

**Unemployment and Workers' Compensation Programs:
Rationale, Design, Labor Supply, and Income Support**

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ABSTRACT

This paper examines the unemployment insurance (UI) and workers' compensation (WC) insurance programs. The paper concentrates on the labor supply, insurance, and income redistribution features of the programs. The paper also focuses on the American experience, though substantial sections cover the theoretical effects of UI and WC and the literature on other countries.

The empirical work on the labor supply effects of UI and WC finds that the programs increase the length of time employees spend out of work. Most of the estimates of the elasticities of lost work time that incorporate both the incidence and duration of claims are close to 1.0 for unemployment insurance and between 0.5 and 1.0 for workers' compensation. These elasticities are substantially larger than the labor supply elasticities typically found for men in studies of the effects of wages or taxes on hours of work. Part of the explanation for this difference is probably that UI and WC lead to short-run variation in wages with mostly a substitution effect and that the programs alter the work participation margin.

The empirical work on the insurance value and redistributive aspects of UI and WC is much less developed. There is some good evidence that UI smooths the consumption of the unemployed, but more work is needed to conclusively establish its role. The extent of redistribution through UI has been more clearly established, but the literature is short. There is substantial evidence that workers injured on the job suffer material hardships even with WC programs, but an overall picture of the insurance and redistributive aspects of WC has not been provided.

I. INTRODUCTION

Social insurance programs are costly, making up the largest single component of government expenditures in many countries. These programs are also not without controversy. Different sets of commentators view these programs as encouraging sloth, on the one hand, or necessary to prevent severe deprivation, on the other hand. Both sets of commentators are partly right. In this paper I will focus on unemployment insurance (UI) programs that provide compensation for the unemployed and workers' compensation (WC) insurance for those injured or made ill by their employment.

I focus on UI and WC programs because the other main components of social insurance, retirement and health benefits, have been covered in earlier articles in this series.¹ UI and WC are also of interest in their own right for several reasons. Since the programs are for able-bodied individuals or those who are generally expected to return to work, the tradeoffs between insurance and moral hazard are potentially more pronounced than in the case of other programs. While the costs of UI and WC, are lower than for retirement or health programs, the costs are still very large. As is discussed below, UI and WC expenditures are typically several percent of GDP.

UI and WC share many attributes. Both programs are primarily for workers who are temporarily unable to work. Both programs condition benefits on past earnings, and generally discontinue benefits once a worker returns to work. Because of these basic similarities, the

¹See Banks and Emmerson (2000) on public and private pensions and Propper (2001) on health spending in the UK.

dimensions on which the programs differ are informative in several ways for both policy makers and researchers. For policy makers, these differences often reveal the differing objectives and constraints of the two programs. In other cases, the differences provide alternative models for policy makers to follow, since the current program structures have partly come about through historical accident. For researchers, the differences in how the programs have been studied often suggest new approaches and topics, as researchers have often acted opportunistically given handy data, and have not analyzed key issues.

I begin by discussing the economic rationales for government involvement in these areas. The natural beginning point is the market imperfections that justify government involvement. I then describe the design of the U.S. programs in detail and provide some more limited information on the programs in other countries.

I then discuss the main distortion generated by the programs, namely the effect of the programs on labor supply.² One may ask, “Why can’t the labor supply parameters estimated in the voluminous labor economics literature just be plugged into the social insurance formulas?” In my view, a separate consideration of the labor supply effects of UI and WC is justified for at least three reasons. First, the labor supply parameters estimated in the public finance and labor economics literatures may not apply to social insurance programs because people are imperfectly informed as to the rules of the programs, or because the preferences may be different for those

²There are other distortions that should be mentioned, such as the effect of UI on precautionary savings. See Engen and Gruber (2001), for example.

who are eligible for social insurance programs than for the population at large. For example, a severe disability may change the way an individual trades off labor for leisure. More generally, the people who are on the margin of going on a social insurance program are likely to have different preferences than the wider population.

