# How Sweden's unemployment became more like Europe's

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> "The main difficulty with the Eurosclerosis hypothesis is one of timing. Although details can be debated, no strong case exists that Europe's welfare states were much more extensive or intrusive in the 1970s than in the 1960s, and no case at all exists that there was more interference in markets in the 1980s than in the 1970s. Why did a social system that seemed to work extremely well in the 1960s work increasingly badly thereafter?" Krugman (1987, p. 68)

## 1 Introduction

Ljungqvist and Sargent (1997) applied an equilibrium version of a McCall (1970) search model to explain the striking first graph in Lindbeck et al. (1994). That graph shows that from the mid 1970s until the early 1990s the Swedish unemployment rate was lower than in other OECD countries, and that in the early 1990s it jumped to the much higher level exhibited by an average of OECD countries' unemployment levels since the early 1980s.[1] After noting that Sweden had no significant problem with long term unemployment before 1990, Lindbeck et al. (1994, p. 6) stated that "There is now an obvious risk that Sweden will go the same way [as the rest of Europe]" and that "It should be an overriding task of economic policy to prevent creating a large group of permanently unemployed citizens ...." Ljungqvist and Sargent (1997) presented a model that explained the set of policies that had allowed Sweden to attain its exceptionally low unemployment rates from 1975-1990, but that also posed a 'nightmare scenario' in which a macroeconomic shock would make one of those

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[1]But still it remained below the average for OECD countries in Europe.

policies become unsustainable; its absence would then make long-term unemployment and a high unemployment rate persist in Sweden.

This paper updates our earlier work in light of recent data about Swedish labor market outcomes. We read these data as saying, yes, Swedish outcomes have become more like Europe's, as Lindbeck and his coauthors feared. To shed light on why, we describe extensions of our earlier theoretical work that are designed to understand some important factors that have contributed to the labor market outcomes in Europe since World War II. Important countries in Western Europe have experienced 25 years of high unemployment. Substantial fractions of their populations have been unemployed for long periods of time. But it was not like that in the 1960s, and it is very important for us to explain that too, because ultimately we shall attribute the persistently high level of European unemployment after 1980 to the higher safety nets and more generous unemployment benefits systems that prevail in Europe compared to the United States. The epigraph from Krugman (1987) concisely expresses the challenge confronting any such 'high safety nets did it' explanation of high post 1980 European unemployment: European unemployment rates were lower than those in the U.S. during the 50s and 60s despite the fact that Europe had more generous safety nets then too. We explain higher-than-U.S. European unemployment in the 80s and 90s after lower-than-U.S. European unemployment in the 50s and 60s by bringing to light the *macroeconomic* implications of a force whose presence we infer from diverse sources of evidence about how the *microeconomic* risks facing individual workers have increased over time. For short, we label as 'turbulence' the confluence of forces that have increased those risks over time. Our explanation of European unemployment stresses how safety nets influence how workers should cope with the emergence of a more challenging and turbulent economic environment after the early 1980s. Within a model that captures precise notions of *frictional* and *structural* unemployment, we study how an increase in microeconomic turbulence impinges, on the one hand, on a welfare state economy with both high government supplied unemployment insurance (UI) *and* strong government mandated employment protection (EP) and, on the other hand, on a laissez-faire economy with neither of those labor market institutions. We show that in times with low turbulence, the welfare state has lower unemployment but that in turbulent times it has higher unemployment. We shall explain these outcomes in terms of how employment protection suppresses frictional but not structural unemployment.

This paper is organized as follows. Section 2 briefly recalls recent patterns of Swedish unemployment and how we sought to explain them in Ljungqvist and Sargent (1995a,b, 1997). Section 3 describes facts about European and U.S. unemployment outcomes, labor market institutions, and earnings volatility that we use to frame the theoretical and computational work that we describe in sections 4 and 5. Section 6 interprets outcomes in Sweden in light of our model. Section 7 concludes by discussing proposals for reforming Swedish labor market institutions.

# 2 Our mid 1990s analysis of Sweden

## 2.1 Salient facts about Sweden

We synthesized our quantitative explanation for the intertemporal pattern of Swedish unemployment portrayed in that first graph of Lindbeck et al. (1994) by building a model that could incorporate the following empirical patterns that we detected in the Swedish experience.

- The Swedish UI system had offered generous benefits to insured male blue-collar workers since the beginning of our time series, but the replacement ratio for all unemployed workers started to increase in the mid 1970s and had almost converged with the generous replacement ratio of insured male blue-collar workers by the mid 1980s.
- Swedish income taxes became substantially more progressive – marginal tax wedges went above 70 percent for both blue-collar and white-collar workers in the 1970s.
- The Swedish government was exceptional among European countries in intervening in workers' search processes by monitoring them to make sure that they accepted job offers that the government deemed to be acceptable.

To us, the search model of McCall (1970) seemed an ideal vehicle for bringing in these features.[2]

## 2.2 Our mid 1990s McCall search model for Sweden

The classic single-worker search model of McCall (1970) envisioned an infinitely lived, risk neutral unemployed worker who discounts the future at a constant factor $\beta \in (0,1)$. At the beginning of each period that he is unemployed, the worker draws one offer to work forever at a wage $w$ from a c.d.f. $F$. If the worker accepts the offer, he receives present value $\frac{w}{1-\beta}$. If he rejects the offer, he receives unemployment compensation $c$ this period, and must wait one period until getting a new draw. The value of taking this option is $c + \beta Q$, where $Q$ is the expected value for the problem of an unemployed worker at the beginning of a period *before* he has drawn a wage offer. Successive draws from $F$ are statistically independent.

The McCall worker optimally rejects offers less and accepts offers greater than a reservation wage $\bar{w}$. Key implications of McCall's model are that $\bar{w}$ increases with increases in unemployment compensation $c$ and also with mean-preserving increases in the spread of the offer distribution $F$.

Ljungqvist and Sargent (1995a,b, 1997) adapted and extended McCall's model to create an equilibrium model of the Swedish unemployment experience. We added the following ingredients to the basic McCall model: (a) each period, a worker makes a search intensity

[2]While we accepted what we understood to be a consensus view that other active labor market programs had minimal effects on labor market outcomes, we decided to highlight the government's monitoring program in our theoretical work.

decision that affects the probability that he succeeds in drawing offer from $F$; (b) instead of drawing a single wage forever, a job offer entitles a worker to work at a wage that will be occasionally reset by drawing from some distribution $G$; (c) there is a fixed rate of exogenous job destruction, so all jobs eventually end; (d) a progressive tax system transforms the pretax distributions of wages $F$ and $G$ into post-tax distributions that are more compressed;[3] (e) the government terminates UI benefits to all workers who reject offers above a government-set minimum acceptable wage $w_g$; (f) a government budget condition and appropriate stationary conditions for the aggregate state of the economy determine equilibrium rates of employment and unemployment complete the model.

Items (a) and (e) created avenues by which unemployment compensation $c$ and the government mandated acceptable wage $w_g$ influenced search intensities and reservation wages. Item (b) created an avenue for endogenous job destruction. The acceptable wage $w_g$ in (e) allowed us to turn on and off a program that earlier researchers had observed to be an unusual aspect of Swedish labor market policies.

This is a model in which countervailing forces combine to determine an equilibrium unemployment rate. *Ceteribus paribus*, more generous unemployment compensation raises the worker's reservation wage, the duration of a typical unemployment spell, and the equilibrium unemployment rate. By decreasing the option value of searching, an increase in the progressivity of taxes causes the reservation wage, the duration of unemployment, and the equilibrium unemployment rate all to fall. By decreasing the reservation wage, a decrease in the government-mandated acceptable wage $w_g$ causes the unemployment rate and the duration of unemployment to fall.

This theory gives the government enough empirically plausible 'handles' for us to explain the above mentioned chart in Lindbeck et al. (1994). Our story is that the tendency for unemployment to increase caused by Sweden's increasingly generous system of government supplied UI before 1990 was offset by the increased progressivity of income taxes and the government's stringent monitoring of workers' acceptance policies (represented by our $w_g$). The 'nightmare' mentioned above is that when we computed an equilibrium with a much higher $w_g$ as a computational experiment to represent a loosening of the government's monitoring program, unemployment exploded, making the 'Sweden in our computer' no different from the average OECD country with its high unemployment rate.

This completes our summary of the situation in Sweden up to the mid 1990s as we interpreted it in Ljungqvist and Sargent (1995a,b, 1997). We now turn to describing unemployment outcomes in Western Europe and how we think we can explain them.

[3]Pissarides (1983) studied how income taxes influence reservation wages by compressing the pertinent after-tax wage distribution confronting a worker searching for a job. In our analysis, we applied that same logic to employed workers who face stochastic upgrades or downgrades on the job and who must decide whether to quit and search for a new job.

# 3 Salient facts about Europe's unemployment experience and 'turbulence'

We divide our brief exposition of the facts into two parts. First, in section 3.1, we summarize how unemployment outcomes and labor market institutions varied over time and between Europe and the United States. Then in section 3.2, we describe a body of microeconomic evidence that provides the 'smoking gun' that explains the puzzle posed in the epigraph by Krugman. We interpret that evidence in light of a model in section 5.

