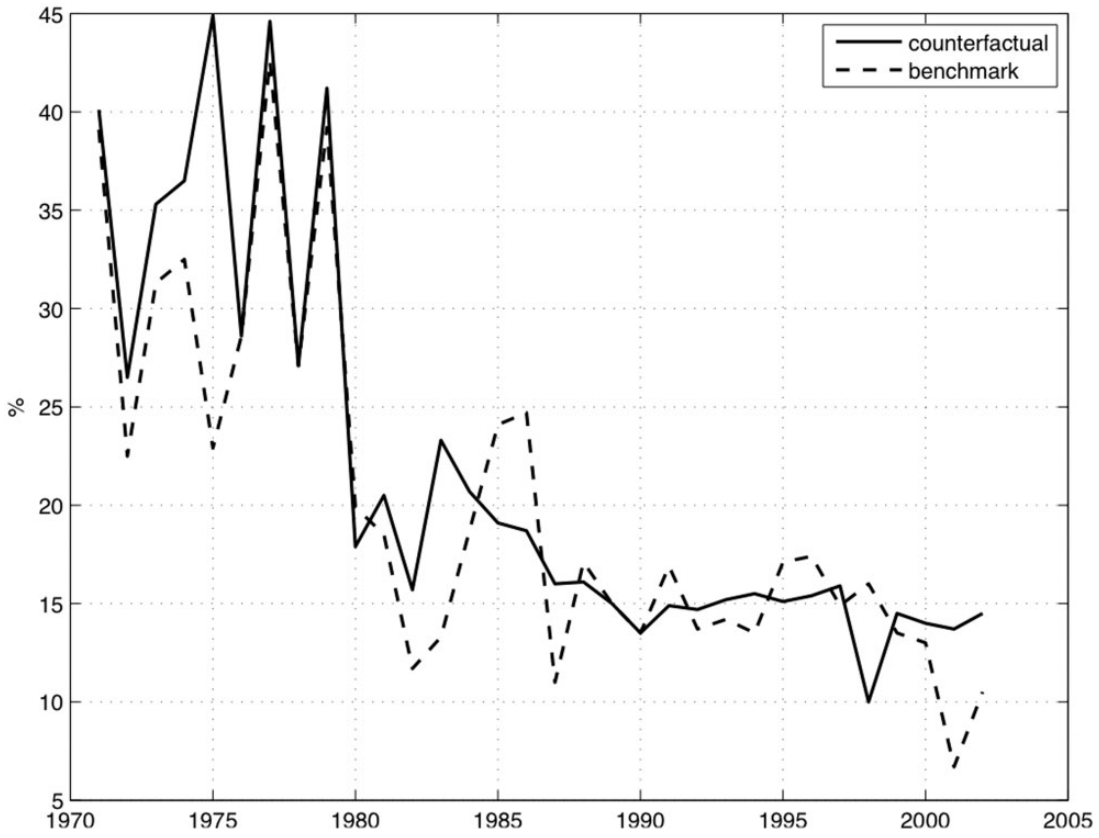

Fig. 7 Robustness tests on UI coverage: unemployment rate set to average value.

The same cannot be said of UI benefits: they clearly explain the trend in generosity (Fig. 8). Indeed, setting UI benefits to their average value over the sample period actually reverses the trend. The variability of $\theta^{\star}$ is also altered asymmetrically: whereas it is more volatile in the early period of the benchmark (pre-Thatcher years), it is less in the remainder of the sample period. The reason is a complex interaction with income support, which provides higher benefits than UI since 1982. This alters in subtle ways the labor and asset decisions of workers, and this interacts with the asset test on income support.

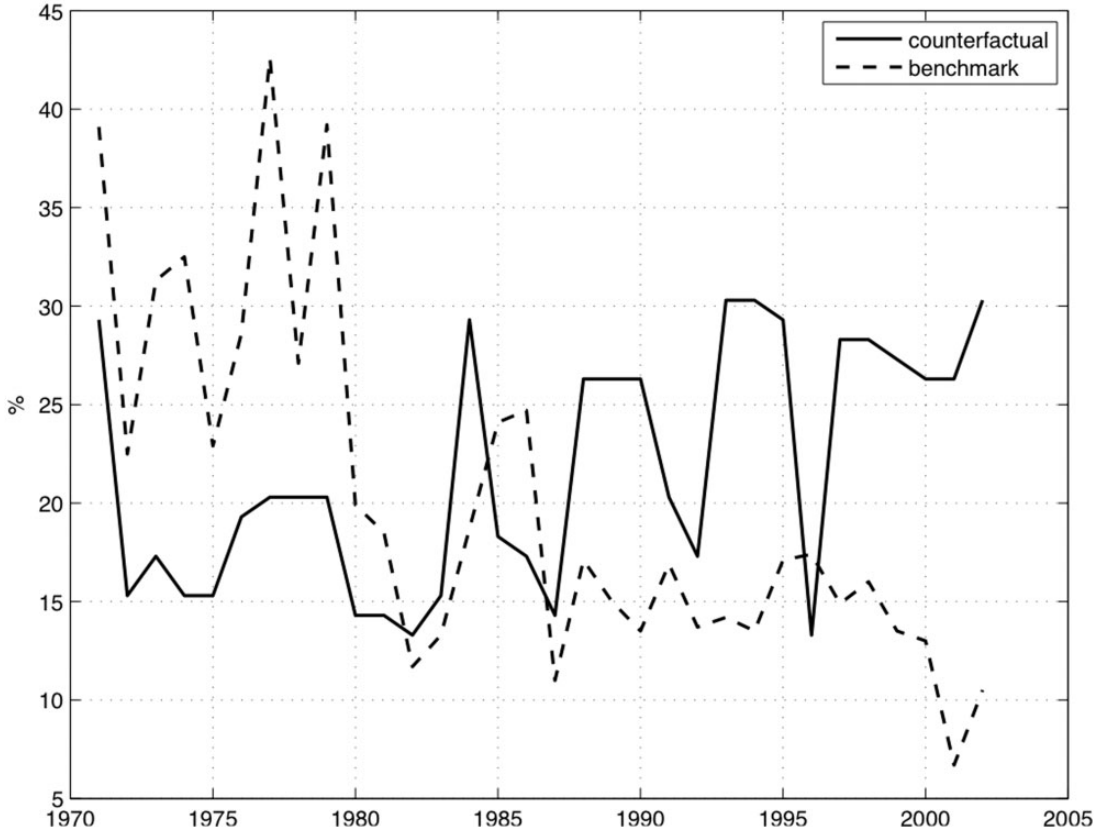

Fig. 8 Robustness tests on UI coverage: UI benefits set to average value.