Second, the labor supply elasticities estimated in the labor economics literature span a huge range. Literature surveys such as Pencavel (1986) and Killingsworth (1983) find wide dispersion in estimates of income and substitution effects. Fuchs, Krueger and Poterba (1998) also find that there is little agreement among economists on the magnitude of labor supply elasticities. A major shortcoming in the broader labor supply literature is that it is difficult to identify exogenous changes in wages or incomes that can be used to estimate labor supply responses. The variation in social insurance programs may provide natural experiments with which to estimate labor supply parameters and test the relevance of labor supply models.

Third, the design of social insurance programs raises theoretical labor supply issues that are not often dealt with in the labor economics literature. For example, most of the labor supply literature deals with how workers adjust their number of hours worked per week, whereas the incentives of social insurance programs often affect the decision of whether to participate at all in the labor force.³ And programs such as UI influence job search intensity, which does not figure

³A reason for the disproportionate effect of social insurance programs on the work/non-work decision is that the programs typically do not proportionally change the return to work. Rather they often provide a large benefit at zero hours of work and high implicit tax rates over a range of low, but positive hours. For UI and WC, the tax rate is often near or even above 100 percent.

into standard labor supply models. I will discuss both the theoretical effects of UI and WC on labor supply as well as the empirical literature. While the literature is most extensive for the U.S. evidence, I will bring in empirical evidence from several other countries.

I then discuss the main positive effect of UI and WC. The classic rationale for the programs is the short-run support they provide for those who are temporarily without the ability to work. This income support may prevent the consumption of recipients from dropping sharply as their incomes fall. There are also potential long-term consequences of this short-term assistance. Support during unemployment may allow the unemployed to find better jobs and may allow the injured to more fully recover from their injuries in the case of WC.

We should emphasize that this is not the first survey of UI and WC. There are excellent prior surveys of the effects of unemployment insurance⁴ and the effects of workers' compensation.⁵

II. ECONOMIC RATIONALE FOR THE PROGRAMS

Unemployment Insurance

The main rationale for UI is that it provides insurance for workers who may lose their

⁴See Hamermesh (1977), Welch (1977), Danziger, Haveman, and Plotnick (1981), Gustman (1983), Atkinson (1987), Atkinson and Micklewright (1990), Devine and Kiefer (1991), Anderson and Meyer (1993), Holmlund (1998) for surveys of the UI literature.

⁵See Ehrenberg (1988), Krueger (1989), Moore and Viscusi (1990), and Kniesner and Leeth (1995) for surveys of the WC literature.

jobs, which may cause a substantial loss in earnings for these individuals.⁶ This rationale is appropriate for workers whose unemployment is unexpected, but not for individuals with frequent and predictable spells of unemployment, say in seasonal jobs. If unemployment insurance is a desirable benefit, this argument does not explain why government provided or mandated benefits are necessary. A possible explanation is that adverse selection may lead firms to not offer insurance, since it would attract people likely to leave their job. This reason is probably not central in a UI system like the U.S., where only job losers are eligible for benefits, not those who quit or are fired.

Probably a more important explanation for government UI provision is adverse selection at the firm level. If private insurance companies sold UI to firms, the insurance companies would also suffer from the adverse selection problem, as those firms most prone to unemployment would be the most likely to buy the insurance. This difficulty does not prevent private companies from offering medical insurance and workers' compensation insurance. However, the size of UI losses due to the layoff of a large fraction of a firm's workforce may greatly exceed losses from medical insurance or workers' compensation.

Perhaps the most compelling reason for publicly provided UI is that unemployment risks are not easily diversifiable for private insurance companies. Unlike workplace injuries, claims for unemployment insurance tend to be concentrated in recessions. A severe recession could

⁶For a good analysis of UI as insurance for workers see Baily (1977). Brown and Kaufold (1988) have argued that this insurance will increase human capital investment by workers. An empirical investigation of the insurance value of UI is in Neill (1989).

involve claims of even \$100 billion over a few years, which would financially strain and potentially bankrupt private insurance companies.