## 3.1 Salient facts about unemployment

Research surveyed by Ljungqvist and Sargent (2007) can be summarized in terms of the following broad findings. First, we state some facts about unemployment and government labor market interventions:

- Because there were higher rates of inflow into unemployment in the U.S., in the 50s and 60s unemployment rates were systematically lower in Europe than in the U.S.
- After the 70s, unemployment became persistently higher in Europe.
- Within both Europe and the U.S., inflow rates into unemployment remained roughly constant between the 50s and 60s, on the one hand, and the 80s and 90s, on the other hand.
- In Europe in the 50s and 60s, average durations of unemployment spells were low. Throughout Europe, they became high after the 70s.
- In the U.S. after the 70s, the average duration of unemployment spells stayed at their low levels of the 50s and 60s.
- In Europe, after the 70s, hazard rates of leaving unemployment fell with increases in the duration of unemployment. The long-term unemployed in Europe constitute a very diverse group but as noted by Machin and Manning (1999, p. 3093): "In all countries there is a higher incidence of [long-term unemployment] among older workers and a lower rate among young workers."
- Government supplied unemployment compensation (UI) has been generous in amount and long in duration in Europe throughout both periods, but it has been stingy in amount and short in duration in the U.S.
- Government mandated employment protection (EP) was stronger in Europe throughout both periods.

## 3.2 Salient facts about 'turbulence'

In this section, we refer to some findings of microeconomists that indicate to us that there has been an increase in what we call turbulence since the late 1970s.

While the volatility of many macroeconomic variables has declined since the 1980s (see e.g. McConnell and Perez-Quiros (2000), and Stock and Watson (2002)), there is extensive evidence of increased volatility of individual workers' earnings in the U.S.[4] In an influential early study, Gottschalk and Moffitt (1994) found that the permanent and transitory variances of log annual earnings both rose by approximately 40% between the periods of 1970–78 and 1979–87. Their findings have proven to be robust across a variety of studies and data sets, as reviewed by Katz and Autor (1999).[5]

Another strand of literature relevant for our notion of turbulence consists of studies of displaced workers. Early contributors such as Topel (1990), Ruhm (1991) and Jacobson et al. (1993) estimate that displaced U.S. workers suffer persistent earnings losses that range from 15 to 30 percent even five years after displacement.[6] Besides administrative data, the most comprehensive source of information about the incidence and costs of job loss in the U.S. is the Displaced Workers Survey (DWS), a biennial supplement to the Current Population Survey since 1984. (See Farber (1997, 2005) for summaries of DWS studies.) We acknowledge that the substantial earnings losses experienced by displaced U.S. workers since the 1980s by themselves say nothing about *increased* turbulence between the 1950s-1960s and the post 1980s, since that would require evidence from similar displaced worker studies from the 1950s and 1960s, which unfortunately do not exist. Perhaps the lack of interest then among both academic researchers and the popular press suggests that worker displacements where less disruptive in those days, but this cannot be known without the historical data.

The central question is whether disruptive labor market experiences have become more common since the 1980s. Evidence that they have is provided by Kambourov and Manovskii (2005), who document a substantial overall increase in occupational and industry mobility

[4]Other studies have documented increased firm-level volatility (see e.g. Campbell et al. (2001), and Comin and Philippon (2005)). Davis et al. (2006) offer a qualification by showing that the increased volatility pertains to publicly traded firms while the volatility among privately held firms has, in contrast, fallen significantly since the 1980s and has almost converged to that among publicly traded firms.

[5]In a recent study by the Congressional Budget Office (2007), Social Security records are shown to be consistent with earlier findings that are based on publicly available survey data. The administrative records confirm that workers have experienced substantial earnings variability that has remained roughly constant between 1980 and 2003. Likewise, there is evidence that the earnings volatility has increased for men between 1960 and 1980 (when computed for the bottom two quintiles of the earnings distribution since recorded earnings in 1960 were truncated at the Social Security maximum taxable income that was relatively low). However, the increase in earnings variability among men was offset by a decrease among women. Note that if the latter observation reflects a secular increase in the persistence of women's labor force participation, it needs not contradict our hypothesis of increased turbulence between the 1960s and 1980s.

[6]There are fewer studies available in Europe. But a common finding seems to be that both earnings losses *and* reemployment probabilities of displaced workers are smaller in Europe than in the United States. For Germany, Burda and Mertens (2001) remark: "As only around 80% of all displaced workers [in Germany in 1986] are observed in socially insured employment even 4 years afterwards, it seems that lower displacement wage losses in Germany come at the cost of lower reemployment probabilities."

in the U.S. over the period 1968–1997. Citing an earlier study by Rosenfeld (1979), who showed that occupational mobility was constant in the 1960s, Kambourov and Manovskii argue that a more turbulent economic environment is a phenomenon of the last 30 years.

Our view that turbulence has increased since the late 1970s is not universally accepted, e.g. Layard et al. (1991) offer one skeptical voice.[7] But others like Heckman (2003) find the evidence of increased turbulence persuasive, as summarized in his wide ranging talk at the 2003 Munich economic summit:

> "A growing body of evidence points to the fact that the world economy is more variable and less predictable today than it was 30 years ago.... [there is] more variability and unpredictability in economic life ..." Heckman (2003, pp. 30–31)

In our theoretical model, we define an increase in *turbulence* as an increase in the probability that an involuntarily displaced worker loses human capital. We have used the microeconomic evidence of increased earnings variability and earnings losses of displaced workers described in Gottschalk and Moffitt (1994) and Jacobson et al. (1993), respectively, as checks on the realism of the model that we constructed to explain the macroeconomic outcomes about inflows and outflows, and durations, and levels of unemployment described in section 3.1. We report some results of these checks in section 5.4.

# 4 Extensions of the Basic Search Model for analyzing Europe

To construct a theory of European unemployment, we again started from the basic McCall model, then added the following features:

*1. Age*

A worker moves stochastically through four age groups with transition probabilities calibrated to represent the following age groups: 20-45, 45-50, 50-55, 55-60. We use only four age groups to control the dimension of the state for an unemployed worker. We want to include age as a state variable, and use a finer grid for older workers, because adverse welfare state dynamics that we describe below threatens to affect older workers especially.

[7] Layard et al. (1991, p. 46) used measures of sectoral reallocation when they asked and answered the question: "has turbulence increased since the 1960s in a way that could help to explain increased unemployment? The answer is a clear no." They computed the proportions of jobs in each industry in adjacent years and then took the changes in each proportion. After summing the positive changes to get a measure of the proportion of employment switching industries, they found that turbulence had not increased enough to explain the emergence of high European unemployment. However, we think that their definition of turbulence is not the appropriate one from the perspective of individual workers. The restructuring of the U.S. steel industry in the 1980s can serve as an example. While the decline and subsequent recovery of that industry might have left a small imprint on measures of sectoral reallocation, the consequences for workers initially employed in that industry were dramatic. As studied by Shaw (2002), the restructuring led to new hiring standards that meant that workers laid off at older, declining steel mills were not considered for employment at the newer steel mills.

*2. Job termination and stochastic wages on the job*

We retain the features from Ljungqvist and Sargent (1995a,b) that a previously employed worker faces a probability $\lambda$ that the job ends exogenously, and his wage rate on the job evolves stochastically, with occasional new draws from the distribution $F$ resulting in job upgrades or downgrades.

*3. Human capital or skills*

We make earnings depend on a worker's 'human capital' or skills and let human capital appreciate when the worker is employed and depreciate gradually during spells of unemployment. Their levels of human capital differentiate workers. Unemployed workers set reservation wages and search intensities that depend on their skill levels because the 'option values' of search and the rewards to more intensive search depend on skill.

We specify $H$ potential skill levels, ordered from lowest to highest. We also specify two sets of transition probabilities that describe the motion over time of skills. One set of transition probabilities applies when a worker is *employed*, and probabilistically impel skills upward. Another set of transition probabilities applies when a worker is *unemployed*, and probabilistically cause skills to deteriorate.

We set a worker's total earnings equal to the product of a 'base wage,' drawn from the exogenous distribution $F$ and the worker's skills. During a spell of employment, a worker who starts from a low level of skills can expect his earnings gradually to grow because his/her skills grow, subject to the caveat that the base wage might also change on the job. The worker takes into account the likely growth of earnings in formulating his reservation wage and search intensity. The worker also takes into account the way unemployment compensation depends on past earnings.

*4. Earnings-dependent unemployment compensation (UI)*

The basic McCall model has a fixed level of unemployment compensation that is independent of the worker's earnings during his previous employment spell. To be more realistic, we modify this feature by linking unemployment compensation to earnings attained on the previous job. This substantially affects the option value of search, and makes it depend on the worker's current skill level, the law of motion of those skills, and the worker's previous earnings. How unemployment compensation alters this option value and its dependence on past earnings is an essential part of our analysis.

*5. Employment protection (EP)*

To represent a government mandated employment protection concisely, we impose a tax on all job destruction except when a worker retires by exiting the highest age group and leaving the labor force.

*6. Representing economic turbulence*

Our model contains two types of parameters that in principle can be used to represent labor market 'turbulence': the 'firing' or job dissolution parameter $\lambda$, and parameters governing the rate at which human capital depreciates while unemployed. We choose to use one

particular parameter from the latter set to measure turbulence, namely, a parameter that sets the one-time depreciation in skill level that an employed worker experiences upon an exogenous job termination. In 'tranquil times', we let such a worker experience no *immediate* depreciation in human capital; but in 'turbulent times', we expose that worker to a risk that there is a one-time reduction in human capital. This is our way of capturing the disparity in skills used in different jobs. In tranquil times, skills are more transferable across jobs than in turbulent times – turbulent times are ones with more rapidly changing job descriptions.

