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7 Taxes and Subsidies in Swedish Unemployment

Lars Ljungqvist and Thomas J. Sargent

Figure 7.1 reproduces a version of the first chart in *Turning Sweden Around* (Lindbeck et al. 1994). It shows two striking features of unemployment in Sweden in the years after 1960. Until 1992, unemployment in Sweden remained persistently lower than in the average OECD country. After 1992, it jumped to share with other OECD countries a high recession level. This situation prompted Assar Lindbeck and his coauthors to write: "During the 1970's and 1980's, long-term unemployment became a serious social problem in most Western European countries. There is now an obvious risk that Sweden will go the same way. Although Sweden's total unemployment, including people in various labor market programs, has recently reached European levels, long-term unemployment has not yet emerged. It should be an overriding task of economic policy to prevent creating a large group of permanently unemployed citizens—without giving up the ambition of low inflation, an efficient use of economic resources, and satisfactory economic growth" (p. 6).

Our work for the SNS-NBER project has aimed to help understand those two striking features of figure 7.1 and to offer insights about government policies that promote or retard labor market efficiency and flexibility. We focused on three sets of forces that can influence the level and average duration of unemployment: (1) unemployment compensation programs, (2) income tax schedules, and (3) administrative procedures to prevent unemployed workers from abusing the unemployment compensation system. These forces moved in Sweden over the last thirty years in ways that help account for changes in the level and structure of unemployment.

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The views expressed here are the authors' and not necessarily those of the Federal Reserve System.

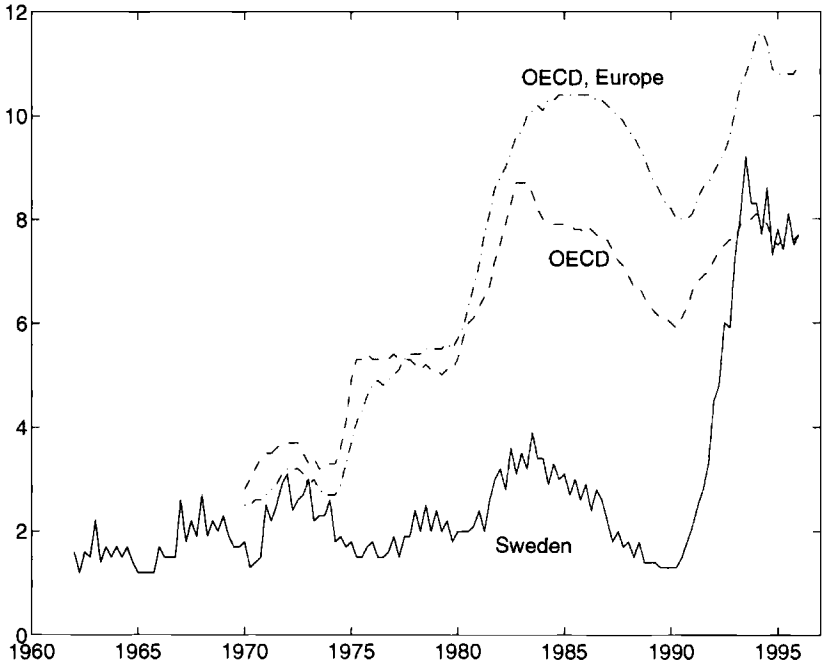

Fig. 7.1 The unemployment rate in Sweden and the OECD average unemployment rate

High and progressive tax systems tend to reduce the level of unemployment, but at a potential cost in terms of decreasing the efficiency of the labor market.[1] Between the 1960s and the 1980s, tax wedges in Sweden increased dramatically, a movement that by itself should have helped keep the unemployment rate low (see fig. 7.2). Between the 1960s and the 1980s, unemployment compensation became more generous (see fig. 7.3), which tended to increase the unemployment rate in Sweden. However, at least until very recently, in order to combat the adverse unemployment effects of generous unemployment compensation, Sweden supplemented its unemployment compensation system with a mechanism to monitor and coax unemployed workers into taking "acceptable jobs." The observed unemployment rate balances these forces.

7.1 Summary of Findings

We interpret the persistently low Swedish unemployment rate from the 1960s through the 1980s as emerging from movements in our three counter-

1. Pissarides (1983) was the first to emphasize the effects of higher tax rates in reducing the unemployment rate in a search model of unemployment. Mortensen (1986), Stigler (1961), and McCall (1970) are key references on search models and their application to labor markets.