A further look at other variables is instructive. We find, for example, that the unemployment duration affects somewhat the variability of generosity (Fig. 9), and that waiting times have virtually no impact (Fig. 10) on our measure. This is in stark contrast to the regression results of Table 1, where waiting times were the second most important contributor to changes in generosity. Again, because of the statistical issues raised earlier, we do not want to rely on the results from the regression and are much more comfortable with those from our counterfactual analysis. Because of the complexity of the relationships, measurement is better driven by theory.

Figure 11 shows an experiment in which the benefit duration during the last seven years is kept constant to what it was prior to 1995; that is, fifty-two weeks instead of twenty-six. Paradoxically, this has a negative impact on our measure of UI generosity $\theta^{\star}$. It turns out that during those years, the replacement income from income support was in fact higher than that from UI benefits (see Fig. 1). So, increasing benefit duration delays access to the more generous income support.

Changes in income support affect program generosity about as much as several of the other variables do (Fig. 12). An important aspect of it is the relationship of income support with UI benefits, as discussed above.

Unemployment benefits became taxable during the Thatcher years, but income support remained exempt of taxes. In Fig. 13, we run an experiment in which we tax program benefits as well as income support during the whole sample, thus removing any tax favor on some aspects of UI transfers. As can be seen from Fig. 13, the impact of the removal of these tax benefits is non-trivial and varies over time. This is due to the combination of several conflicting effects: (1) agents do not like a reduction in income support; (2) they do tend to like the ensuing lower taxes; (3) they enjoy the flatter time profile of UI benefits and income support compared to an increasing profile; (4) they tend to adjust asset accumulation, which is also influenced by the time-varying asset test on

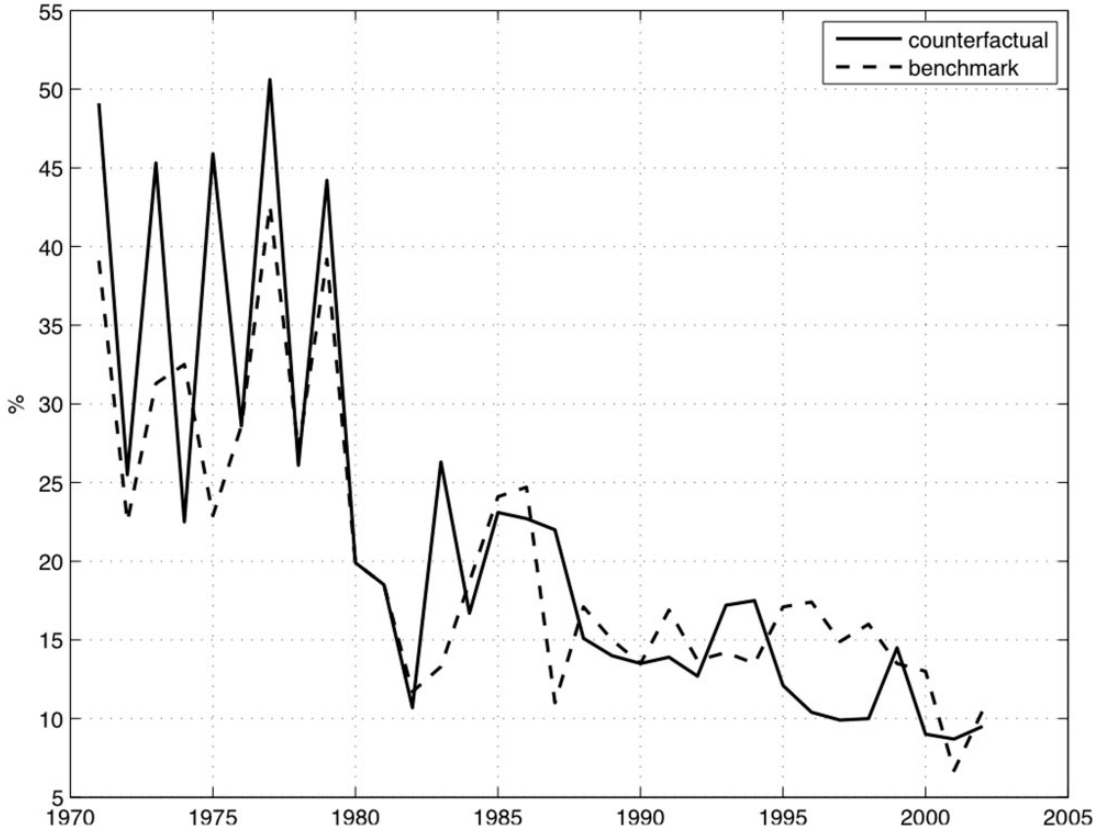

Fig. 9 Robustness tests on UI coverage: unemployment duration set to average value.

income support. All in all, there are times, in particular at the end of the sample, where agents perceive a more agreeable system despite a loss of tax benefits.

Finally, we see in Fig. 14 that the introduction of asset tests that were truly binding during the Thatcher years has had a rather substantial impact. The experiment with no asset test, in particular, induces significantly more asset accumulation, and more self-insurance. The effect was particularly strong during the early eighties when benefits were more generous than today. The simple regression of Table 1 did not suggest such an impact.

It appears from the counterfactual experiments we have just performed that, except for the waiting period, all changes in labor market conditions and program parameters have a measurable impact on program generosity. It is therefore important to take them all into account when evaluating the generosity of an unemployment insurance system.

Other parameter values that are not related to the unemployment insurance program or the labor market conditions, such as risk aversion or the discount rate, may also influence our measure of generosity. However, as a change in such a parameter value would affect both the complex and the simple model economies, the impact is moderate. The strongest impact we have found comes from a change in the risk aversion parameter. We illustrate this in Fig. 15.