## 4.1 Consequences of the additional features

The modifications of the basic model alter the incentives that an unemployed worker faces. An unemployed worker's choice of search intensity and reservation wage depend on his skill level, his current entitlement to UI benefits, which in turn depend on his skill level at the time his previous job was terminated, and his age. Because his job may terminate, the unemployed worker takes into account not only his current unemployment compensation, which is linked to his *past* earnings, but also the fact that his *future* unemployment compensation will be linked to his *future* earnings, which in turn depend on his base wage and his human capital level. The present value of these future compensations depend on the worker's age. Because his human capital level deteriorates with the passage of time spent unemployed, the worker will balance the benefits of waiting for a higher 'base wage' against the prospects of further deterioration of human capital while unemployed.

High unemployment compensation sets the following trap. Consider a worker who had relatively high earnings before he was dismissed, and who therefore qualifies for a high level of unemployment compensation. This person's reservation base wage and search intensity both depend on his human capital level. Early in a spell of unemployment, the worker searches intensively, and sets a 'reasonable' reservation base wage, because his earnings are the product of that wage and the human capital level, and even for typical wages, the associated earnings compare favorably to unemployment compensation. However, if the worker remains unemployed for a while and finds himself with a lower level of human capital, the incentives confronting him change adversely. His unemployment compensation remains high (because it is tied to his previous earnings), but for any given prospective draw from the 'base wage' distribution, his earnings are lower because of his diminished human capital. Because the benefits of searching have declined relative to the compensation for remaining unemployed, the worker will tend to search less intensively *and* to set a higher reservation base wage. Both of these types of behavior will diminish the worker's probability of leaving unemployment and increase the mean duration of unemployment. The likelihood that a worker falls into this trap depends on his age, the risk being greater than an older worker will become discouraged from making the kinds of search intensity and wage acceptance choices that would be likely soon to return him to work.

Human capital acquisition can also provide a source of 'quits' or voluntary separations. It can occur that a worker with low human capital accepts a lower base wage than one who has higher human capital. Having accepted a low-base-wage job, but then experienced growth

in human capital, the worker can find it optimal to quit his job, and search for a higher base wage to capitalize on his higher human capital.

The dynamics coming from human capital are too difficult to work out analytically. But they can be worked out with the computer, which is what we have done in Ljungqvist and Sargent (2007).

## 4.2 An equilibrium as a system of lakes and streams

The search model is about the experiences of an individual worker as time and opportunities pass. We can use it as a building block to model the behavior of a large number of *ex ante* identical but *ex post* diverse workers composing a complete labor market. The key step in building a model of the labor market is to reinterpret the search model's *individual* descriptive statistics – average duration of unemployment, average accepted wage, average times between incidents of quitting or being laid off – as applying to the average at any point in time of a large number of 'statistically identical' individuals.

Imagine the labor market as a set of lakes connected by inlet and outlet streams (see figure 1). The volume of water in each lake represents the number of people in a particular labor market state (e.g., employed, unemployed and having quit a previous job, unemployed and having been laid off from a previous job, unemployed because of having just entered the labor force), and the flows between lakes represent rates of hiring, laying off, and quitting. The system is in equilibrium when all lake levels are constant over time, which means that inflows just balance outflows for each lake. The rates of inflow and outflow are evidently the critical determinants of the lake levels. The individual search model lends itself to becoming a model of these inflow and outflow rates. For example, simply reinterpret the probability of job acceptance as determining the *rate* of flow from a state of unemployment to a state of employment.

Within such a model, government supplied unemployment compensation gives rise to expenditures that must be financed. In particular, the size of the unemployment lake (or lakes) determines the total volume of government unemployment compensation payments. We suppose that these are financed from income taxes. In a stationary *equilibrium*, government expenditure rates and tax rates must be set so that the government budget balances.

## 4.3 Some parameters

We report some of the results for the calibrated versions of our model reported in Ljungqvist and Sargent (2007) for two types of economies, one that we call 'laissez-faire' (LF) and other that we call the 'welfare state' (WS). The laissez-faire economy has no UI and no EP. The welfare state economy has UI that is set to approximate a replacement ratio of .6 times earnings on the last job and layoff tax that is set at a what amounts to 14 weeks of the average productivity of all employed workers. We intend LF to represent a stylized version

of the U.S. and WS to stand in for 'Europe'.[8] Other parameters are calibrated in ways that Ljungqvist and Sargent (2007) describe.

Unemployed workers draw base wages from the same truncated normal distribution with range $[0, 1]$. A worker's skill level can assume one of eleven possible levels inside the range $[1, 2]$, among which he moves according to calibrated transition matrices. To represent economic turbulence, we expose a newly involuntarily displaced worker to an instantaneous reduction in his human capital modeled as a draw of a new skill level from a truncated left half of a normal distribution with specified variance, where the right end point of the distribution is the displaced worker's skill level in the latest period of employment just before being laid off. We use this specification to study six different degrees of economic turbulence (with the variance of the underlying normal distribution in parenthesis): T00 (var. 0), T03 (var. 0.03), T05 (var. 0.05), T10 (var. 0.1), T20 (var. 0.2) and T99 (uniform distribution). Only during tranquil times (T00) does the worker retain his skill level from the latest period of employment when laid off. In tables 2 and 3, we use these T labels to denote different levels of turbulence.

# 5 Computational results

We have computed equilibria of our model under the WS and LF settings of government policy for different settings of the turbulence parameter. But before examining the effects of increased turbulence, we first scrutinize equilibrium outcomes in tranquil economic times when there is no turbulence.

## 5.1 Tranquil economic times

Table 1 displays the equilibria of the WS economy and the LF economy when there is no economic turbulence. The WS economy has significantly lower unemployment than the LF economy because of a lower inflow rate into unemployment while the average duration of unemployment is similar across the two economies. As a result, lower unemployment in the WS economy is accompanied by much longer average job tenures than in the LF economy. Ljungqvist and Sargent (2007) explain these outcomes with the aid of a detailed analysis of decision rules for job destruction and a worker's choice of his reservation wage and search intensity. We provide a brief summary as follows.

[8] While unemployment insurance is typically of limited duration, Layard et al. (1991) emphasize the fact that in Europe further benefits are often available for an indefinite period once unemployment compensation has been exhausted. For example, Hunt (1995) describes the German policy in 1983 when unemployment compensation ('Arbeitslosengeld') replaced 68% of an unemployed worker's previous earnings and could be collected up to a maximum of 12 months. And if those benefits were exhausted, means-tested unemployment assistance ('Arbeitslosenhilfe') paid a replacement rate of 58% for an indefinite period. Although a cap was imposed on the amount that one could receive, it affected less than 1% of the unemployed. For additional evidence on generous replacement rates and long benefit durations in Europe, see Martin (1996). Regarding our assumption of costly layoffs in Europe, quantitative measurements are fraught with difficulties but the account of Myers (1964) in footnote 12 suggests a long-standing difference between Europe and the U.S.

In tranquil times (denoted by an index of turbulence equal to T00), table 2 shows that the layoff cost in the WS economy is responsible for the lower unemployment rate. If the LF economy were to impose the same layoff cost, it would have an even lower unemployment rate than the WS economy. The reason for layoff costs being an effective tool for holding down unemployment is simply that such costs make it expensive to lay off workers and as a result, there is much less worker turnover in the economy. The less turnover translates into a lower rate of frictional unemployment. Thus, the analysis dispels a common argument that layoff costs should increase unemployment because firms that anticipate the future payment of layoff costs, find it too costly to hire workers which should cause employment to fall. The problem with this argument is that it is *partial* equilibrium rather *general* equilibrium in nature. The argument apparently treats the payment to a worker as a constant while it is endogenous and changes in our general equilibrium analysis. In particular, payments to workers must adjust downward to restore firms' profitability in response to the introduction of layoff costs. The lower payments to workers do not only reflect the future payments of layoff costs but also the fact that layoff costs interfere with efficient separations in the labor market, i.e., layoff costs give rise to a less efficient allocation of labor in the economy. Hence, we can say that the workers in an economy with layoff costs enjoy longer job tenures at the cost of a less efficient allocation or, that the workers pay for more job security with lower earnings.[9]

The government's policy of paying unemployment benefits in the WS economy does increase unemployment relative to the LF economy. In table 2, it can be seen that unemployment in the WS economy is higher for any level of turbulence and any level of layoff costs relative to the corresponding entry for the LF economy. But it is important to understand why the upward pressure that the benefit system exerts on unemployment in the WS economy is not strong enough to overwhelm the downward pressure from layoff costs in tranquil times, i.e., the WS unemployment rate is lower than the LF unemployment rate in table 1. The reason is that in tranquil times, workers do not incur any immediate skill losses at the time of layoffs and hence, they can search for new job opportunities with pay comparable to their last earnings. So while unemployment benefits do make unemployed workers search a little less diligent than they otherwise would do, they are still relatively eager to recoup their "full" earnings potential in the market place rather than collecting benefits that amount to 60 percent of their last earnings.