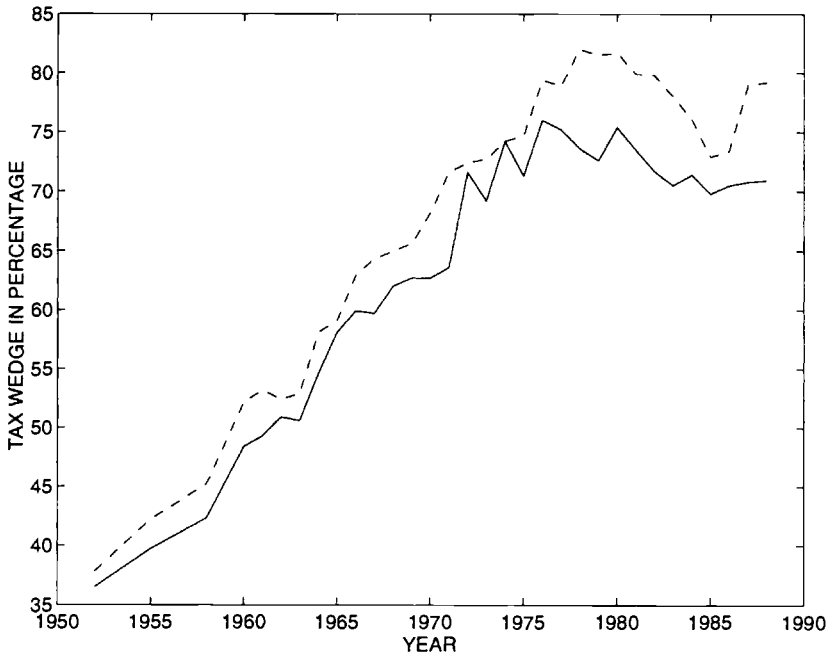

Fig. 7.2 Time-series observations of tax wedges in Sweden
Source: Gustafsson and Klevmarken (1993).
Note: The solid line is the tax wedge for blue-collar workers. The dashed line is the tax wedge for white-collar workers.

vailing forces. In their effects on the unemployment rate, increases in tax wedges and progressivity tended to offset the increased generosity of unemployment insurance benefits. The monitoring program that supplemented the unemployment compensation system to safeguard it from abuse also helps us account for why unemployment in Sweden was as low in the 1980s as it was in the 1960s. We interpret the rise in unemployment after 1992 in terms of a relaxation of that program in response to adverse macroeconomic shocks. In the absence of a resuscitation of that program, and unless unemployment benefit levels are reduced, Sweden is in danger of inviting persistently high levels of unemployment like those borne by other European countries in recent years.

7.2 Two Views of Unemployment

We analyze the juxtaposition of the forces described above with a quantitative model that incorporates aspects of two views about unemployment. One view, that too high an unemployment rate represents waste and inefficiency, was stated by Alan Blinder (1987, 33) when he called unemployment the "biggest inefficiency of them all." The other view, that unemployed workers are not

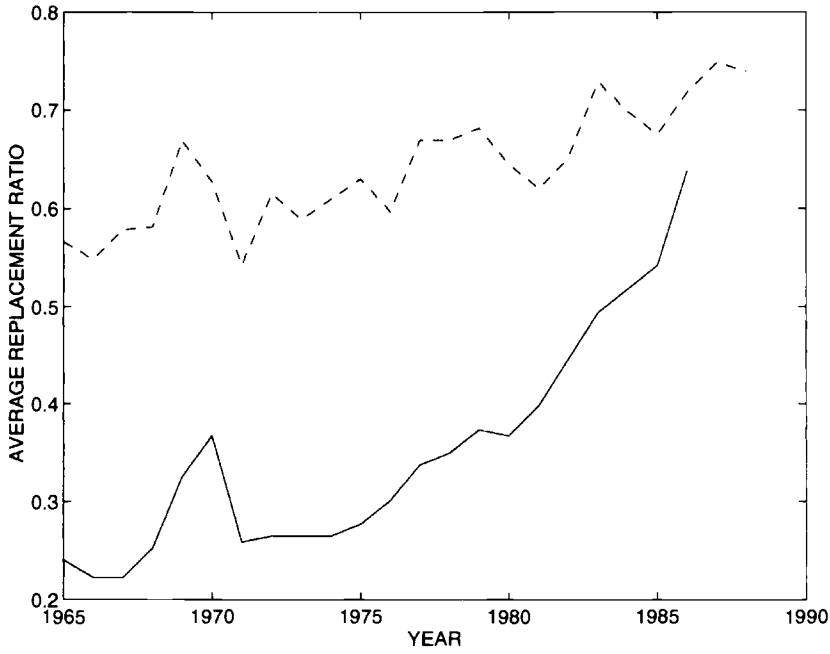

Fig. 7.3 Time-series observations of average replacement ratios in Sweden
Source: Björklund and Holmlund (1991).
Note: The solid line is the average replacement ratio for all unemployed workers. The dashed line is the average replacement among insured male blue-collar workers.

just wasting time but are investing in useful information, was stated by George Stigler (1962, 104), who wrote: "From the social viewpoint, the return from investment in information consists in a more efficient allocation of the labor force: the better informed the labor market, the closer each worker's (marginal) product is to its maximum at any given time." We need a quantitative model to evaluate whether the unemployment rate is too high (resources are being wasted in idleness) or too low (resources are being committed with too little information about alternative and superior uses).