Another argument for government mandate UI that is more difficult to evaluate is that subsidizing search by the unemployed may increase societal welfare. UI may increase search activity, and search activity may increase the probability of a good job match. This argument must rest on a reason why the value of the job match is different for society than for the individual searching for a job, and the firm seeking employees.

The other common rationale for UI is that it provides an automatic stabilizer in downturns, by maintaining the purchasing power of the unemployed. This argument requires that the timing of the benefit payments and tax charges be countercyclical. Hamermesh (1977) describes several studies of this effect and suggests that it is a crucial role of UI. However, the importance of this argument depends crucially on the true character of business cycles. If cycles are due to "shocks" to technology as suggested by real business cycle theorists, then UI will reduce welfare by decreasing efficiency.⁷ If cycles are due partly to insufficient aggregate demand, then the increases in demand during downturns provided by UI may increase welfare.

A final reason for unemployment insurance might be income redistribution. If this goal is to be attained, it requires that the actual program be implemented in a way that distributes more benefits net of taxes to lower income groups.⁸

⁷See Christiano (1984) for a discussion of such effects.

⁸This issue is briefly discussed in Section V below.

Workers' Compensation

To understand the rationale for workers' compensation, it is useful to first think about information, wages and compensating differentials in an abstract economy. Consider a simplified world where labor markets are competitive, workers have perfect information about job risks, and there are no mobility barriers. Then, there would be fully compensating wage differentials for job risks, and firms would offer the optimal wage rates and levels of injury reduction such that the marginal cost of injury reduction would equal the marginal benefit from injury reduction.

Abstracting from worker responses, if WC is introduced with no load factors and perfect experience rating (and benefits at an amount needed to compensate workers for injuries), then we would see no change in firm injury prevention and a fall in wages equal to the value of the insurance on the margin.

The main argument of WC is probably that workers do not have perfect information about job risks. The most glaring example is occupational diseases such as asbestosis where the dangers have only recently become known. This lack of knowledge is not surprising in such a case given the long exposure period and the lengthy latency period before the onset of the disease. Nevertheless, this example illustrates the difficulty workers have in being fully knowledgeable regarding job risks. A second argument for a government mandated workers' compensation system is that by making routine injury compensation (and limiting firms'

liabilities) such a system reduces worker uncertainty and also reduces administrative and dispute costs relative to an ad hoc system of legal remedies.

III. UNEMPLOYMENT INSURANCE: PROGRAM FEATURES AND LABOR SUPPLY EFFECTS

Unemployment insurance is one of the most extensively studied government programs in the U.S. and elsewhere. As mentioned earlier, there are several excellent prior surveys of UI.

1. Main Features of U.S. Unemployment Insurance Programs

UI programs differ sharply across states due to the provisions of the Social Security Act of 1935 which created the current system and gave states great latitude in designing their programs. State UI programs differ in the earnings required for eligibility, the level of benefits (the replacement rate, the minimum and maximum benefit), the potential duration of benefits, and other parameters. Table 1 reports key features of twelve state programs in 2000. It is apparent from this table that there are large differences in program parameters across states. These cross-state differences and their frequent changes over time have been a fundamental source of the identifying variation used to estimate the effects of these programs.

Approximately 97 percent of all wage and salary workers are in jobs that are covered by

unemployment insurance. The main categories of workers not covered are the self-employed, employees of small farms, and household employees whose earnings are below the threshold amount. Despite this near universal coverage, less than forty percent of the unemployed received UI in many recent years.⁹ The cause of this low rate of receipt is largely that individuals who are new entrants or reentrants to the labor force, who have irregular work histories, and individuals who quit or are fired from their last job are typically not eligible for benefits. Such individuals are frequently excluded by minimum earnings requirements for eligibility ranging from \$130 in Hawaii to \$3,400 in Florida, with a typical state requiring previous earnings just over \$1,500.¹⁰

UI benefits are paid on a weekly basis, and except for minimum and maximum benefit amounts, are usually between 50 and 60 percent of previous earnings.¹¹ All states have a maximum weekly benefit amount, which varies from a low of \$190 in Mississippi to over \$600 in Massachusetts if dependents' allowances are included. The median state had a maximum benefit of about \$292 in 2000. About 35 percent of claimants receive the maximum benefit. For these individuals, the fraction of their previous earnings replaced by UI can be much lower than 50 percent. The minimum weekly benefit is typically very low; the median state has a minimum

⁹See Blank and Card (1991) and Anderson and Meyer (1997) for studies of the reasons for the low rate of UI receipt.