We have not given much space to moral hazard in the experiments above. Moral hazard, however, has been shown to be an important factor in the social desirability of unemployment insurance programs (see Hansen and Imrohoroğlu 1992; Pallage and Zimmermann 2001). Here, we have assumed that those who refuse job offers can be perfectly screened and are denied benefits. If monitoring is imperfect and cheaters succeed in collecting UI benefits with a certain probability, would our results be altered? The answer is no. The fact is that the generosity of UI is comparable, by definition, in the complex and the simple model economies. Hence cheating would happen in both models in similar ways. It should therefore only have a negligible effect, unless there are some

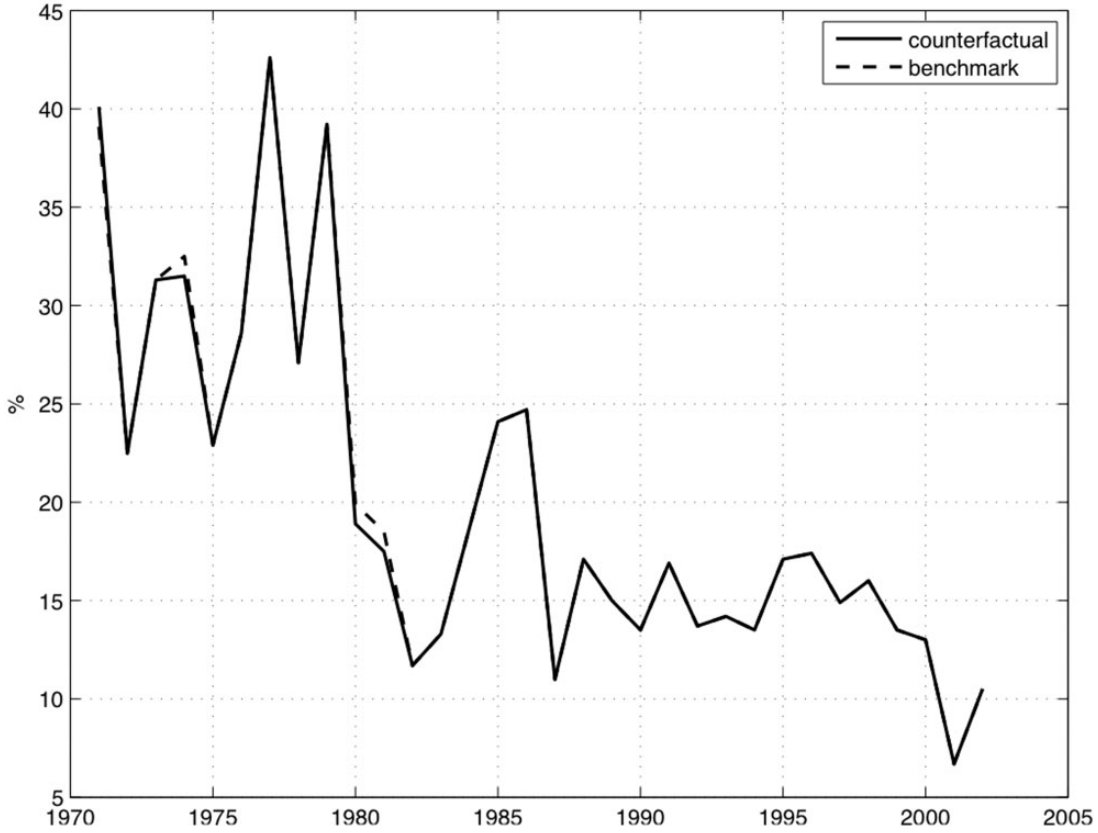

Fig. 10 Robustness tests on UI coverage: wait time set to average value.

very strong amplification mechanisms at play with asset accumulation. We checked this by amending the model with the possibility of moral hazard much in the same way as Hansen and Imrohoroğlu (1992) and Pallage and Zimmermann (2001). We find no impact in the case at hand. Workers in the model simply do not bother to shirk as the UI system is not sufficiently generous in the United Kingdom to risk losing a sure income.

6 Value-Added of Our New Measure

Existing comparative indices of unemployment insurance programs (and of social programs more generally) tend to measure generosity in one of three ways.

First, an important literature known as *the new politics of the welfare state* focuses on total program spending or on total spending as a fraction of gross domestic product (GDP) (e.g., Pierson 1994; Garrett 1998; Stephens, Huber, and Ray 1999; Huber and Stephens 2001). This methodology leads to a conclusion that welfare states have shown substantial resilience under conservative governments. Measuring the generosity of welfare states by total spending on social programs, however, ignores the fact that the population receiving benefits may have increased during the years under study, in which case, the actual transfers per person in need may decrease even though spendings remain unchanged. If GDP decreases in times of economic downturns, measuring welfare state generosity by the ratio of total spendings on social programs and GDP may lead one to believe that social generosity increases when spendings remain constant. Again, this ignores the fact that in times of economic downturn, the population in need of social programs rises. Finally, what actually matters to the needy is not what is transferred, but what stays in his wallet. Ignoring the effect of taxes can be profoundly misleading.