7.3 Overview of a Model

Our analysis is based on a computer model of a labor market that we designed to imitate salient features of the Swedish labor market.[2] It is a version of the search model that Stigler recommended for labor markets. Search models cast an unemployed worker as facing uncertainty about the wages that he can earn from different jobs and about the prospects that he will be offered a

2. The technical details of the model are described in Ljungqvist and Sargent (1995a, 1995b).

job. Our model represents the labor market as consisting of a large number of workers, each of whom either does or does not have a job. We model each job situation as evolving over time in ways that often lead to "promotions" but sometimes cause workers to be fired or to quit their jobs. In particular, at the beginning of each period, a worker is exposed to a small probability that his job is destroyed, in which case he enters the ranks of unemployed workers whether he likes it or not. Also, at the beginning of each period that a job continues, there is a small chance that the nature of the job will change. It may be upgraded or downgraded. Job reclassifications confront workers with the choice of staying with a reclassified job or quitting and searching for a new job. Thus, job destructions and rejected reclassifications are the immediate sources of unemployment.

To find a job, an unemployed worker must search for one. Searching requires that the worker expend some effort or other resources. The potential reward for searching is finding a job offer. A job offer has some of the features of a financial option: it promises a particular stated pretax real wage so long as the job is not terminated or is not reclassified. When the worker accepts a job, he is accepting the bundle of possible reclassifications and terminations associated with it. Job offers—which we summarize by initial wage offers—are from a probability distribution. This distribution helps determine the prospective gains from further searching. The unemployed worker cares about the dispersion of after-tax wages, which is affected by the tax system.

An unemployed worker who has received an offer to work at a particular wage balances the gains and losses from accepting the current offer. The gain is the after-tax wage that the worker will receive this period, plus the value to him of starting next period with this job in hand. The loss comprises any unemployment benefits he would have qualified for and the prospective return from searching one more period and perhaps drawing a better job offer next period. The worker does best to accept the first offer that he receives that exceeds a reservation wage. An unemployed person increases the likelihood that he will leave unemployment by lowering his reservation wage. The value of the reservation wage depends first on the level of unemployment benefits. In general, increases in the generosity of unemployment benefits cause the worker to increase his reservation wage and to increase the expected duration of his unemployment. The value of the reservation wage also depends on the after-tax distribution of wages that the worker faces. A decrease in the dispersion of the after-tax wage distribution diminishes the rewards to search and thereby causes the worker to decrease his reservation wage and to decrease the average duration of his unemployment.

Employed workers whose jobs have just been reclassified also set a reservation wage for staying on the job. They face a choice similar to that of unemployed workers who have just received a new offer: they can accept the new offer or else quit and enter unemployment. However, quitters are not eligible for unemployment compensation during the subsequent spell of unemploy-

ment. This means that potential quitters face a different potential gain from entering unemployment than do workers who qualify for unemployment compensation and that they choose a different reservation wage.

Unemployed workers' reservation wage policies determine a rate of transition from the states of (involuntary and voluntary) unemployment to employment.[3] Employed workers' reservation wages and the process for reclassifying jobs determine a rate of transition from employment to (voluntary) unemployment. We also specify an exogenous rate at which existing jobs are extinguished, triggering an (involuntary) move to unemployment. These three transition rates determine flows into and out of unemployment and enable us to calculate the unemployment rate that emerges from the experience of a large number of workers. Any force that alters workers' reservation wages will in general alter the implied unemployment rate.

The rule for administering unemployment benefits is one determinant of the reservation wage and therefore the unemployment rate. We use a one-parameter rule designed to capture in a simple way the spirit of the institution described by Björklund (1996, 177). "In order to receive unemployment compensation, the worker must be registered as a job seeker at the public employment office, and an offer of 'suitable' work must be accepted. If a 'suitable' offer is turned down, benefits can be denied for 4 weeks; further denials may occur if offers are repeatedly turned down. Manpower training programs may in some cases be regarded as 'suitable' work, and the same holds for temporary jobs (relief work) provided by the Labour Market Board. The disqualification rules also apply to workers who are dismissed for failure to perform their jobs and those who quit into unemployment." We embody a version of this institution by specifying a "suitable wage" level, w_g, any offer above which must be accepted if an unemployed worker is to remain eligible for unemployment compensation. By lowering the parameter w_g, we tighten the rule.

An important macroeconomic element of our model is a feedback loop from the level of general government expenditures and expenditures on unemployment benefits to the tax rates borne by workers. This makes the tax rates in our model "endogenous," meaning that, because they depend partly on the level of unemployment (which they in turn influence), they must be determined simultaneously with the unemployment rate.

The model captures Stigler's notion of unemployment as being, at least in part, a valuable social activity of information gathering, perhaps even one worth subsidizing. By waiting, unemployed workers are speculating that a more worthwhile job might come along. Inefficiencies can arise either because

3. Our model distinguishes between two classes of unemployed workers, depending on whether they qualify for unemployment compensation. Involuntarily unemployed workers are those whose previous jobs were exogenously terminated. Voluntarily unemployed workers are those who quit their previous job after a reclassification plus those who have been disqualified from receiving unemployment compensation. In our simulations, we keep track of the numbers of both categories of unemployed workers because we have to compute the national bill for unemployment compensation.

workers wait too long (the unemployment rate is too high, tending to make output lower than it could otherwise be) or because they wait for too short a time (the unemployment rate is too low, making output lower than it could be because workers are mismatched and work at lower-productivity jobs than they might hold).