¹⁰More precisely, earnings during the first four of the five full calendar quarters prior to the quarter an individual files for benefits. Five states now use alternative time frames that differ from this rule.

¹¹A typical benefit schedule would compute the weekly benefit amount as high quarter earnings divided by 23. High quarter earnings are typically the highest calendar quarter of earnings during the first four of the five full calendar quarter prior to the quarter an individual files for benefits.

of about \$39.

In almost all states, benefits last up to 26 weeks. However, in all but eight states, total benefits paid are restricted to some fraction of previous earnings or weeks worked. Table 1 indicates that a typical state requires just over 3 quarters (39 weeks) of work for a claimant to be eligible for 26 weeks of benefits. This provision causes the potential duration of benefits to be less than 26 weeks for approximately half of all recipients.¹² In all but 11 states, there is a waiting period of one week after the beginning of unemployment until one can receive benefits.

In 1970, a permanent Federal-State extended benefits program was established to provide additional weeks of benefits to individuals who exhaust their regular State benefits in periods of high unemployment. When a state's insured unemployment rate is sufficiently high, weeks of benefits are extended 50 percent beyond that which an individual would be entitled to under State law, with the extension not to exceed 13 weeks. In addition, in times of high unemployment Congress has typically passed ad hoc laws temporarily extending benefits further. Because the unemployment rate has been low in recent years, benefits have only rarely been extended, despite a change that relaxed the threshold for benefit extensions in 1993.

Prior to 1979, UI benefits were not subject to Federal income taxation, but in 1979 they became taxable for high income individuals. In 1982 taxation of UI was extended to most

¹²A typical state calculates potential weeks of benefits as the minimum of 26 and base period earnings divided by three times the weekly benefit amount. Base period earnings are usually calculated as earnings during the first four of the five calendar quarters prior to the quarter an individual files for benefits.

individuals, and in 1987 benefits became taxable for all recipients.¹³ UI benefits are not, however, subject to OASDHI (Social Security and Medicare) payroll taxes.

A convenient indicator of the work disincentive of UI is the fraction of previous after-tax earnings replaced by after-tax benefits, the after-tax replacement rate. This replacement rate has fallen dramatically in recent years, particularly due to the taxation of benefits, and is now typically under one-half. As recently as 1986, some people had replacement rates near one (often those lifted by the minimum benefit), implying that they would receive from UI nearly what they would earn if they returned to work.¹⁴ This situation is much less common today. Strong disincentives to work part-time remain, though, as benefits are typically reduced dollar for dollar for earnings greater than a fairly small amount (the earnings disregard).

2. UI Financing

UI financing in the U.S. is unique in that a firm's tax rate depends on its layoff history. In other countries benefits are funded through general revenues or payroll taxes that are not determined by a firm's layoffs. The dependence of a firm's tax rate on previous UI use is called experience rating. Federal law levies a 6.2 percent tax on the first \$7,000 in wages a year paid to

¹³In 1979 UI benefits became taxable for married taxpayers filing jointly with income over \$25,000, and single filers with income over \$20,000. In 1982 the cutoffs changed to \$18,000 and \$12,000 respectively.

¹⁴See Feldstein (1974) for an earlier discussion and evidence on high replacement rates.

an employee. The law provides for a credit of 5.4 percent to employers that pay State taxes under an approved UI system, so that all employers pay at least 0.8 percent.