It is instructive to take a closer look at an unemployed worker's decision rule for the choice of a reservation base wage (per unit of skill), as defined in section 4. The arguments entering the decision rule are the 'state variables' that describe circumstances relevant for making an optimal decision: the worker's age, last earnings, and current skills. The age determines

[9]The outcome that layoff costs reduce equilibrium unemployment is not unique to our analysis. Despite countervailing forces in search and matching models, Ljungqvist (2002) shows that there is a quantitative presumption that layoff costs reduce unemployment in these models of frictional unemployment. Exceptions in the literature, notably Millard and Mortensen (1997), arrive at the opposite conclusion by making the nonstandard assumption that firms incur layoff costs not only when laying off workers but also after encounters with job seekers whom they do not hire.

the worker's time left in the labor force, last earnings determine the benefits to which he is entitled, and current skills determine his earnings potential. Recall that the earnings in a new job is the product of the worker's skills and the base wage that he draws from the wage offer distribution. As an illustration, figure 2 depicts the reservation base wage of workers in age group 55–60 as a function of their last earnings and current skills. For example, consider a recently laid off worker who has high last earnings which would indicate that this worker is likely to have attained a high skill level in his last job. Such a worker should then also have high current skills because layoffs in tranquil times are not associated with any instantaneous loss of skills. Our argument implies that recently laid off workers are likely to be found on a diagonal in figure 2 with a positive relationship between last earnings and current skills. It is interesting to note that the reservation base wage lies on an almost flat plateau for these unemployed workers – a plateau that extends below the diagonal where lower last earnings mean less generous benefits. It follows that all these workers with similar reservation wages will find jobs at similar rates and the implied average duration of unemployment spells turns out be close to that of the LF economy (as also reported for the aggregates of all unemployed in table 1). In this sense, we can say that the workers in the WS economy have 'reasonable' wage demands.

We find an important hint about what will happen in the WS economy in turbulent times in figure 2. Workers who experience instantaneous skill losses upon layoffs will be positioned above the described diagonal where their benefits are high because of high last earnings while their current earnings potentials are low because of low current skills. Figure 2 suggests that these skill losers will choose much higher reservation wages, i.e., before giving up their generous benefits, they want to find jobs that pay very well per unit of remaining skills. Furthermore, it turns out that because these high reservation wages are hard to find and the generous benefits make it less costly to remain unemployed, an unemployed worker in these circumstances invests less in search by choosing a relatively low search intensity. Ljungqvist and Sargent (2007) show that these adverse incentive effects of generous benefits are most pronounced for the highest age group 55–60.

Fortunately, in tranquil economic times, it turns out that there are hardly any unemployed workers with low skills who are entitled to high benefits based on high last earnings, so the WS economy sustains a low equilibrium unemployment rate in table 1.

## 5.2 Turbulent economic times

When we increase the turbulence parameter in Table 3, the WS economy posts an ever higher unemployment rate, while unemployment is practically flat (with some drift downward) in the LF economy. The emergence of high, long-term unemployment in the WS economy is due both generous unemployment benefits and to high layoff costs.

The decision rules of unemployed workers in turbulent economic times are qualitatively the same as in times of tranquility. But the adverse incentive effects of unemployment compensation in the WS economy are exacerbated in turbulent times because there are now laid off workers who suffer significant amounts of instantaneous skill loss, and they will

choose high reservation wages (as suggested by the decision rule depicted in figure 2). Since these workers' depreciated skill levels are low relative to their recent earnings history, their unemployment benefits, based as they are on their high previous earnings, are very attractive when compared to their current labor market prospects. Therefore, these workers demand a high wage per unit of remaining skill before being willing to give up those generous benefits. Moreover, such high wages are hard to come by, so workers under these circumstances tend to become discouraged and to choose low search intensities. Older laid off workers have a shorter horizon until retirement and therefore less time for any accumulation of new skills, so they are choosier than younger workers before accepting a job and giving up their benefits. These adverse incentive dynamics are absent from the LF economy because past earnings are not a state variable for unemployed workers. Therefore, any laid off worker in the LF economy who experiences an instantaneous skill loss will immediately adjust to the new situation and search diligently for a suitable job given the change in circumstances.

We now briefly examine the effects of layoff costs in the WS economy. Ljungqvist (2002) showed that in a search model like ours, higher layoff costs lower the unemployment rate by reducing frictional unemployment. However, table 2 shows that in turbulent times the effect is reversed in the WS economy because in turbulent times unemployment has both frictional and *structural* components. The structural component contains the long-term unemployed who have chosen to become less active in the labor market. In turbulent times, when agents think about withdrawing from the labor market, both the higher turbulence and the higher layoff cost make labor market participation less attractive by reducing the equilibrium wage. But in the absence of generous benefits, not participating in the labor market is not a viable option. In fact, the negative relationship between layoff costs and unemployment is a robust feature in the LF economy even in the face of variations in the degree of economic turbulence as shown in table 2 (even though it *isn't* such a robust feature of the WS economy).

## 5.3 Summary of macroeconomic findings

Interactions among EP, UI, and turbulence constitute the "smoking gun" that solves the puzzle summarized in the epigraph from Krugman. With our calibration, in tranquil times, most unemployment is *frictional* in the sense that it consists of workers who are actively searching and who expect to find new jobs quickly. In tranquil times, there is little *structural* unemployment consisting of discouraged workers who have already been unemployed for a long time and who do not expect to find jobs soon. The imposition of strong EP serves to suppress frictional unemployment by reducing the inflow of workers into unemployment, thereby lengthening the durations of existing jobs by reducing churning.

Strong EP also reduces frictional unemployment in turbulent times, but now frictional unemployment is not the main problem. In turbulent times, the adverse welfare state dynamics coming from generous UI indexed to past earnings traps a significant minority of workers who have experienced skill losses into structural unemployment. The frictional unemployment fighting tool of EP does nothing to encourage the discouraged workers who have been unemployed for a long time.

This is our explanation for how generous UI benefits led to benign outcomes under a low-turbulence environment but contributed to forming pools of discouraged workers, especially among older workers, when times became turbulent.

## 5.4 Implications about earnings heterogeneity

So far we have described the implications that our way of introducing increased turbulence has for equilibrium aggregate outcomes within the WS and LF regimes. But the computations used to obtain those results contain a rich set implications about the ex post heterogenous workers who inhabit the various versions of the model. We can form artificial panels of these workers and apply to them the same procedures that microeconomists used to ferret out the implications summarized in some of the studies mentioned in section 3.2. This is an independent check on our calibration of the turbulence parameter and other parameters of the model because those microeconomic observations were not among the targets that we used to calibrate the model. It is encouraging to us that by using our model in this way, we have been able to replicate important aspects of earnings dynamics described by Gottschalk and Moffitt (1994) and Jacobson et al. (1993). We describe that exercise in detail in Ljungqvist and Sargent (2007) and summarize it briefly here.

Using the LF economy with economic turbulence indexed by T10 and T20, we generate artificial versions of Gottschalk and Moffitt's PSID panels for 1970–78 and 1979–87, respectively. After applying their method for decomposing each panel's earnings into permanent and transitory components, we arrive at figures 4.a and 4.b as our counterparts to their figures 2 and 4 (reproduced here in our figures 3.a and 3.b). Evidently, an increase in our turbulence parameter spreads the distributions of both components of the Gottschalk-Moffitt decomposition in the direction observed. However, there are differences in the ranges of the distributions. The fact that our distribution of permanent earnings in 4.a spans a smaller range than the Gottschalk-Moffitt data is not surprising. Our artificial panel contains a group of homogeneous individuals who are *ex ante* identical, while the PSID used by Gottschalk and Moffitt comprises a diverse group of American males with different educational backgrounds. It is also noteworthy that the increased earnings variability in the more turbulent period in our Figure 4.b occurs at lower standard deviations than Gottschalk and Moffitt's. In this respect, the increase in economic turbulence in our parameterization for the 1980's falls short of the changes documented for the U.S.

Our figure 6 reproduces figure 1 of Jacobson et al. (1993) (reported here in our figure 5). It shows earnings losses experienced by displaced workers in Pennsylvania in the first quarter of 1982. Using artificial data from the LF economy with economic turbulence indexed by T20, we produce a counterpart of their graph in figure 6. The surprisingly good fit here is obtained for our subsample of separators who have experienced skill losses of at least 30%. These separators constitute roughly one third of all separators in our artificial data set.

# 6 Recent Swedish outcomes

An essential question as posed by Lindbeck et al. (1994) was whether Sweden had succeeded in permanently setting itself apart from Europe starting in the 1980s when the Swedish unemployment rate remained low while Europe experienced sustained higher unemployment. Was the episode in the early 1990s in Sweden only a temporary departure from Sweden's exceptionally low unemployment rate? Or was the higher Swedish unemployment rate in the early 1990s the start of a reversion of Sweden's unemployment rate to a permanent level more typical of most other Western European countries?

We answered this question by using a particular theory of the European unemployment experience. We constructed a model that attributes the historically low European unemployment rates to welfare state institutions that tend to suppress frictional unemployment like employment protection. This part of our theory aligns well with our earlier analysis of the Swedish unemployment experience and after adding the system of monitoring the unemployed in Sweden, our theory can rationalize why unemployment until the 1970s was lower in Europe, and especially in Sweden, as compared to the U.S. Next, our theory attributes the outbreak of persistently higher unemployment in Europe in the 1980s to generous unemployment benefits in times of microeconomic turbulence that increase the volatility of individual workers' earnings prospects. We allege that such turbulence is driven by world-wide developments such as new IT-technologies and competitive pressures coming from globalization. So how has Sweden fared in this context?

Recent economic events that are unfolding in Sweden have made it clear that the national economy has changed and that repercussions from the global market place are greater than ever. As an example, the restructuring of the global automobile industry has reached Sweden with far-reaching implications for its former domestically owned car makes Volvo and SAAB, and their many local subcontractors. Edling (2005) uses this restructuring of the automobile industry to support his argument that the increased specialization associated with the new global economy is here to stay and that it necessitates a more adaptive Swedish labor force in which individual workers are better prepared to make career changes.