To judge whether an observed unemployment rate is too low or too high, we have to unravel the factors that create it. That is what our quantitative model is for.

7.4 Numerical Experiments

We used a computer to design experiments to tell us how different hypothetical settings of government policy variables would affect the level and structure of unemployment. Below, we summarize the results of three sets of experiments that focus on variations in (*a*) the progressivity of the tax system, (*b*) the level of unemployment compensation, and (*c*) the vigor with which the program to suppress abuses of the unemployment compensation system is enforced.

7.4.1 Effect of Taxes on Unemployment and Output

Figures 7.4 and 7.5 report the effects of unemployment of variations in a parameter I_τ that measures the progressivity of the tax system. If a worker receives a pretax wage of w, he pays taxes in the amount $\tau w + .5\tau \times \max(w - I_\tau, 0)$, where τ is the base marginal tax rate, and I_τ is a wage level at which the marginal tax rate jumps up by 50 percent. In the range reported in figure 7.4, increases in I_τ correspond to decreasing the progressivity of the tax system.[4] Figure 7.4 shows how increases in progressivity of the tax system cause the unemployment rate to decrease. Both voluntary and involuntary components of unemployment decrease with increases in progressivity.

These reductions in unemployment result from workers' responses to the narrowing of the after-tax wage distribution caused by an increase in progressivity. A reduction in the dispersion of after-tax wages lowers the potential rewards to further search, prompting workers to lower their reservations wages and on average to accept offers sooner. This causes the unemployment rate to fall. However, there is a social cost associated with this reduction in unemployment, alluded to by Stigler in the passage quoted above. This cost is captured in figure 7.5, which shows the locus of unemployment-output pairs traced out as we vary the progressivity of the taxes, holding other parameters constant.[5] Increases in progressivity decrease both unemployment and output. This happens because workers are accepting jobs at which their marginal products are

4. This is because we have calibrated the mean of the distribution of new wage offers to .5. As I_τ increases above .5, a larger and larger fraction of workers do not pay the higher marginal tax rate on any part of their incomes and in effect just face a flat-rate tax of τ.

5. The adjusted GNP in fig. 7.5 refers to the economy's output net of utility costs of search.

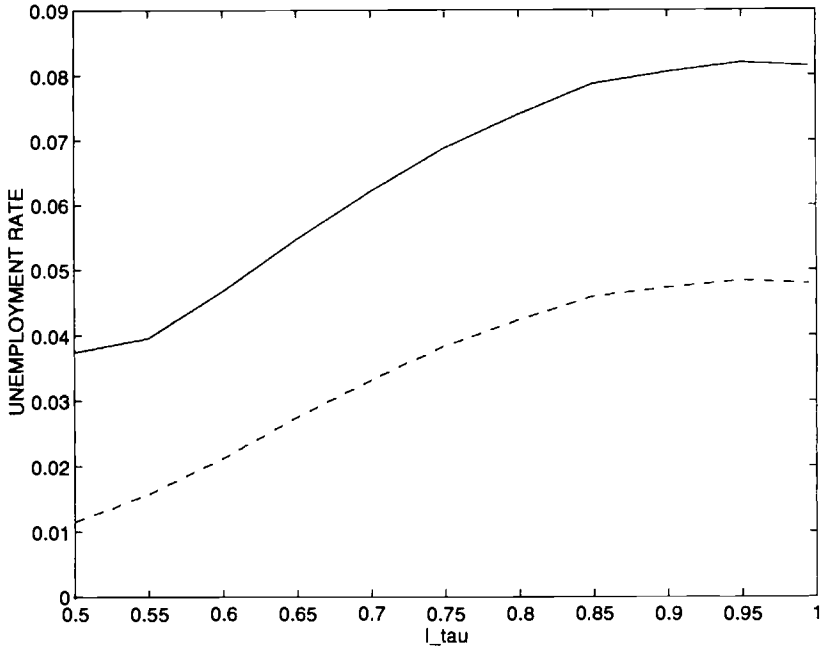

Fig. 7.4 How unemployment rates vary as functions of the progressivity of the tax system, as measured (inversely) by l_τ

Note: The tax system becomes *less* progressive as l_τ increases. The solid line is total unemployment; the dashed line is voluntary unemployment.

farther and farther from their "maximum" (in Stigler's terms) as the tax system is made more and more progressive.

In the next section, we describe how variations in unemployment compensation can be used to offset the covariation of unemployment and output depicted in figure 7.5.