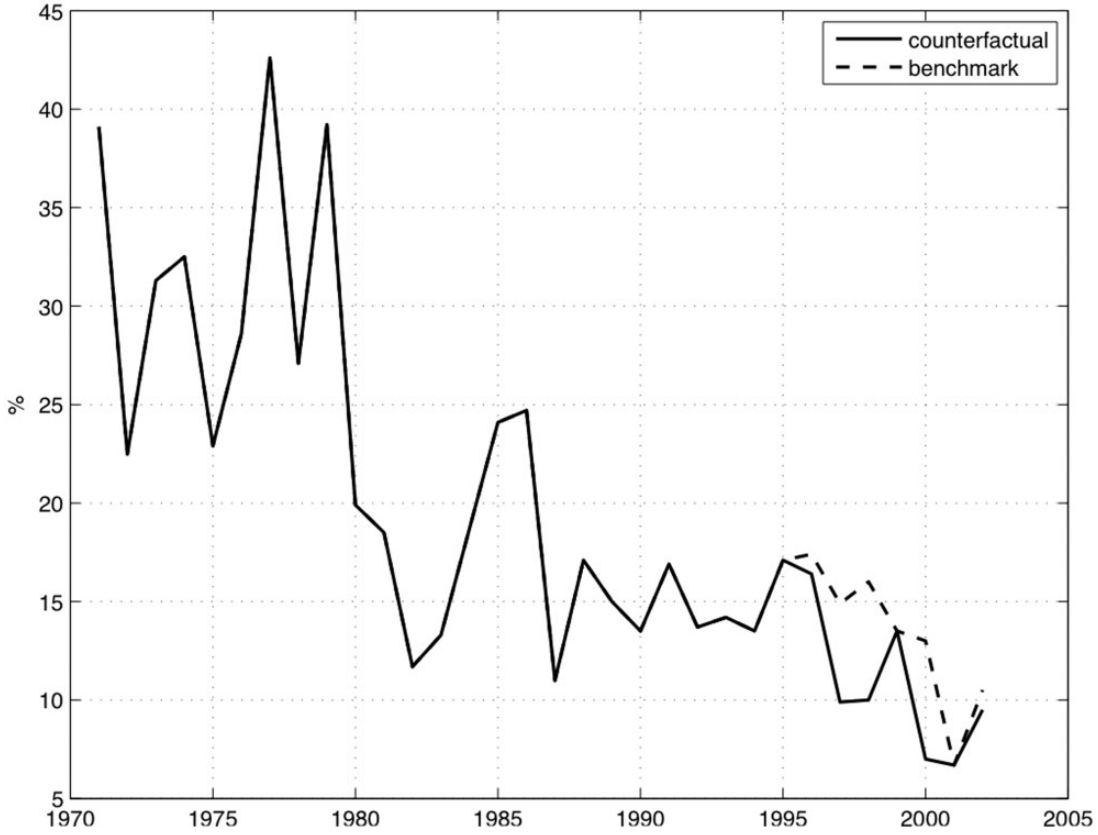

Fig. 11 Robustness tests on UI coverage: benefit duration set to initial value.

Second, another literature to which we belong focuses on individual entitlements. Most authors, however, only consider in their generosity measure the wage income replacement rates for the main insurance programs with and without tax benefits (e.g., Castles 1998; Clayton and Pontusson 1998; Hicks 1999; Kitschelt 2001; Green-Pedersen and Haverland 2002; Gilardi 2010; OECD 2012a, 2012b).[19]

Third, in this literature on individual entitlements, some authors try to incorporate multiple program features, but assign them arbitrarily equal weights and omit the risk and duration of involuntary unemployment (e.g., Allan and Scruggs 2004; Scruggs 2006).

The approach to generosity suggested in the present article provides several improvements over existing indicators. First, we provide a theoretical basis for converting multiple dimensions of social insurance programs into a single index, and provide some evidence that most of these features matter for program generosity. The approach here allows for the empirical weights of different features to vary cross-nationally.

Second, the measure developed here explicitly takes into account variations in the labor market context, which is critical for the concept of program generosity. Existing measures return the same generosity scores regardless of the unemployment risks and duration in the economy. But offering large benefits when people are unlikely to use them only *appears* generous. Benefits that amount to 75% of wages for up to one year when the unemployment rate is 2% and job loss is expected for no more than three months are generally much less generous than offering the same set of benefits when the unemployment rate is 7% and unemployment lasts on average nine months.

[19] An additional practical shortcoming of those versions of the OECD measure that consider tax benefits is the fact that the measure is available only after 2000.

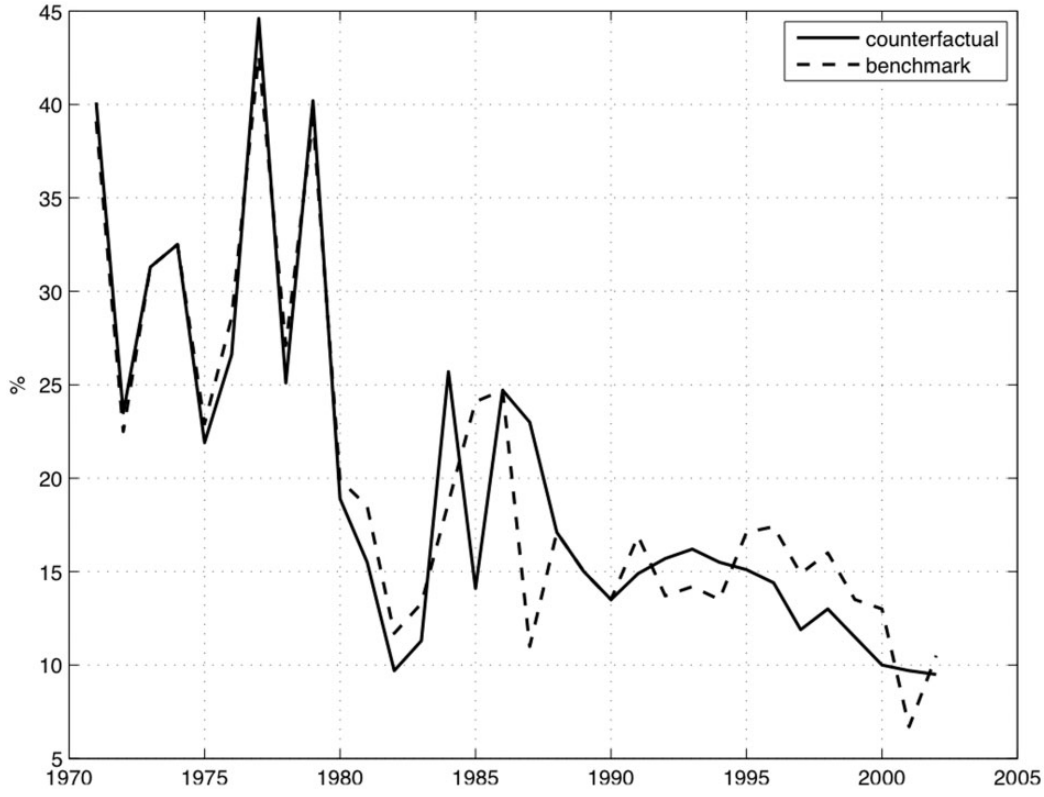

Fig. 12 Robustness tests on UI coverage: income support set to average value.