To illustrate further the loss of Swedish innocence in the new global market economy, consider the changing fortunes of another "heirloom" in the Swedish economy – Ericsson, an international supplier on telecommunications. The company lost considerable public goodwill in 1997 because of cost-cutting measures that involved mass layoffs in the Swedish city Norrköping. In a public speech that year, the party secretary of the governing social democratic party suggested that Swedish consumers should consider boycotting the company's mobile phones because of its apparent disregard for workers' welfare (Dagens Nyheter 1997). It was not a domestic boycott but rather a weakening international demand for its mobile phones, and ultimately world-wide difficulties in the telecommunications industry, that threatened Ericsson's survival as an independent company. Compared to the high that its share price attained in 2000, the value of the company's equity had tumbled more than 98 percent two years later (Ericsson 2005). Since then Ericsson has regained ground in an intensively competitive international industry and its comeback in mobile phones has fittingly

been undertaken as a joint venture with the large Japanese company SONY.

What has happened to Swedish unemployment in this new economy?

## 6.1 Two views of Swedish unemployment

The lower solid line in figure 7 represents the official Swedish unemployment rate that excludes participants in labor market programs. The unemployment rate explodes during the economic crisis in 1992-93, and remains high for a few years before starting to come down at the end of the 1990s. Since then unemployment seems to have settled down to a somewhat higher level than the historically low Swedish unemployment rate.

The lower dashed line is the unemployment rate when participants in labor market programs are also included in the ranks of unemployed.[10] The difference between the lower dashed and lower solid line are fairly constant with less than 2 percentage points of the labor force in labor market programs at any point in time. An exception occurred in the 1990s when the economic crisis caused enrollment in labor market programs to increase. Since then enrollment has apparently returned to pre-crisis levels.

Edling (2005) offers a different view of Swedish unemployment by asking whether "unemployment is hidden in accounts other than those originally intended for the unemployed?" Edling documents that the number of early retirees and the long-term sick in different geographic regions in Sweden seem to vary with labor market conditions in those regions. The correlation between unemployment and early retirement in local municipalities is especially strong for the older labor force in the age group 55-64. Edling concludes that early retirement is to a large extent used as a measure for labor market policy rather than only for its original purpose of providing insurance against disability.

To impart a time dimension to Edling's argument, we make the following calculations. After summing up all the employed, unemployed including labor market program participants, and early retirees in year 1963, we estimate that the early retirees made up 3.5% of that base. For now, suppose that this fraction constitutes the 'true' fraction of disabled workers in the labor force in 1963 and in all subsequent years. Under this maintained assumption that 3.5% are truly disabled in every year, we can ask what has been an adjusted Swedish unemployment rate in the period 1963-2004 after adding to the number of unemployed the 'excessive' enrollment in early retirement. The upper solid line in figure 7 depicts our answer.

Using sick insurance data available from 1974, we can make a similar adjustment to the unemployment rate for the number of long-term sick, i.e., those who have received sick insurance benefits for more than one year. The long-term sick can be found both in the labor

[10] Participants in labor market programs are involved in 1) subsidized employment, 2) education or 3) work practice. The first group is counted as employed when computing the official unemployment rate, represented by the lower solid line in figure 7, while the latter two groups are completely left out from the labor force. Hence, starting from the official unemployment rate, the unemployment rate that includes labor market program participants, represented by the lower dashed line in figure 7, is computed by transferring the first group of program participants from employment to unemployment and by adding the latter two groups that are involved in education and work practice to both the labor force and to the ranks of unemployed.

force and out of the labor force. As a first approximation, if we assume that all long-term sick have employment, we find that in 1974 there was 0.5% long-term sick out of the previous base. Under the assumption that 0.5% are truly long-term sick in every year, we can ask how the previous adjusted unemployment rate would look like in the period 1974-2004 if we add the 'excessive' number of long-term sick. The upper dashed line in figure 7 depicts this adjusted unemployment rate that includes both early retirees and long-term sick in excess of their fractions prevailing in 1963 and 1974, respectively.

Our alternative measure of unemployment conveys a very different picture of Swedish unemployment than the official measure, represented by the lower solid line, in figure 7. According to the alternative measure in the upper dashed line, Sweden's unemployment has indeed become more like Europe's since the beginning of the 1990s. But instead of classifying the long-term unemployed as unemployed, Sweden has relabelled many of them as early retirees and long-term sick. Admittedly, unemployment rates in general would have to be adjusted upward to reflect hidden unemployment in social welfare programs other than unemployment insurance.[11] In any case, when the 'activity' of unemployment is properly measured, the fear of Lindbeck et al. (1994) that there would become a large group of permanently unemployed citizens in Sweden seems to have been realized.

## 6.2 Swedish outcomes through the camera of our model

Some observers of the Swedish economy might argue that turbulence is nothing new because in the 1960s there were large migratory flows from the northern to the southern parts of the country and an accelerated urbanization. But such restructuring of the economy is not necessarily associated with the kind of turbulence described in our theory. In fact, workers in the 1960s were moving to regions where expanding industries in the manufacturing sector offered better paying jobs than could be found where they came from. Hence, the circumstances in the 1960s were actually the opposite to our theory of *negative* shocks to individual workers' earnings potentials.

Other observers of Sweden might argue for alternative theories that attribute current unemployment problems to the *macroeconomic* shock of the early 1990s. A similar reason that has been offered for the European unemployment dilemma has been that the oil price shocks of the 1970s served as the catalyst for high European unemployment. But as time has

[11] Autor and Duggan (2003) argue that reduced screening stringency since 1984 and rising replacement rates of the disability insurance program in the U.S., have led to a higher propensity of workers facing adverse shocks to exit the labor force to seek disability benefits. Because of the progressive (i.e., concave) benefit formula, they find that these incentive effects apply foremost to high school dropouts who have also experienced adverse demand shifts for their skills in recent decades. Autor and Duggan suggest that the measured unemployment rate in the U.S. would be about half a percentage point higher if the excessive enrollment in the disability insurance program were to be included. Hence, their reasoning is qualitatively the same as our argument for Sweden but the magnitudes are different. According to Autor and Duggan, 3.7% of Americans in ages 25-64 received disability insurance benefits in 2001 while Edling (2005) reports for the Swedish population in ages 20-64 that early retirees comprised 10% in 2004 and another 2.4% had received sick insurance benefits for more than a year in 2003.

gone by that view has become less and less tenable because the transient response to that shock should not have lasted so long. Likewise, our theory suggests that the high incidence of long-term unemployment and early retirement in Sweden of today has little do with the macroeconomic shock of the early 1990s.

An open question is why Sweden seemed to have been spared the European unemployment problem until the 1990s. One could also ask why Belgium was the first country to experience the problem of long-term unemployment already in the 1960s. (See Sinfield (1968).) This is not puzzling in the light of our theory and the fact that there was an economic upheaval in Belgium with massive layoffs in mining and a faltering steel industry. In hindsight, the Belgian experience signalled what the future had in store for the rest of Europe.

Our analysis raises concerns about Swedish labor markets that were not present in our earlier analysis, (Ljungqvist and Sargent 1997), where we proceeded under the assumption that *macroeconomic* shocks had given rise to an increase in the Swedish unemployment rate in the early 1990s that was exogenous to our model. The implication of our earlier model was that Sweden could revert to its historically low unemployment rate if the government could restore its monitoring of unemployed workers and make them accept 'suitable' wage offers. Our present analysis that attributes high European unemployment to increased turbulence complicates the policy problem: what constitute suitable wage offers depends now on shocks to individual workers' earnings potentials that cannot be easily verified by unemployment agencies, making it likely that benefit levels become misaligned relative to those unobserved diminished earnings potentials.

Wages serve as signals that induce workers to find jobs that value their skills highly. Markets award pay increases when workers' skills increase but also make them accept pay reductions when their skills become economically obsolete. Generous unemployment benefits do not interfere with the former but make the latter more difficult. A worker who has experienced adverse labor market conditions might have to leave a long-tenure job and seek employment in a new industry where the pay is lower and where valuable skills must be reconstructed. Needless to say, such transitions are especially difficult for older workers who have shorter horizons and therefore less time to accumulate skills. The challenge of a welfare state with generous unemployment benefits is to provide incentives to workers who have experienced adverse labor market conditions to return to employment. Questions about incentives in social insurance systems are now common in the Swedish policy debate.

# 7 Concluding remarks

In this second generation of the SNS-NBER project, we have extended our analysis of the Swedish unemployment experience in a model that extends our earlier framework. We have widened our inquiry to contrast the experience of Sweden in particular and European welfare states in general to outcomes in a more laissez-faire economy like that of the U.S. Our research strategy has remained one of identifying and analyzing institutions and factors that tend either to decrease or to increase the equilibrium unemployment rate in a welfare

state relative to that of a laissez-faire economy. Among welfare state institutions that tend to decrease equilibrium unemployment in tranquil economic times, our analysis focuses on employment protection that makes it costly for firms to lay off workers. Because government mandated employment protection has been much stronger in Europe since World War II, our model can explain why unemployment rates in the 1950s and 1960s were systematically lower in Europe than in the U.S.[12] The lower rates of inflow into unemployment in Europe are consistent with this prediction because employment protection reduces 'churning' of workers in the labor market and locks workers into their current employment. The result is a reduction in frictional unemployment in tranquil economic times that allow transferability of workers' skills between jobs. The ease with which unemployed workers can find jobs comparing favorable ones in pay and other benefits ensures that the average duration of unemployment spells remains low in a welfare state despite generous unemployment benefits, as in Europe in the 1950s and 1960s.