7.4.2 Effects of Unemployment Compensation

Figures 7.6 and 7.7 show effects of increasing the level of unemployment compensation on unemployment and output. Increasing unemployment compensation drives up the total unemployment rate, even though it has a minor tendency to reduce the level of voluntary unemployment. (The reason that the voluntary unemployment rate goes down with an increase in unemployment benefits is that voluntarily unemployed workers do not receive benefits, but the tax rates of employed workers must go up to pay for the higher benefit levels. This diminishes the reward to workers to leave their jobs following reclassifications.) Figure 7.7 shows how increasing unemployment compensation causes output to decline as it drives unemployment upward.

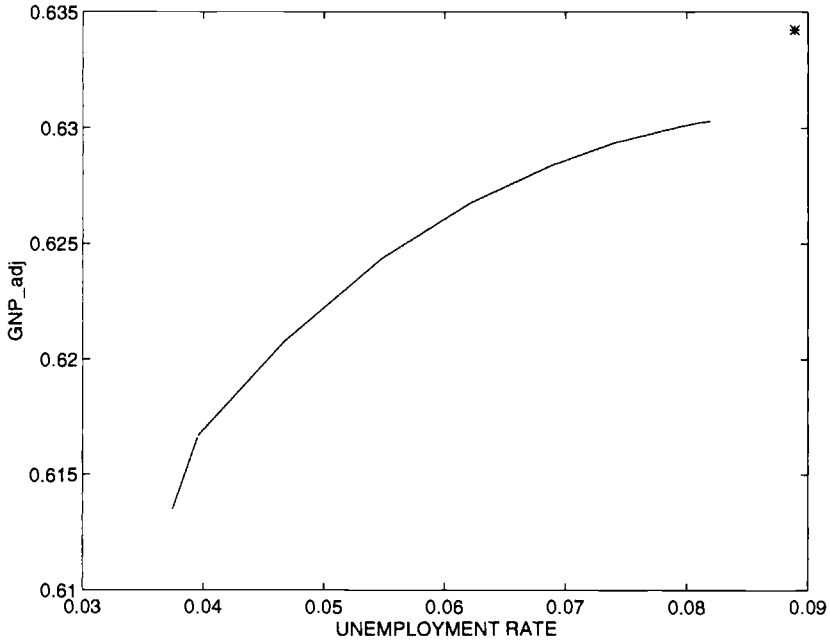

Fig. 7.5 Relation between the total unemployment rate and adjusted GNP when varying I_τ as in fig. 7.4

Note: The efficient unemployment, adjusted GNP pair is denoted by an asterisk (*).

7.4.3 Effects of Monitoring the Unemployed

Figure 7.8 shows how the unemployment rate varies with a parameter w_g designed to capture the way that the government administers unemployment compensation. If wage offers exceeding w_g are tendered and refused, it triggers termination of unemployment benefits during the current spell of unemployment. Thus, w_g parameterizes the unemployment compensation branch of the worker's "option" in a particular way. We have calibrated things so that w_g = .55 represents quite a stringent policy and $w_g \geq .7$ represents a very lax policy. Figure 7.8 shows how effective this policy is in reducing unemployment, even in the face of very generous unemployment compensation payments.

We have "calibrated" the various parameters underlying figure 7.8 to match some key features of the Swedish labor market. In particular, we have set parameters governing taxes and unemployment compensation to approximate their levels in Sweden in the 1980s.[6] At those levels of parameters, we find that setting a "tough" (i.e., low) value for the administrative parameter w_g is im-

6. Figure 7.8 holds I_τ fixed at .50, which corresponds to a very progressive tax system, and the unemployment compensation is set at a very generous level of .55.

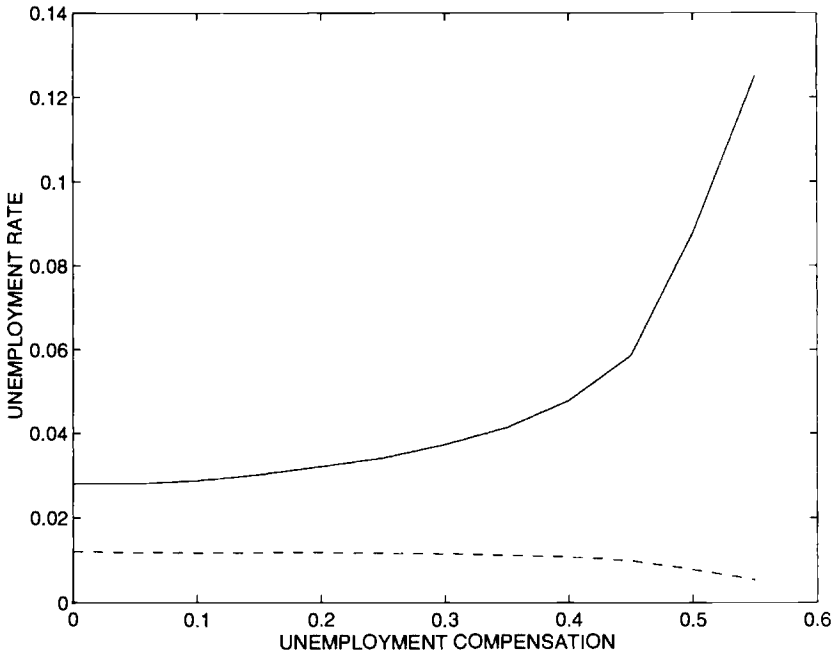

Fig. 7.6 Unemployment rates as functions of unemployment compensation
Note: The solid line is total unemployment; the dashed line is voluntary unemployment ($I_\tau = .50$).

portant in holding down the level of unemployment. To match a comprehensive level of unemployment of around .056 (this level counts people in various training programs as unemployed and is more comprehensive than the concept reported in fig. 7.1 above), we find that we have to set w_g at a value of about .55.