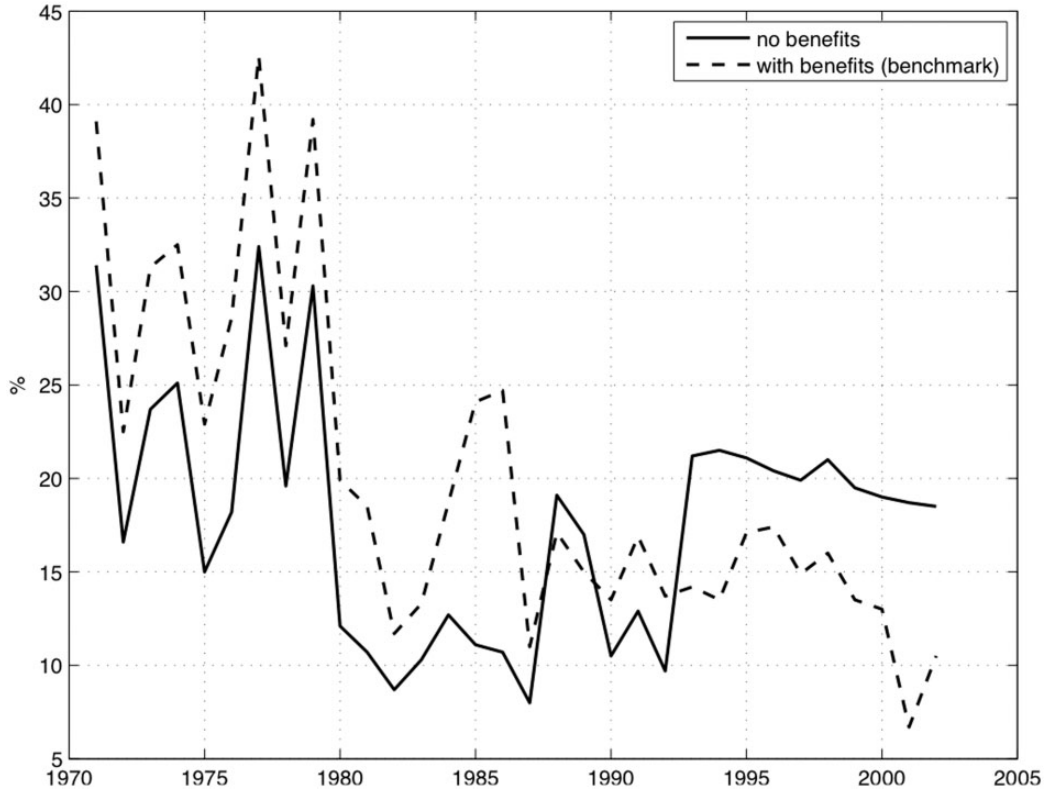

Fig. 13 Robustness tests on tax benefits.

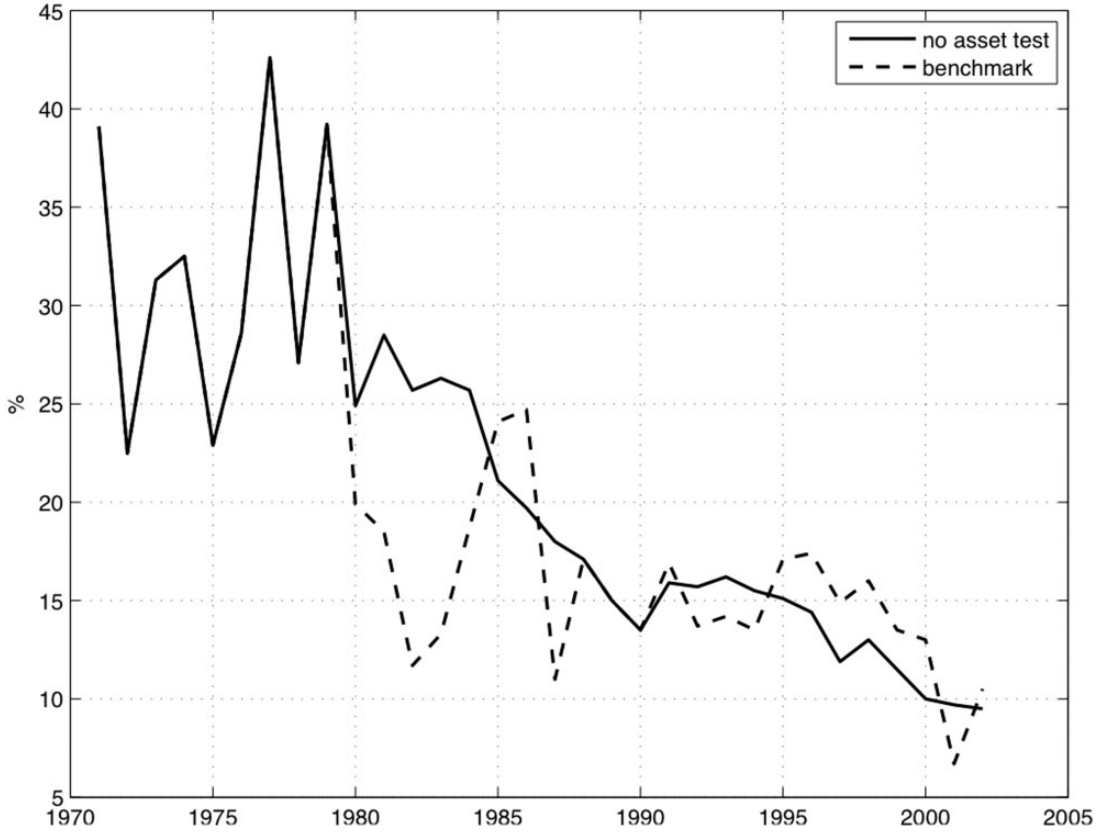

Fig. 14 Robustness tests on UI coverage on asset test.

Finally, empirically our measure suggests stark evidence of large and essentially permanent program retrenchment in the UK unemployment benefit system under the Thatcher government. It also shows that this retrenchment continued through the 1990s and that the labor government of Tony Blair was the architect of another important wave of retrenchment. Figure 16 shows noticeable empirical differences over time in our measure compared to prevailing measures of program generosity, the OECD measure of gross replacement rates for average earners, and the Scruggs (2006) index. While all three indicators show a downward trend under Thatcher, our measure provides much clearer evidence of the intensity of cutbacks. The Scruggs measure even records a small increase in generosity at the beginning of the Thatcher years. The Scruggs index would not have been able to capture the further important generosity cuts during the Blair years, whereas the OECD measure would have failed to capture the intensity of this second wave of retrenchment.

Compared with Scruggs's multifeature generosity index and the OECD's simple measure of gross wage replacement rates for average earners, our experiments suggest that benefits were relatively more generous in the 1970s, declined more dramatically in the early 1980s, and trended downward faster after the mid-1980s. Scruggs's indicator overweights the impact of reductions in the waiting period and qualification period compared with replacement rate reductions and fails to consider labor market conditions. The OECD results, meanwhile, undervalue retrenchment in benefit duration, the introduction of benefit taxation, and labor market conditions.