Concerning the outbreak of high European unemployment after the late 1970s, our analysis starts from *microeconomic* evidence that labor market prospects facing workers have become more variable and less predictable. Our model explains why such turbulent times should cause unemployment to increase in welfare states with generous benefits; our model also says that increase should take the form of long-term unemployment – 'structural' unemployment – with an especially high incidence among older workers. Notwithstanding the apparent delay in the onset of these adverse welfare dynamics in Sweden, we argue that the analysis also pertains to Sweden where the growing numbers of long-term unemployed and early retirees should be a source of major concern.

Our analysis attributes the unemployment problems of Europe in general and Sweden in particular to the adverse incentive effects in a welfare state when workers encounter unfavorable developments in the labor market. While we have modeled those unfavorable developments as negative shocks to laid off workers' earning potentials, it is important to keep in mind that workers' job opportunities can also deteriorate in other ways because of the multi-dimensional character of employment. Thus, the dilemma of the welfare state becomes how to increase job acceptance rates among workers who have encountered unfavorable labor market conditions in one way or another, and who are entitled to generous benefits while staying unemployed. Although it is outside the scope of our paper to suggest a solution to this dilemma, it is useful to comment on various proposals from the perspective of our theoretical framework. Many of the proposals fall within one of two categories: a) measures

[12]Our explanation mirrors the insight developed by Myers (1964, pp. 180–181), Deputy Commissioner at the U.S. Bureau of Labor Statistics, when thinking about possible reasons for the low European unemployment rate in the 1950s and 1960s: "One of the differences [between the United States and Europe] lies in our attitude toward layoffs. The typical American employer is not indifferent to the welfare of his work force, but his relationship to his workers is often rather impersonal. The interests of his own employers, the stockholders, tend to make him extremely sensitive to profits and to costs. When business falls off, he soon begins to think of reduction in force ... In many other industrial countries, specific laws, collective agreements, or vigorous public opinion protect the workers against layoffs except under the most critical circumstances. Despite falling demand, the employer counts on retraining his permanent employees. He is obliged to find work for them to do. ... These arrangements are certainly effective in holding down unemployment."

that attempt to increase the return to work, and b) measures that reduce the return to being unemployed.

## 7.1 Proposals for reducing unemployment in the lens of our model

If government programs for retraining had proved effective in raising the marketable skills of the unemployed, they could be a potent measure for reducing unemployment in our model. But the accumulated empirical evidence on the returns to government arranged retraining programs is not promising. The latest major initiative in Sweden, called the "Knowledge Lift," does not seem to have been an exception. Albrecht et al. (2004) provide an evaluation of this massive program: in the period 1997-2000, more than 10% of the labor force had participated in it. While the study detects a positive employment effect for young men, it finds no evidence of an income effect from the program and hence, older men and the average female participant seemed to have fared no better than non-participants. For a further discussion and summary of studies finding at most minor effect of labor market programs, see Forslund and Krueger (chapter XX in this volume). Our model embodies a stark version of this empirical evidence, by assigning no role to public expenditures on retraining and relief jobs. In our model, displaced workers who incur losses of earnings potential are left to seek employment opportunities where new skills can be accumulated. Our model incorporates an empirically based skepticism about government mandated programs and abstracts from initiatives by individual workers who acquire formal education in response to perceived market opportunities.

Other measures aimed at increasing the return to work include proposals to subsidize employment of long-term unemployed workers. Such measures would certainly reduce unemployment in our model because the subsidies would come on top of the return to the workers' marketable skills and because in a competitive labor market, the subsidies would be reflected in workers' pay. Hence, a policy-induced artificial increase in workers' earnings potentials would motivate them to search more intensively and be more willing to accept new employment. We have two doubts about targeted employment subsidies. First, there would be incentives for both firms and workers to try to qualify for these temporary subsidies. Such behavioral responses are well-known for policies that attempt to single out and subsidize some marginal actions like new hires by firms. Second, the risk that subsidies distort competition in the market place is always a concern. An illustration of the latter would be a case where an unemployed worker gets a subsidy to cover some of his/her pay when starting a new coffee house. Needless to say, existing coffee house in the same community would be at a disadvantage in the competition with the new subsidized entrant. Therefore, as an alternative to targeted subsidies, one might want to consider measures aimed at improving the return to work for low-income workers in general, like recent proposals to reduce taxes at lower income levels. Such labor supply inducements for low-income workers would necessarily be more costly than targeted employment subsidies, but they could also be seen as serving the overall "workfare" goal espoused by Björklund and Freeman (chapter XX in this volume).

A reduction in benefit levels is the most obvious measure that reduces the return to being unemployed, and it would clearly reduce unemployment in our model. However, proposals prescribing benefit reductions for the long-term unemployed have been criticized for abandoning the European welfare model and for advocating a stinginess resembling that of social insurance systems in the U.S. It is probably safe to say that there is a strong European sentiment that the low benefit levels for the long-term unemployed in the U.S. would not be acceptable in Europe. The question becomes then how to reform the unemployment insurance system so that it provides proper incentives while preserving the social fabric of Europe. After recognizing that the task is to reduce the return to being unemployed *relative* to being employed, one shortcoming of our model stands out – the value of leisure enters only in the workers' decision to search for jobs whereby a choice of higher search intensity is associated with exerting more effort, i.e., a loss of leisure. The model incorporates no disutility of working relative to the enjoyment of leisure while not working. If this feature were to be added to our model, proposals to reduce the return to being unemployed would not necessarily have to take the form of reduced benefits but could also be accomplished by reducing the amount of leisure available to the unemployed.

Requiring that the long-term unemployed perform 'social work' commensurate to the number of hours in a regular full-time job could markedly reduce the return to unemployment compared to employment.[13] If the states of unemployment and employment are not that different in terms of hours devoted to either social work or regular work, unemployment benefits would become much less attractive when compared to earning a wage in the market place. In addition to providing incentives for the unemployed to return to regular employment, social work requirements would address concerns about the mental health of the unemployed. Jahoda (1982) identifies a number of psychological benefits from working, including the joy of participating in useful social activities and the daily structure that regular activities provide. Apart from the economic hardship of being unemployed, Nordenmark and Strandh (1999) document from a longitudinal survey of unemployed Swedes that a standard measure of poor mental health is correlated with the extent to which individuals feel socially deprived by not having a job. It seems that unemployed workers "who have, or manage to find, alternative roles and identities to the role of employee fare quite well." In this perspective, social work requirements would aid those who have lost jobs and yearn to join a social context with the ultimate goal of securing regular employment and also provide work incentives for those who have become complacent in a life of benefit dependence. From a budgetary perspective, the measure would not cost anything in term of payments to the unemployed since they already receive benefits, and the social needs that could be met when the unemployed perform social work assignments would presumably outweigh the administrative costs of the program.

[13]Ljungqvist (1999, sect. VI) discusses a number of conditions that a social work program for the unemployed should satisfy. A key condition is that the assignments should fall within a well-delimited range of work that would not distort competition in the rest of the economy. Because of high turnover rates, the tasks should require minimal skill requirements. The fact that social work would not earn a market wage qualifies it as a labor market program rather than an alternative to regular employment.

A new Swedish labor market program, called the "Activity Guarantee," was introduced in 2000 with the goal of strengthening labor market prospects of UI recipients who are at the risk of becoming long-term unemployed. The program participants are entitled to unemployment benefits but participation is also supposed to imply full-time activity. The unemployment agencies are instructed to organize both individual and group activities for the participants to be engaged in job search, regular labor market programs, studies or activities arranged by firms, municipalities and other government agencies. Implementation of the program has encountered difficulties, as reported by Forslund et al. (2004). More than half of interviewed supervisors at the unemployment agencies complain about insufficient information about how to organize the activities and lack of manpower is cited as an explanation to why a quarter of the agencies have been unable to offer full-time activities. It can also be noted that only a small fraction of those with long unemployment spells have entered the program – the fraction was less than 3% among those with spells of at least 2 years. Despite the rather negative assessment of the program to date by Forslund et al., we see this measure as a potential tool for implementing the social work requirement discussed above.[14]

## 7.2 Jobs are not the bottle neck

Whether there are enough jobs available in the economy is a question that is often raised in discussions of reforms aimed at reducing unemployment. In our search model, there is no lack of jobs because the unemployed search against a wage offer distribution where one worker's decision to accept a job does not impinge on the ability of other workers to find jobs commensurate to their earnings potentials. Both historical evidence and economic theory support the notion that market economies will create jobs in response to workers' aspirations that reflect their marketable skills. For example, Blanchard (2006, p. 24) notes that "even in economies with high unemployment, exogenous movements in the labor force – due to demography or repatriation, such as the return of European nationals after the independence of former colonies – translate fairly quickly into movements in employment." In their treatise about European unemployment, Layard et al. (1991, p. 73) also refute the view that the available work in an economy is given – the "lump-of-output fallacy." As a consequence, they forcefully argue that early retirement and work-sharing are not solutions to Europe's problem but rather "excellent way[s] of making a country poorer." Against this background, a recent Swedish initiative, called the "Free Year," that furloughs gainfully employed workers into a sabbatical year so that their vacant positions can be offered to the

[14] In addition to the considerations mentioned in footnote 13, Ljungqvist (1999) argues for why social work requirements should be imposed in a gradual fashion over unemployment spells. First, as in the analysis of optimal unemployment insurance by Shavell and Weiss (1979), the foremost purpose of imposing work requirements or reducing benefits is to provide the unemployed with correct incentives in their choice of search intensities and reservation wages. The anticipation of a future imposition of a work requirement, like the anticipation of a future reduction in benefits, induces an unemployed to adjust his or her search behavior so that the probability of gaining employment increases already today. Second, the gradual imposition is warranted because, in contrast to reductions in benefits, work requirements reduce the time left for the unemployed to search for regular employment.

unemployed seems perverse.