The dotted line in figure 7.8 shows the level of unemployment that would be efficient, in the sense that it maximizes the average rate of output. This rate (being the comprehensive measure) is about .089 and exceeds by about .03 the .056 rate of unemployment observed from the 1960s until the 1980s. Our model imputes the excess of the efficient rate of unemployment over the average rate of .056 observed to the particular Swedish constellation of income tax rates and structures, the unemployment compensation rate, and the rules in place for administering unemployment compensation.

To explore the effect of the administrative rules, figure 7.9 depicts the locus of unemployment, GNP pairs that would be associated with alternative levels of our administrative parameter w_g. Notice how far below the efficient point, depicted by an asterisk in figure 7.9, this locus lies. In figure 7.9, tightening (i.e., lowering) the administrative parameter w_g drives unemployment down and production up.

Figure 7.8 asserts that the monitoring program supplementing unemploy-

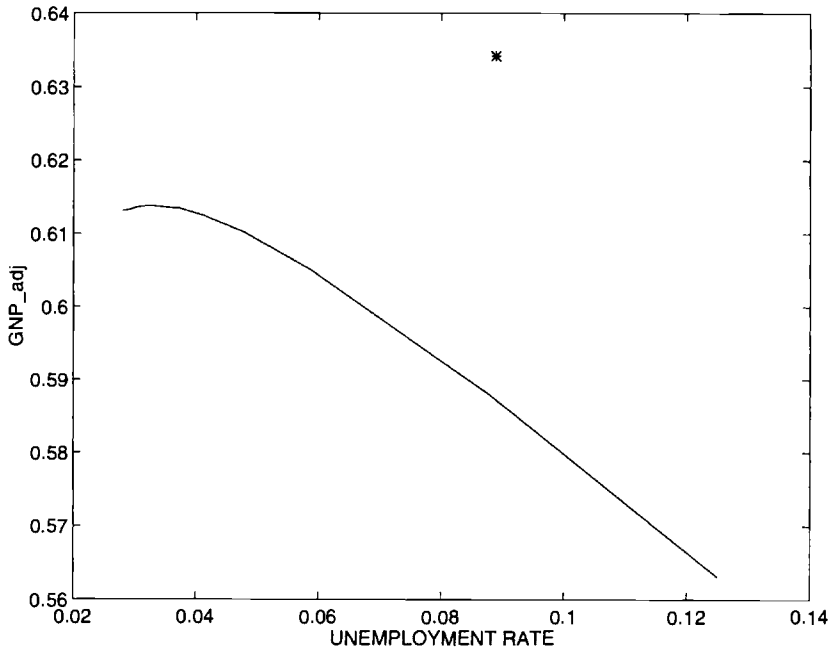

Fig. 7.7 Relation between the total unemployment rate and adjusted GNP when varying unemployment compensation, as in fig. 7.6 (I_τ = .50)
Note: The efficient unemployment rate, adjusted GNP pair is denoted by an asterisk (*).

ment compensation was an important ingredient in delivering low unemployment and that relaxing enforcement of that program could show up in much higher unemployment rates if other government policies were not adjusted. This "nightmare" is depicted in figure 7.10, where we posit a dashed line that depicts a "policy response" function that makes the seriousness of enforcement depend inversely on the aggregate unemployment rate. At low unemployment rates, a tough enforcement policy (low w_g) is easier to sustain than at high unemployment rates, which imparts a positive slope to our policy response line. This policy response function generates the occurrence of "multiple equilibria": in addition to the type of low unemployment, strict enforcement pair discussed above, there is another lax enforcement, high unemployment equilibrium. The value of the unemployment rate at the high-unemployment equilibrium matches up well with the .13 comprehensive unemployment observed in Sweden during 1993.