State experience rating systems take many forms, but the two most common are reserve ratio (30 states and D.C.) and benefit ratio experience rating (17 states).¹⁵ In reserve ratio systems, a firm's tax rate depends on the difference between taxes paid and benefits accrued divided by average covered payroll. Taxes paid and benefits accrued are typically summed over all past years and are not discounted, whereas average payroll is typically the average over the last three years. In benefit ratio systems, a firm's tax rate depends on the ratio of benefits paid to taxable wages, both generally averaged over the last three years.

In reserve ratio states, a firm's tax rates increases in steps as its reserve ratio decreases (in benefit ratio states tax rates rise as the benefit ratio rises). However, for most firms in almost all states, the tax rates do not adjust sufficiently when the ratios change to cause firms to pay the full marginal UI costs of laying off a worker. In addition, there are large ranges at the top and bottom, over which a firm's layoff history has no effect on its tax payments. This provides an incentive to temporarily lay off workers, and subsidizes industries with seasonal variation in employment. Forty states have a tax base that is higher than the Federal base of \$7,000. Alaska has the highest at \$22,600. Overall, in 1998 UI taxes were a highly regressive 1.9 percent of

¹⁵See National Foundation for Unemployment Compensation & Workers' Compensation (2000). Michigan and Pennsylvania are counted as benefit ratio states even though they have hybrids of reserve ratio and benefit ratio systems.

taxable wages, and 0.6 percent of total wages.¹⁶

3. UI Programs Outside of the U.S.

We should emphasize that there are often very different institutions in other countries to insure the unemployed. Moreover, programs for the unemployed are often combined with other programs, and those eligible for one type of benefit are often eligible for another in certain circumstances. These features often make cross-country comparisons problematic. Subject to these caveats, in Table 2 we report UI expenditures as a share of GDP and in absolute terms in 7 countries.¹⁷ Analogous expenditures on compensation for work injuries are reported for comparison. There are pronounced differences across countries. Among these countries, the U.K. has the lowest share of GDP devoted to UI expenditures at 0.25 percent, while four other countries have shares at least ten times as big. Part of the explanation for the low GDP share in the U.K. is that they provide a benefit that does not vary with previous earnings and is set at a fairly low level. For example, a single individual over age 25 was entitled to a weekly benefit of £52.2 (\$77) in 2000. This amount is only slightly higher than a typical minimum benefit in the U.S.

One of the countries with a GDP share over 2.5 percent is Canada. The Canadian UI

¹⁶See Anderson and Meyer (2001) for an analysis of the distributional effects of UI taxes and benefits.

¹⁷For summary measures of the replacement rate and benefit duration in OECD countries, Nickell (1998) provides a nice overview.

program provides an interesting comparison as Canada is a close neighbor of the U.S. and has a similar per capita income and industry base. Surprisingly, Canadian expenditures are almost one-half of those in the U.S. despite Canada having a population less than 11 percent as large. While Canadian weekly benefits are slightly higher and last slightly longer on average than U.S. benefits, the major difference between the countries is in the ratio of UI recipients to the number of unemployed. An unemployed individual is approximately three and one-half times more likely to receive benefits in Canada than in the U.S. This difference is hard to explain on the basis of the composition of unemployment in the two countries or current statutory qualification rules, though Canadian benefits were certainly more generous in the 1970s and 1980s than those in the U.S.. The amount of earnings in the past needed to qualify for benefits is only slightly higher in Canada. Those who have left their previous job are usually not eligible in the U.S., but are often eligible in Canada. It is also true that without experience rating, Canadian employers have less incentive to enforce eligibility rules. However, these features appear to only explain a small part of the difference. Furthermore, the timing of when UI became more generous in Canada than in the U.S. does not fit particularly well with when the two countries' unemployment rates diverged.¹⁸

¹⁸See Card and Riddell (1993, 1997), Riddell and Sharpe (1998) and Riddell (1999) for detailed comparisons of the U.S. and Canadian UI systems and discussions of the role of UI in explaining unemployment rate differences between the two countries.