7 Conclusion

We view the main contribution of this article as methodological. We develop a method to determine a comparable, one-dimensional measure of the level of generosity of a complex social program based on a micro-founded model. We apply this methodology to assess the generosity of an

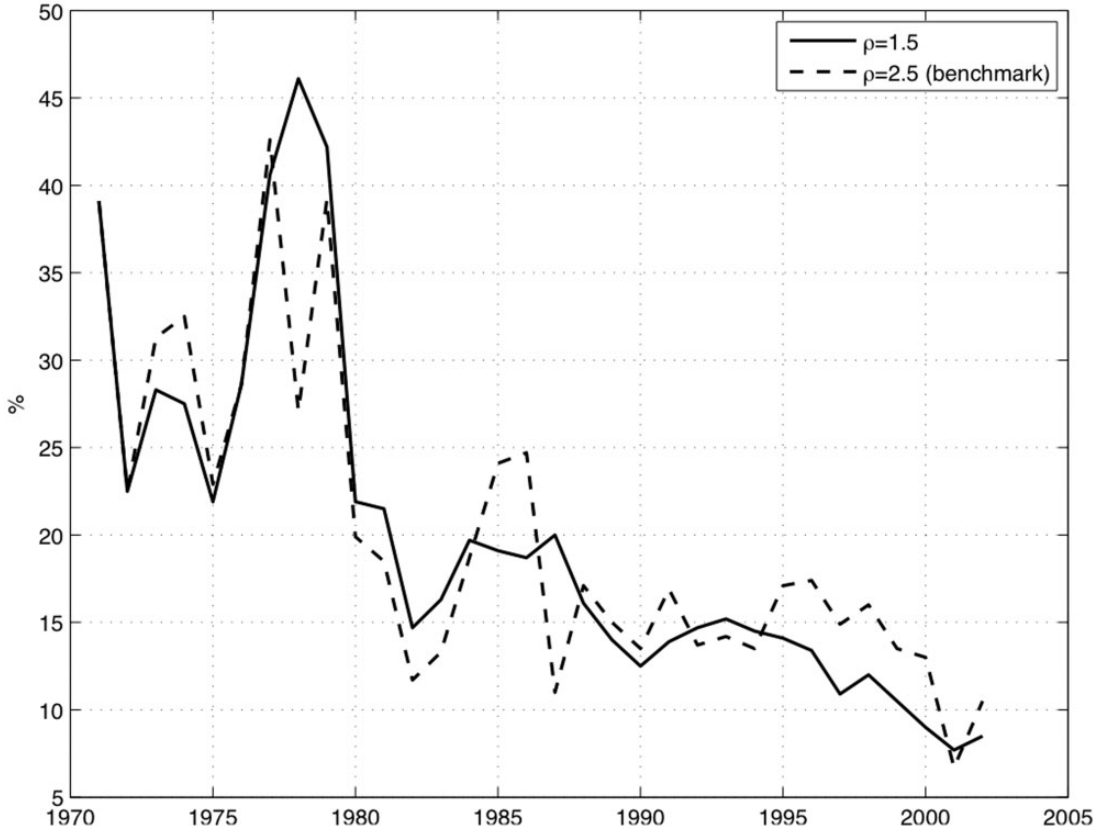

Fig. 15 Robustness tests on risk aversion.

unemployment insurance program. Specifically, we build a model where heterogeneous agents face labor market shocks, react by accumulating assets, and use a multidimensional UI system. We then determine how generous a one-dimensional UI system needs to be for society to be indifferent between the two. This socially equivalent measure of generosity synthesizes the many dimensions of the program and captures the prevailing labor market conditions as well as the endogenous response of agents to the policy and the environment. Unlike all previous attempts at measuring the generosity of a social program, our measure is in fact equilibrium-based.

Our second contribution is empirical. Parameterizing our model economies to the period 1972–2002 in the United Kingdom, we find dramatic drops in the generosity of the unemployment insurance program in the early 1980s despite more generous eligibility requirements. Since then, the generosity of unemployment insurance in the United Kingdom has continued to decline. We show that the severity of this drop would not have been captured by a measure of generosity that would have focused solely on the parameters of the system, thereby ignoring the reactions of the agents and the changing labor market. The Thatcher reform meant cuts in unemployment insurance generosity in the United Kingdom by far more aggressive than any previous measure could have told.

The methodology we have presented here can be applied in many ways. For example, it makes it possible to have direct international comparisons of unemployment insurance or other social programs. Is the United States more or less generous than France or Spain when it comes to supporting the jobless? The answer to such question should be of high interest to policymakers and to researchers trying to understand differences in employment incentives across countries (see, e.g., Ljundqvist and Sargent 1998). Others may find our measures of interest for the proper calibration of unemployment insurance benefits in models that necessarily need to abstract from the many dimensions of actual programs.