The story embodied in figure 7.10 is capable of reconciling our explanation of the low unemployment rates observed in the 1980s with the much higher unemployment rate observed after 1992. This occurrence is to be interpreted in terms of a jump from the low unemployment rate to the high unemployment

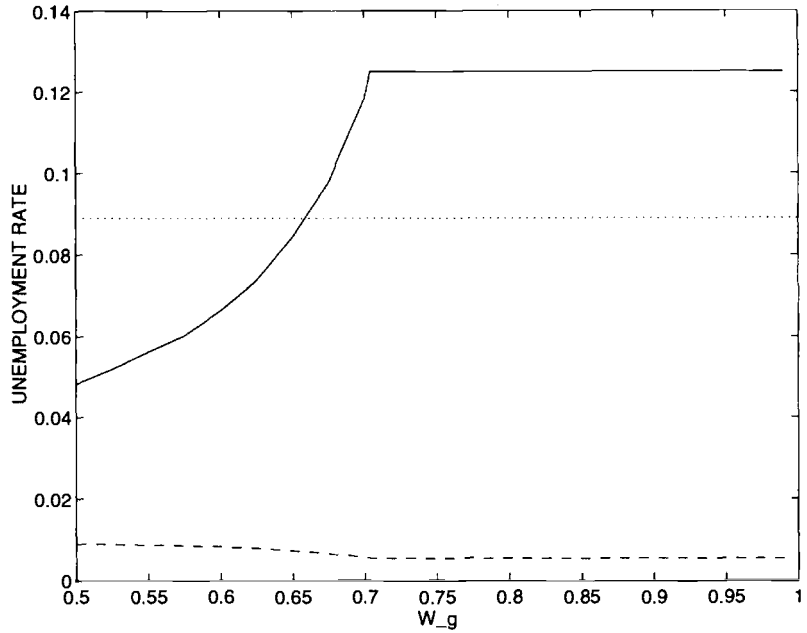

Fig. 7.8 Unemployment rates as functions of w_g
Note: The solid line is total unemployment; the dashed line is voluntary unemployment. (I_τ = .50, and unemployment compensation is set at .55.) The laissez-faire unemployment rate is indicated by the dotted line.

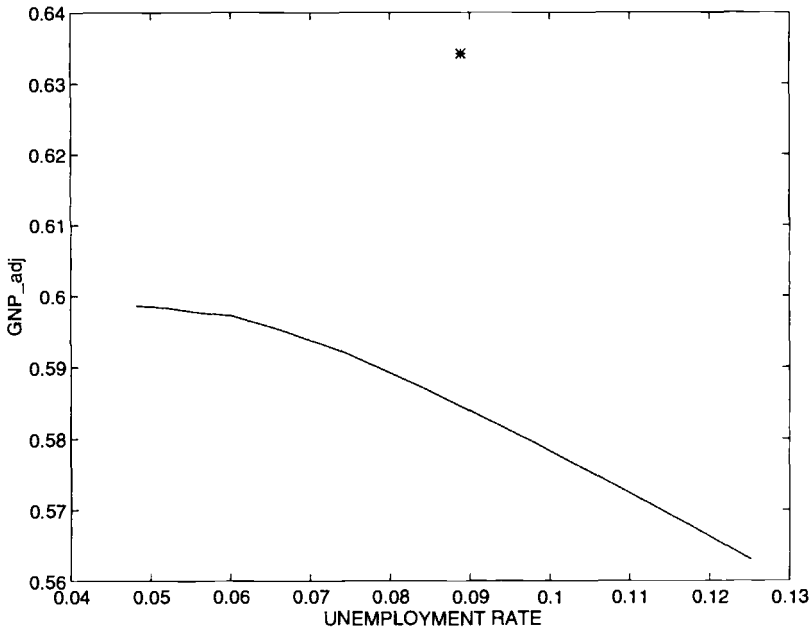

Fig. 7.9 Relation between the total unemployment rate and adjusted GNP when varying w_g, as in fig. 7.8 (I_τ = .50, and unemployment compensation is set at .55$_g$)
Note: Lower unemployment rates are associated with lower levels of w_g. The efficient unemployment rate, adjusted GNP pair is denoted by an asterisk (*).

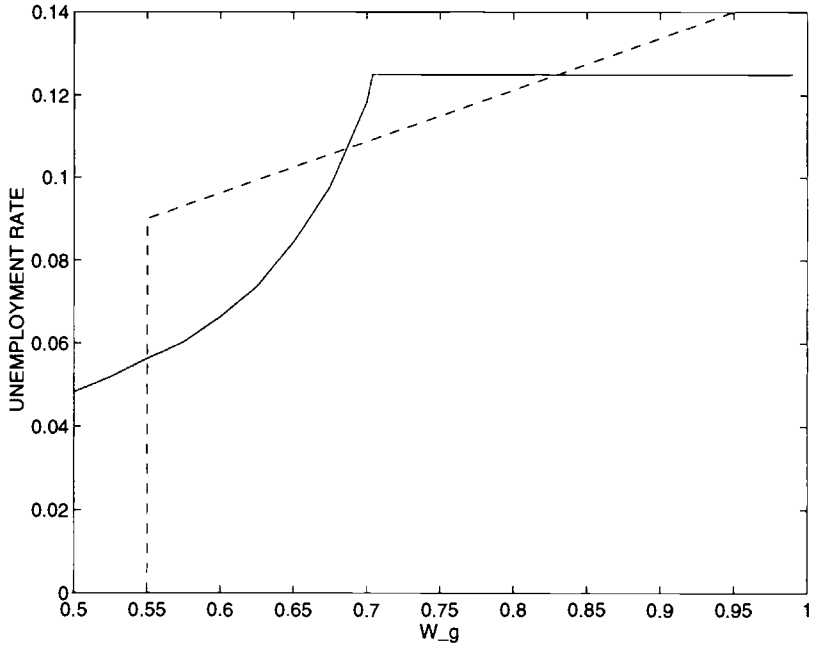

Fig. 7.10 A nightmare

Note: The dashed line is an example of a policy relation between the unemployment rate and w_g. The solid line is the equilibrium relation between the unemployment rate and w_g as earlier shown in fig. 7.9. (I_τ = .50, and unemployment compensation is set at .55.)