## 7.3 Reform is imperative

Measures that facilitate job creation, such as those aimed at improving the conditions for entrepreneurs and small firms as discussed by Davis and Henrekson (chapter XX in this volume), would certainly be helpful when trying to reduce the ranks of the unemployed and early retirees in Sweden. However, we would like to emphasize that real success hinges critically upon reforms that increase the returns to employment relative to unemployment for workers who have experienced unfavorable labor market outcomes. Reform here is imperative because a culture of non-employment is not only difficult to reverse but is also unfair to individuals lured into prolonged periods of non-activity. They are exposed to the political risk that the "rules of the game" will ultimately change and that they will have to return with much diminished skills to a harsher labor market. The difficulties that France and Germany are having in implementing labor market reforms after decades of long-term unemployment ought to serve as an early warning and to spur reform efforts that could spare Swedish workers future hardships.

## 7.4 Post scriptum – a new Swedish government and policy

Most observers of the Swedish national election in September 2006 attribute the defeat of the incumbent social democratic government and the victory of the centre-right coalition to differences in labor market policies. While the former government promised to raise the cap on labor income below which the social insurance system replaces lost earnings during joblessness, the opposition offered a different vision in which benefit dependency and the ranks of the jobless should be reduced by, among other things, increasing the relative return to work over non-employment. Besides tax breaks on labor income, the new centre-right government has decided to reduce replacement rates over unemployment spells and to impose activity/work requirements (see Swedish Government (2007a,b)). The replacement rate in the UI system becomes 80% during the first 200 days of an unemployment spell, 70% during the next 100 days, and 65% thereafter. (Parents with children are allowed longer benefit durations at the higher replacement rates.) After 300 days of unemployment, benefit recipients are entitled and obliged to participate in a "Job and Development Guarantee" that replaces the earlier "Activity Guarantee" discussed above.

There are quite a few overlaps between these measures of the new Swedish government and our own proposal for reducing unemployment. Since the government's lowest replacement rate of 65% is likely to be close to what is 'socially acceptable' in Sweden, we believe for the reasons stated above that it will be vital how the "Job and Development Guarantee" is designed in practice. The Swedish Government (2007a, p. 34) lays out three phases for an unemployed worker who enters this program: the first phase focuses on assistance with intensified job search, the second phase involves a battery of instruments including retraining, trainee work, subsidized employment and other activities aimed at raising the

level of competence, and the final third phase prescribes that "someone who has failed to gain employment after 450 days under the Job and Development Guarantee, is assigned lasting socially valuable work that corresponds to the participant's full labor supply." We might quarrel about the duration and timing of the different phases, but we prefer to reiterate on our comment above that the last third phase will be crucial for successfully reducing the ranks of the non-employed. Properly designed, what we called 'social work' will provide potent incentives to those non-employed who are able to return to regular employment and also serve as a meaningful source of activity for those who are unable or unwilling to make that transition.

Table 1: Equilibrium values for the WS economy and the LF economy (under no economic turbulence)

| | **WS** | **LF** |
|---|---|---|
| Unemployment rate | 3.83 % | 5.70 % |
| Inflow into unemployment per month[a] | 2.06 % | 3.39 % |
| Average unemployment duration[b] | 7.73 weeks | 7.13 weeks |
| Percentage of unemployed with spells so far $\geq$ 6 months | 2.87 % | 1.73 % |
| Percentage of unemployed with spells so far $\geq$ 12 months | 0.08 % | 0.02 % |

[a] The monthly inflow into unemployment is expressed as a percentage of employment.
[b] The average unemployment duration is computed by dividing the unemployment rate by the inflow rate, when both rates are expressed as percentages of the labor force.

Table 2: Unemployment effects of layoff costs with different degrees of economic turbulence. (Tranquil times have an index of turbulence equal to T00.)

| | **WS economy** | | | **LF economy** | | |
|---|---|---|---|---|---|---|
| *Layoff cost*[a] / *Turbulence* | 0 | 5 | 10 | 0 | 5 | 10 |
| T00 | 5.85 | 4.77 | 3.83 | 5.70 | 4.43 | 3.51 |
| T03 | 5.65 | 4.74 | 4.18 | 5.24 | 4.14 | 3.23 |
| T05 | 5.76 | 5.03 | 5.06 | 5.18 | 4.06 | 3.16 |
| T10 | 6.01 | 5.92 | 6.75 | 5.11 | 4.03 | 3.19 |
| T20 | 6.31 | 7.00 | 8.76 | 5.07 | 4.00 | 3.19 |
| T99 | 6.60 | 8.08 | 10.95 | 5.02 | 3.98 | 3.24 |

[a] A layoff tax of 5 (10) corresponds to roughly 7 (14) weeks of the average productivity of all employed workers.

Table 3: Equilibrium values for the WS economy and the LF economy with different degrees of economic turbulence

| | | **Index of economic turbulence**$^{\star}$ | | | | | |
|---|---|---|---|---|---|---|---|
| | | T00 | T03 | T05 | T10 | T20 | T99 |
| Unemployment rate (%) | WS | 3.83 | 4.18 | 5.06 | 6.75 | 8.76 | 10.95 |
| | LF | 5.70 | 5.24 | 5.18 | 5.11 | 5.07 | 5.02 |
| Inflow into unemployment$^{a}$ | WS | 2.06 | 2.05 | 2.03 | 2.00 | 1.99 | 1.97 |
| (% per month) | LF | 3.39 | 3.33 | 3.30 | 3.27 | 3.25 | 3.23 |
| Average duration of unempl.$^{b}$ | WS | 7.73 | 8.53 | 10.52 | 14.47 | 19.34 | 25.00 |
| (in weeks) | LF | 7.13 | 6.64 | 6.63 | 6.59 | 6.57 | 6.56 |
| Percentage of unemployed with | WS | 0.08 | 9.67 | 23.53 | 41.10 | 54.14 | 62.64 |
| spells so far $\geq$ 12 months | LF | 0.02 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |

$^{\star}$ A higher index of economic turbulence is associated with a higher variance of skill losses at layoffs.

$^{a,b}$ See corresponding footnotes in table 1.

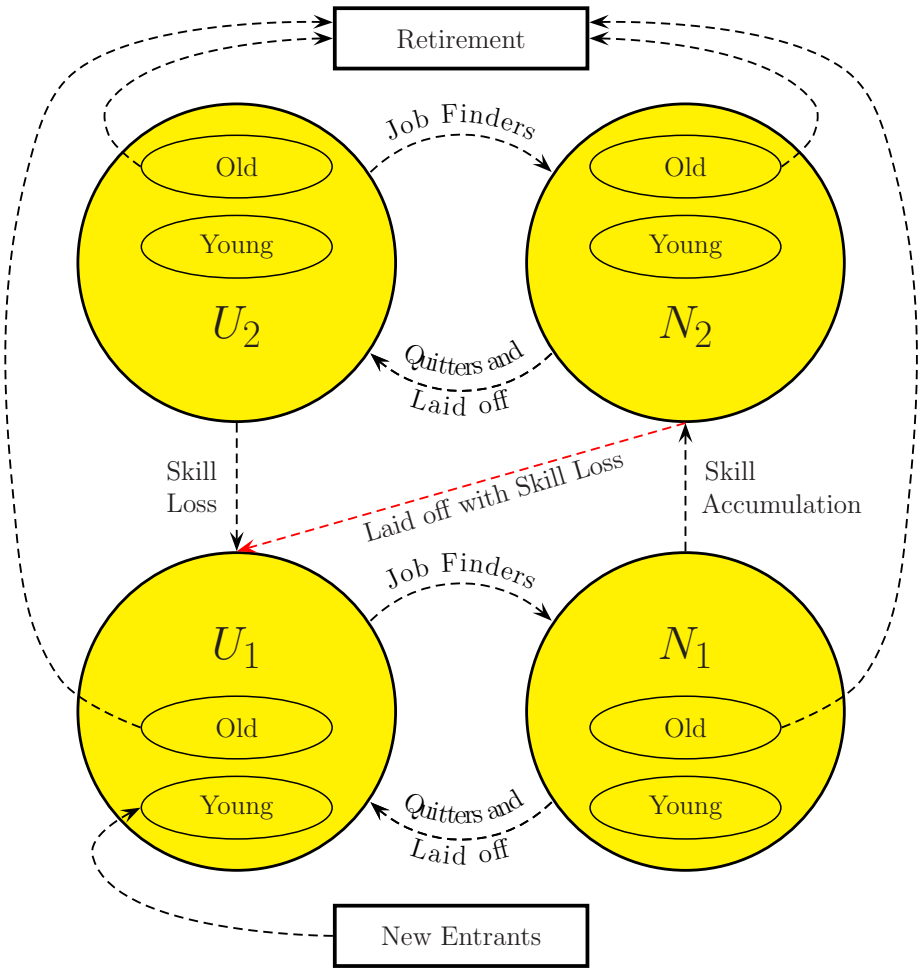



Figure 1: Search model of the labor market. $U_i$ and $N_i$ refer to pools of unemployed and employed, respectively, where the subscript denotes the skill level of workers in a particular pool with skills increasing in the index $i$.