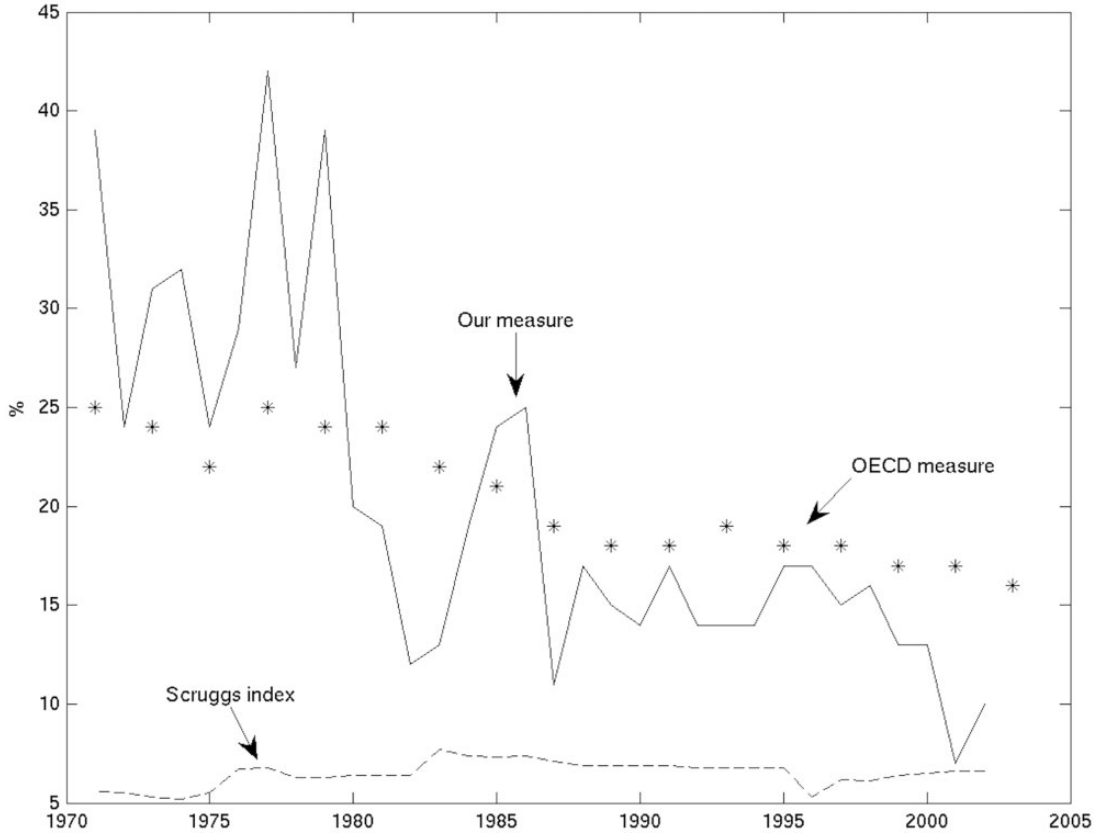

Fig. 16 Comparing our measure to those proposed in the literature.

Is our exercise positive or rather normative in nature? We believe that it is both. Our methodology can certainly be used to assess what is and to a lesser extent what ought to be. It can bring light on the way a policy reform has affected the generosity of a social program or how future reforms might affect it, in possibly various labor market scenarios. The possibility to experiment with policy changes, which we have demonstrated in this article, is a useful, though imperfect, tool for policymakers and political scientists interested in policy improvements. Hence our measure is clearly appropriate for positive and normative evaluations. It is not adequate, however, to assess the political support behind a policy or to explain the genesis or the retrenchment of welfare states. But it is appropriate to establish that there was a significant retrenchment during the Thatcher years (which directly challenges results in the important literature on welfare state resilience) and that this trend has continued through the Blair years. Our measure captures the intensity of retrenchment better than any previous measure. Of course, understanding the vote on social policies by heterogeneous voters is likely to be very important in the determination of what policy is ultimately chosen (e.g., Pallage and Zimmermann 2001; Brooks and Manza 2006). Why social policies exhibit multidimensionality is another interesting question, which this article does not address.[20]

Appendix A: A Brief Description of the UK's Unemployment Benefit System

Like most European countries, the unemployment benefit system in the UK consists of an insurance benefit available to all insured individuals who are unemployed, together with a

[20]We thank a referee for pointing this out.

means-tested assistance benefit and a housing benefit available to those with low income and limited means. A rare feature of the contemporary UK system is that the contribution-based benefit is paid at a flat rate, and is equal to the income-based benefit.

Insurance

A constant element of Britain's unemployment insurance benefit since the end of the second World War is the flat rate (or contribution-based) benefit. From 1948 to 1995, this was called simply Unemployment Benefit. In 1995, the name changed to Contribution-Based Job Seekers Allowance (JSA). The level of this benefit has changed annually (sometimes more frequently during periods of high inflation) to reflect changes in living standards.[21] Historically, this benefit has been paid after a three-day waiting period. Until 1996, this benefit was payable for up to fifty-two weeks. From 1996 on, the duration of the benefit was reduced to twenty-six weeks. Between 1966 and 1981, the flat rate amount was supplemented by an earnings-related benefit. The earnings-related supplement varied with the worker's wage level. When in force, it was paid for up to twenty-six weeks, after a twelve-day (two-week) waiting period. When originally introduced in 1966, the earnings-related supplement was 33% of weekly wages between 9 and 30 pounds per week. From 1974, the 33% band applied to weekly wages between 10 and 30 pounds, and a second band was introduced (15% of wages between 30 and 48 pounds). Under the Thatcher government, the earnings-related benefit was gradually eliminated between 1980 and 1982.

Social Assistance

Whereas unemployment insurance is paid to the insured unemployed regardless of their income, social assistance benefits are means-tested, and they have no time limits. Social assistance benefits for the unemployed have also undergone two major reorganizations. Until 1988, they were known as Supplementary Benefits. In that year, they became known as Income Support. Since 1995, however, they have been known as Income-Based Job Seekers Allowance. Despite these reorganizations, the basic conditions and amounts paid for these benefits have been regularly adjusted in line with inflation and wages. As a rule, those on unemployment insurance are not eligible for social assistance for themselves. However, under existing rules, they might qualify for social assistance benefits for dependents.

Housing Benefit

A final notable benefit available to the unemployed is the housing allowance. The latter is a means-tested benefit designed to cover parts of the costs of rental housing up to the full amount of rent (subject to a maximum "reasonable" rent). All UK residents, including those employed or receiving contribution-based JSA, are eligible for housing allowance provided they meet the means-test.

A final note about unemployment insurance benefits is that, until 1982, they were not considered taxable income. In that year, unemployment benefits were made taxable. Today, only contribution-based job seekers allowances are taxable. All means-tested benefits, including housing benefit, are not taxable.

Funding

Financial support for data used in this project was provided by a grant from the National Science Foundation (grant number SES-0095367). Parts of this paper were written while Lyle Scruggs was a Visiting Scholar at the Russell Sage Foundation and while Christian Zimmermann was at the University of Connecticut Economics Department.

[21] In addition, the flat rate benefit is adjusted based on age (over/under eighteen or twenty-five years), family circumstances, such as whether the household of the claimant has a dependent spouse or children, and, under JSA, disability.

References

Allan, James P., and Lyle Scruggs. 2004. Political partisanship and welfare state reform in advanced industrial societies. *American Journal of Political Science* 48(3):496–512.

Allard, Gayle. 2005. *Measuring the changing generosity of unemployment benefits: Beyond existing indicators*. Instituto de Empresa Business School Working Paper 05-18.

Atkinson, A. B., and John Micklewright. 1985. *Unemployment benefits and unemployment duration: A study of men in the United Kingdom in the 1970s*. London: Suntory-Toyota International Center for Economics and Related Disciplines.

Bellman, Richard E. 1954. *The theory of dynamic programming*. Santa Monica, CA: RAND Corporation.