4. Theoretical Responses of Labor Supply to UI

UI affects at least five dimensions of labor supply. First, UI can increase the probability of unemployment by affecting worker and firm actions to avoid job loss. Second, program characteristics affect the likelihood that workers will file a claim for benefits once a worker is laid off. Once a claim has been made, we expect that labor supply will be affected by the adverse incentives of the UI program. Third, once on the program, UI can extend the time a person is out of work. Most research on the labor supply effects of UI has focused on this issue. Fourth, the availability of compensation for unemployment can shift labor supply by changing the value of work to a potential employee. Finally, there are additional effects such as the work responses of spouses of unemployed workers. We discuss these five effects in turn.¹⁹

First, we discuss the effect of UI on the incidence of unemployment. UI can induce eligible workers to search less hard for a different job or work less hard on the current job, both of which can lead to a layoff. There has been some modeling of this issue; for example, Mortensen (1990) examines the effect of UI on search while employed. However, these effects have not been extensively studied. There is a substantial theoretical literature on how the availability of UI may make layoffs more common when firms face variable demand for their product. The presence of UI, particularly UI that is not fully experience rated, may make firms more likely to layoff workers and employees more willing to work in layoff-prone firms (see

¹⁹This classification of the labor supply effects of UI leaves out some effects that can be considered labor supply such as possible improvements in the matching of workers to jobs.

Baily 1977; Feldstein 1976). While this response to UI is partly a labor demand effect, it is also partly a labor supply response as workers are induced to take jobs with higher layoff risk because of UI.²⁰

Second, the generosity of UI benefits may affect the probability that a person claims benefits conditional on a layoff. As the generosity of benefits rises, it is more likely that the stigma and transaction costs of applying for UI will be outweighed by the benefits. Furthermore, whether someone initially receives UI is partly related to how long they are out of work. A UI claimant in nearly all states must be out of work over a week to be eligible for benefits.²¹ It is more likely that a person will remain out of work for the waiting week if benefits are high. In addition to affecting program costs, the increased claim rate in turn affects weeks worked, because once a person is on the UI rolls, they become subject to the implicit taxes on work and the consequent work disincentives.

Third, conditional on beginning an unemployment spell, the duration of time out of work is affected by UI. This issue has received the most attention in the UI literature. Both labor supply and search models suggest that higher and longer duration UI benefits will cause unemployed workers who receive UI to take longer to find a new job. An elegant, yet fairly realistic search model is provided by Mortensen (1977), though there are many search models incorporating unemployment insurance.²² Mortensen models workers as choosing a search

²⁰This effect of UI occurs through an outward shift in the labor supply curve to high layoff jobs, so it partly falls under the fourth effect of UI below.

²¹This waiting week can be thought of as the deductible in the UI insurance policy.

²²See Mortensen (1986), for example.

intensity and a reservation wage while facing a stationary known wage offer distribution and a constant arrival rate of job offers (for a given search intensity). If the worker is offered a job at a wage that exceeds the reservation wage, he or she accepts it. Mortensen incorporates two key features of the UI system in the United States into the model: benefits are assumed to be paid only for a specified duration rather than in every period of an unemployment spell, and new entrants or workers who quit jobs are not qualified for benefits.²³

In this framework, the main labor supply effect of UI is to lengthen unemployment spells. This effect can be seen in the model as increases in either the level or potential duration of benefits raise the value of being unemployed, reducing search intensity and increasing the reservation wage. Thus, the exit rate from unemployment,

$$\lambda(s)[1-F(w)],$$

falls, as both s and $[1-F(w)]$ fall, where $\lambda(\cdot)$ converts search effort s into job offers, w is the reservation wage and F is the cumulative distribution function of wage offers.