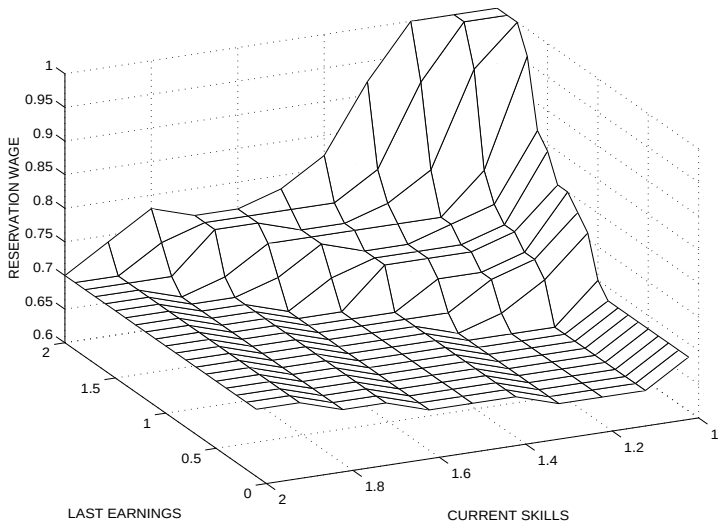
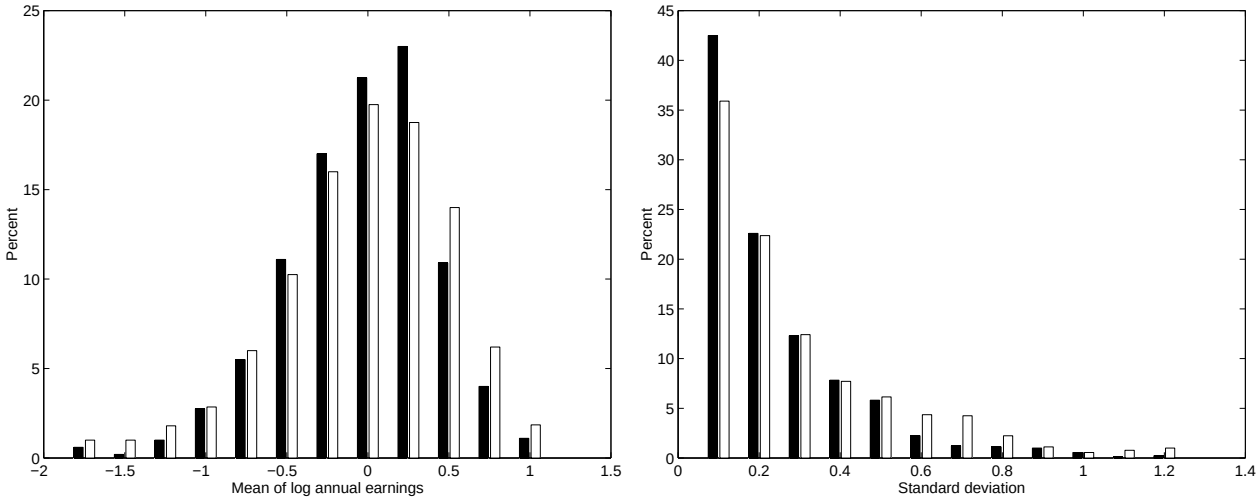


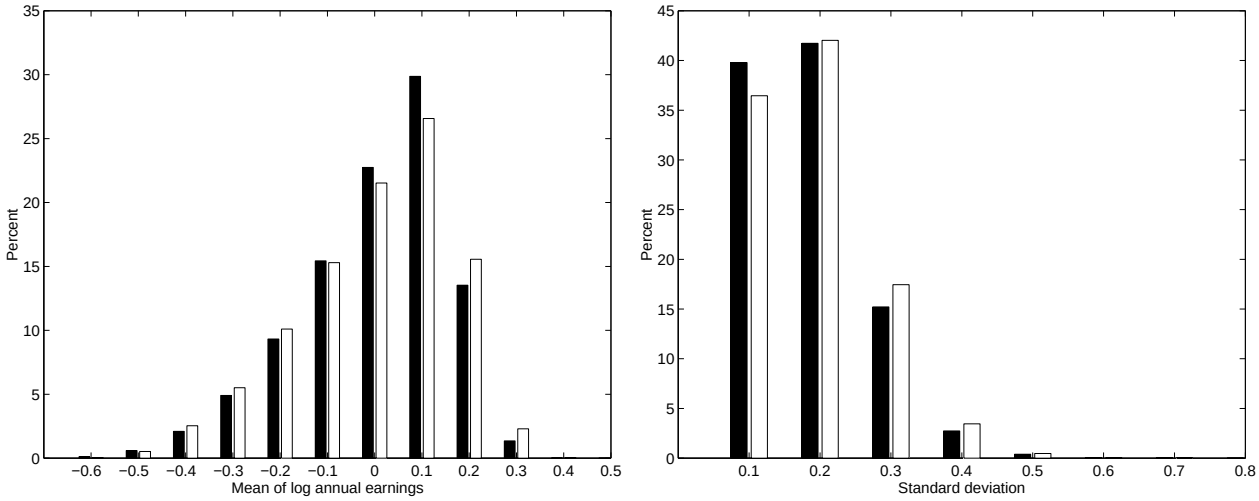

Figure 2: Reservation base wage of the unemployed in age group 55–60 who are eligible for unemployment compensation in the WS economy (under tranquil economic times)




(a) Distribution of permanent earnings

(b) Distribution of standard deviations of individuals' transitory earnings

Figure 3: Reproduction of Gottschalk and Moffitt's (1994) Figure 2 (a) and Figure 4 (b). The black bars correspond to 1970-78, the white bars to 1979-87




(a) Distribution of permanent earnings

(b) Distribution of standard deviations of individuals' transitory earnings

Figure 4: Simulated laissez-faire economy. The black bars and the white bars correspond to degrees of economic turbulence indexed by T10 and T20, respectively


Figure 5: Quarterly earnings of high-attachment workers separating in the first quarter of 1982 and workers staying through 1986. The solid line refers to stayers, the dashed line separators. Reproduction of Jacobson et al.'s (1993) Figure 1, omitting their last observation because it was based on an insufficient sample.

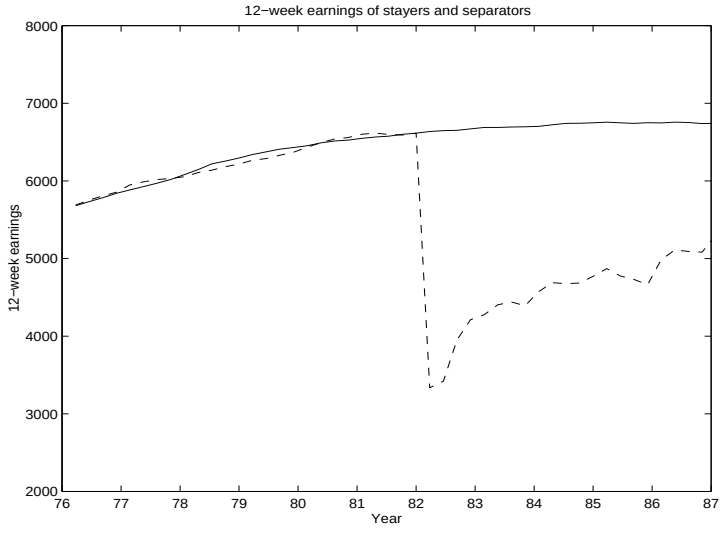



Figure 6: Simulated quarterly earnings of high-attachment workers separating in the first quarter of 1982 with skill losses exceeding 30% and workers staying through 1986. The solid line refers to stayers, the dashed line separators. The simulation is based on the LF economy with economic turbulence indexed by T20. (The earnings numbers are multiplied by a factor of 700 to facilitate comparison with the empirical study by Jacobson et al. (1993).)

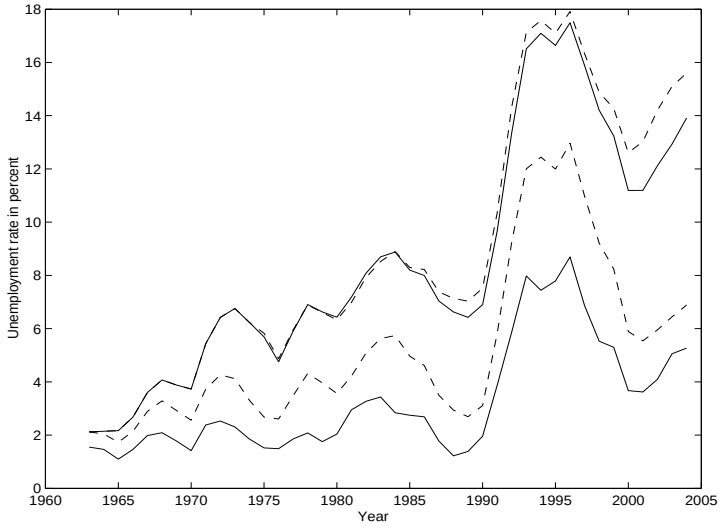



Figure 7: Measures of Swedish unemployment. The lower solid line is the official unemployment rate, and the lower dashed line is the unemployment rate after adding participants in labor market programs. The upper solid line is an adjustment of the latter unemployment rate that includes also 'excessive' enrollment in early retirement, defined as early retirees in excess of the fraction of early retirement that prevailed in year 1963 (i.e., 3.5% of the labor force). The upper dashed line is yet another adjustment of the unemployment rate that adds the 'excessive' number of long-term sick who have received benefits for more than a year, defined as long-term sick in excess of the fraction of long-term sickness in year 1974 (i.e., 0.5% of the labor force).

*Data sources:* openly unemployed (yearly average), Labor Force Survey, Statistics Sweden (AKU, SCB); participants in labor market programs (yearly average), National Labor Market Board (AMS); early retirees and long-term sick (in December), Swedish Social Insurance Agency (Försäkringskassan).

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