Botero, Juan, Simeon Djankov, Rafael Porta, Florencio Lopez-De-Silanes, and Andrei Shleifer. 2004. The regulation of labor. *Quarterly Journal of Economics* 119(4):1339–82.

Brooks, Clem, and Jeff Manza. 2006. Why do welfare states persist? *Journal of Politics* 68(4):816–27.

Castles, Francis. 1998. *Comparative public policy: Patterns of post-war transformation*. Cheltenham, UK: Edward Elgar.

Clasen, Jochen, and Nico A. Siegel. 2007. Comparative welfare state analysis and the "dependent variable problem." In *Investigating welfare state change: The "dependent variable problem" in comparative analysis*, eds. Jochen Clasen and Nico A. Siegel, 3–12. Cheltenham, UK: Edward Elgar.

Clayton, Richard, and Jonas Pontusson. 1998. Welfare-state retrenchment revisited: Entitlement cuts, public sector restructuring, and inegalitarian trends in advanced capitalist societies. *World Politics* 51:67–98.

Esping-Andersen, Gosta. 1990. *The three worlds of welfare capitalism*. Princeton: Princeton University Press.

Garrett, Geoffrey. 1998. *Partisan politics in the global economy*. Cambridge, UK: Cambridge University Press.

Gilardi, Fabrizio. 2010. Who learns from what in policy diffusion processes? *American Journal of Political Science* 54(3):650–66.

Green-Pedersen, Christoffer, and Markus Haverland. 2002. The new politics and scholarship of the welfare state. *Journal of European Social Policy* 12(February):243–51.

Hagedorn, Marcus, and Iourii Manovskii. 2008. The cyclical behavior of equilibrium unemployment and vacancies revisited. *American Economic Review, American Economic Association* 98(4):1692–706.

Hansen, Gary D., and Ayse Imrohoroğlu. 1992. The role of unemployment insurance in an economy with liquidity constraints and moral hazard. *Journal of Political Economy* 100(1):118–42.

Heckman, James. 2007. Comments on are protective labor market institutions at the root of unemployment? A critical review of the evidence by David Howell, Dean Baker, Andrew Glyn, and John Schmitt. *Capitalism and Society* 2(1):article 5.

Hicks, Alexander. 1999. *Social democracy and welfare capitalism*. Ithaca, NY: Cornell University Press.

Hopenhayn, Hugo A., and Juan Pablo Nicolini. 1997. Optimal unemployment insurance. *Journal of Political Economy* 105(2):412–38.

Howell, David R., Dean Baker, Andrew Glyn, and John Schmitt. 2007. Are protective labor market institutions at the root of unemployment? A critical review of the evidence. *Capitalism and Society* 2(1):article 1.

Huber, Evelyne, and John Stephens. 2001. Welfare states and production regimes in the era of retrenchment. In *The new politics of the welfare state*, ed. Paul Pierson, 107–45. Oxford: Oxford University Press.

Institute for Fiscal Studies. 2006. *Fiscal facts: Benefit tables for income support and supplementary benefits*. http://www.ifs.org.uk/ff/indexben.php (accessed June 10, 2007).

Kenworthy, Lane. 1999. Do social-welfare polcies reduce poverty? A cross-national assessment. *Social Forces* 77(3):1119–39.

Kitschelt, Herbert. 2001. Partisan competition and welfare state retrenchment: When do politicians choose unpopular policies? In *The new politics of the welfare state*, ed. Paul Pierson, 265–302. Oxford: Oxford University Press.

Kolmogorov, A. N., and S. V. Fomin. 1975. *Introductory real analysis*. Minneola, NY: Dover Publications.

Layard, Richard, Stephen Nickel, and Richard Jackman. 1991. Unemployment: Macroeconomic performance and the labour market. Oxford: Oxford University Press.

Ljungqvist, Lars, and Thomas J. Sargent. 1998. The European unemployment dilemma. *Journal of Political Economy* 106(3):514–50.

Martin, John P. 1996. Measures of replacement rates for the purpose of international comparisons: A note. *OECD Economic Studies* 26:99–115.

Mendoza, Enrique, Assaf Razin, and Linda Tesar. 1994. Effective tax rates in macroeconomics: Cross-country estimates of tax rates on factor incomes and consumption. *Journal of Monetary Economics* 34(3):297–323.

OECD. 2012a. *The historic OECD summary measure of benefit entitlements, 1961–2005*. *OECD summary measure of benefit entitlements*. http://www.oecd.org/els/benefitsandwagesstatistics.htm (accessed October 15, 2012).

———. 2012b. *NRR summary measure of benefit entitlements (including SA and HB)*. *OECD summary measure of benefit entitlements*. http://www.oecd.org/els/benefitsandwagesstatistics.htm (accessed October 15, 2012).

Osberg, Lars. 2009. *Canada's declining social safety net: The case for EI reform*. Ottawa: Canadian Center for Policy Alternatives.

Pallage, Stéphane, and Christian Zimmermann. 2001. Voting on unemployment insurance. *International Economic Review* 42(4):903–23.

Pierson, Paul. 1994. *Dismantling the welfare state? Reagan, Thatcher, and the politics of retrenchment*. New York: Cambridge University Press.

———. 1996. The new politics of the welfare state. *World Politics* 48:143–79.

Scruggs, Lyle. 2004. *Welfare state entitlements data set: A comparative institutional analysis of eighteen welfare states*. Version 1.0b, http://sp.uconn.edu/~scruggs/wp.htm (accessed October 15, 2012).

Scruggs, Lyle. 2006. The generosity of social insurance, 1971–2002. *Oxford Review of Economic Policy* 22(3):349–64.

Shavell, Steven, and Laurence Weiss. 1979. The optimal payment of unemployment insurance benefits over time. *Journal of Political Economy* 87(6):1347–62.

Shimer, Robert. 2005. The cyclical behavior of equilibrium unemployment and vacancies. *American Economic Review* 95(1):25–49.

Starke, Peter. 2006. The politics of welfare state entrenchment: A literature review. *Social Policy & Administration* 40(1):104–20.

Stephens, John D., Evelyne Huber, and Leonard Ray. 1999. The welfare state in hard times. In *Continuity and change in contemporary capitalism*, eds. Hebert Kitschelt, Peter Lange, Gary Marks, and John D. Stephens, 164–93. Cambridge, UK: Cambridge University Press.