Mortensen's model also implies a second labor supply effect of UI, known as the "entitlement" effect. This effect of UI raises the escape rate from unemployment for workers who currently do not qualify for benefits and for qualified workers close to when benefits are exhausted. That is, because the potential for receiving benefits on a future job makes work more attractive, workers who are ineligible for UI search harder to find a job. Higher benefits reduce the escape rate for recipients when time until exhaustion is high and increase the escape rate

²³See Burdett (1979) for an analysis of a similar model.

around the time of exhaustion. This pattern of UI effects on the hazard of leaving unemployment is illustrated in Figure 1. Since the entitlement effect is likely to be small relative to the standard search subsidy effect in many countries, the average duration of unemployment is likely to rise with increases in both the level and potential duration of benefits. The effect of UI on unemployment durations has also been modeled using the standard static labor supply model. In a version of this model, Moffitt and Nicholson (1982) assume people to have preferences over two goods, income and leisure. Unemployment in this model raises utility because of its leisure value. The wage on a new job is fixed and a job can be found at any time. At the time of job loss, an individual chooses income and weeks of unemployment subject to a budget constraint that can be seen in Figure 2. The budget constraint becomes flatter as the level of UI benefits increases and is extended outward as the potential duration of benefits increases. Both effects make unemployment more attractive, thus making it more likely that an individual will choose to be unemployed longer.

The two models make very different assumptions but have similar predictions. In the Mortensen model the individual is uncertain when a job will be found and what the wage will be. One remains unemployed until a sufficiently high paying job is found. In the Moffitt and Nicholson model one can find a job anytime at a fixed wage. Their model emphasizes the leisure value that a period of unemployment may have if one optimizes over a long period of time such as a year. This explanation has its greatest plausibility when there is a significant demand for

home production or it is difficult to take a vacation once a new job has begun.²⁴

One should note that unemployment benefits affect the labor supply of employed and unemployed workers in other ways. We already mentioned the Mortensen entitlement effect where unemployed workers who are currently not eligible for benefits search harder because a job with UI is more valuable. In a standard labor supply framework, a similar mechanism would shift out the labor supply curve of the unemployed. This type of affect should also apply to the employed. Because UI makes employment more attractive if individuals realize that they may be laid off sometime in the future, the labor supply curve shifts outward (ignoring financing). Anderson and Meyer (1997), following Summers (1989) and Gruber and Krueger (1991), describe how labor supply may shift in this way in response to the provision of benefits.

UI may also reduce work by spouses and limit part-time work. One of the responses to unemployment in the absence of UI may be an increase in hours worked by the spouse of an unemployed worker. This spousal labor supply is likely to be “crowded out” at least in part by unemployment benefits that reduce the loss in family income when one spouse is unemployed.

As for part-time work, the incentives mentioned earlier discourage part-time work. In particular, one would expect that when there is a decrease in the allowable earnings before an individual’s benefits are reduced (the disregard), there will be an decrease in part-time work and a smaller increase in full-time work (McCall, 1996). In addition, those seeking part-time work are ineligible for benefits in most states. These workers’ earnings are taxed to finance the

²⁴Implicit in this discussion is the assumption that the search requirement for UI receipt can be satisfied at low cost.

program, yet they are disqualified from receiving benefits. This issue has aroused controversy in recent years.

Finally, we should emphasize that the above results are based on partial equilibrium analyses, i.e. they do not include the effect of the behavior of UI recipients on those that do not receive UI. This issue is discussed briefly below.

5. Empirical Evidence on UI Labor Supply Effects

There are excellent surveys, as mentioned earlier, that include summaries of the labor supply effects of UI. Atkinson (1987), in particular, provides concise summaries of the literature up through the mid-1980s. In this survey we will not replot that ground, but rather focus on mostly newer studies, though we will discuss the results in relation to some of the earlier summaries of the literature.

(a) Identification of Unemployment Insurance and Workers' Compensation Effects

Before discussing estimates of UI program effects, it is useful to make some general comments that apply to both the UI and WC literatures. While good evidence on UI and WC effects from outside the English-speaking countries is becoming more common (especially for UI), there are reasons to believe that the best evidence on the effects of UI and WC—especially for programs with features similar to those in the states—is likely to come from the U.S. With 50

states and the District of Columbia having essentially the same systems but with often sharply different benefit levels and other characteristics, one has transparent variation in incentives that is arguably exogenous and can be used to estimate the effects of UI and WC. Moreover, there are often differing incentives across groups within a state, and sharp changes in program characteristics for one group, but not another, providing additional levers to identify the effects of the programs.