equilibrium, a jump occasioned by macroeconomics shocks outside our model.[7]

7.5 Other Aspects of the Computer Model

Our model has other features that we trace out in Ljungqvist and Sargent (1995a).

1. We are able to calibrate separate 1960s and 1980s versions of the model, the first having less-progressive taxes and lower unemployment benefit levels, the second having more-progressive taxes and higher benefit levels. These calibrations give realistic sets of tax wedges and replacement ratios for the two periods at the same unemployment rates for both periods. These calibrations are the foundation for our explanation of how offsetting forces accounted for the persistently low unemployment rate from the 1960s through the 1980s.

2. Our calibrations imply that, despite the stability of the unemployment rate from the 1960s to the 1980s, its structure should have changed. In particu-

7. We certainly do not regard the increase in unemployment after 1992 as the response to a *spontaneous* weakening of the rules for qualifying for unemployment compensation.

lar, our model implies that the new constellation of tax wedges and benefit levels that emerged in the 1980s should have led to a substantial increase in the average duration of unemployment as well as to a reduction of flows into and out of unemployment. Such changes in the structure of unemployment in Sweden have been observed between the 1960s and the 1980s.

7.6 Relationship to Other Chapters

In constructing our model, we have taken to heart and incorporated key conclusions of Edin and Topel and of Forslund and Krueger (chaps. 4 and 6 in this volume, respectively), namely, that labor market programs have had at most a minor effect on the overall unemployment rate in Sweden. Our model embodies a stark version of their finding, by assigning no role to public expenditures on retraining and relief jobs.[8] In our model, a government program does suppress unemployment, but, instead of retraining and relief jobs, it is the administrative apparatus for restraining abuse of unemployment compensation, alluded to in the above quotation from Anders Björklund.

While we have not mentioned unions and central bargaining, any wage compression attributable to those institutions would serve to reinforce the mechanism that we have adduced to explain the low Swedish unemployment of the 1980s. In our search model, anything that compresses the after-tax wage distribution—be it a progressive income tax or pretax wages compressed through centralized bargaining—will tend to lower the unemployment rate by diminishing the rewards to search.

7.7 Implications for Sweden

A given level of the unemployment rate can be attained in various ways, from diverse packages of public policies and external circumstances. To interpret or judge the social desirability of a given unemployment rate requires understanding the particular package of policies and circumstances that produced it. We require a way to probe the composition of unemployment and to evaluate whether spells of unemployment and employment are too long or too short from the standpoint of the efficiency of matching workers to suitably productive tasks. Our research has studied how aspects of public policy influence workers' incentives to modify those aspects of their behavior that determine flows into and out of employment.

We attribute the persistently low Swedish unemployment rate from the 1960s to the 1980s to a triumvirate of forces—high and progressive taxes, generous unemployment benefits, and administrative procedures to prevent abuse of unemployment compensation—that excludes Swedish government

8. A very minor macroeconomic role surfaces in their effects on equilibrium tax rates through the government budget constraint.

expenditures on labor market policies such as relief jobs and retraining. We are able to account for the level of the Swedish unemployment rate in the 1960s and 1980s while ignoring those expenditures. In our view, the administrative procedures' successful containment of "abuse" of unemployment compensation coalesced with lower job mobility emerging from higher income tax wedges to sustain a low unemployment rate. But the unemployment rate was suppressed by accepting the cost of a less-efficient labor market, symptomized by increased duration of unemployment.

Our analysis asserts that the changes in the structure of unemployment between the 1960s and the 1980s signified increasing labor market distortions. The increase in the average duration of unemployment spells and the lower flow of workers into unemployment can be explained by the increased progressivity of the tax system and more generous unemployment compensation of the 1980s. A less efficient labor market harmed the performance of the Swedish economy during the last fifteen years. Lindbeck et al. (1994) describe the slowdown in productivity growth that has sent Sweden from third to fourteenth place among OECD countries in terms of per capita GDP.

Our analysis raises apprehensions about Sweden's ability to cope with its present high unemployment rate. If, as seems likely, the administrative procedure for monitoring unemployment compensation—the system's dike—breaks down at high unemployment rates, then our analysis predicts persistently high unemployment rates. In the absence of effective administrative controls, our analysis suggests that the way to diminish such structural unemployment is to lower unemployment compensation benefits.

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