That states differ in many respects, and that their policies are often driven by these differences, does not invalidate many of the approaches that can be taken with U.S. data. There certainly is work showing that state UI and WC benefits are affected by underlying state attributes.²⁵ Nevertheless, the best work using data from the States relies on sharp changes in policies (and uses comparison groups), while the underlying determinants of policies tend to move slowly. For example, studies using data immediately before and after benefits have been increased sharply are likely to be immune from a political economy critique, especially when the forces that lead to these policy changes are understood. Other sensible approaches include, for example, the examination of policies that affect one group but not another or have sharply different effects on different groups. For example, U.S. benefit schedules generally do not provide high benefits for all of those in a particular state. Rather, they provide very different benefit replacement rates depending on one's earnings, and these schedules differ sharply across states and over time.

²⁵For example, see Adams (1986) for UI, and Besley and Case (1994) for WC.

This is not to say that U.S. evidence is applicable to all countries or that non-U.S. studies cannot be convincing. Only a narrow range of policies can be directly evaluated using U.S. data because state differences in UI programs are all within the confines of the parameters of a federal system and because state WC programs are similar (due in part to influential commissions, the efforts of national insurance organizations, unions, and multi-state employers). Furthermore, the economic, cultural and institutional background in other countries may render the U.S. experience not directly transferable. Nevertheless, in the vast majority of non-U.S. studies (and many U.S. studies) it is difficult to see the identifying variation in UI or WC program characteristics across units that allows researchers to estimate program effects. Atkinson and Micklewright (1985), in their review of UI research, argue that micro-data studies that do not describe their sample and other basic facts are “likely to be meaningless” (p. 241). We would stress that the same is true of studies that do not make clear the source of differences in program incentives across individuals and why those sources are likely to be exogenous. Other problems arise in cross-country studies that have difficulty holding constant the many country specific features that affect unemployment.

Before describing the central tendencies of the empirical work on UI and WC labor supply effects, we describe an empirical approach that has been used successfully in a number of recent studies. Specifically, a number of recent studies have examined changes in state laws that affected some individuals, but not others, or reforms that provided plausible comparison groups through another means.

A useful place to start is the numerous papers that examine the effects of unemployment

insurance (UI) on the length of unemployment spells. In a typical study that does not use exogenous variation from policy changes, the length of unemployment benefits is regressed on the benefit level or the replacement rate, the past wage or earnings, and demographic characteristics. Welch (1977) criticizes this conventional methodology by pointing out that within a given state at a point in time, the weekly UI (or WC) benefit is a constant fraction of previous earnings except when an individual receives the minimum or maximum weekly benefit. Thus, regressions of spell length on weekly benefits and previous earnings consequently cannot distinguish between the effect of UI and WC and the highly correlated influence of previous earnings. This result is especially true if we are uncertain about exactly how previous earnings affect spell length. As we discuss below, this identification problem, which is created by the dependence of program generosity on an individual's previous earnings, is common to many social insurance programs besides UI and WC, including social security and disability insurance. Other sources of differences in benefits, such as family composition and earnings, are also likely to have independent effects on spell length making their use in identification suspect. In many studies of UI outside the U.S., eligibility for UI or benefit generosity are often taken as exogenous even though they depend on an individual's work history and place of employment. This problem also arises when other outcomes are examined, such as savings.

Several papers exploit potentially exogenous variation in UI benefit levels from increases in state maximum weekly benefit amounts. These natural experiments are used to estimate the effects of UI on the length of unemployment, reemployment earnings, and the incidence of UI claims. Early work in the spirit of this approach can be found in Classen (1979) and more

closely Solon (1985). Classen examines benefit changes, but relies mostly on departures from a linear effect of earnings on outcomes as a measure of benefit effects. Solon examines the length of UI receipt in Georgia just before and after the introduction of federal income taxation of UI for high income individuals in 1979. In the typical study of spell lengths, the variation in UI benefits comes from some combination of different replacement rates in different states, different minima and maxima, and maybe some variation in these parameters over time. Many of the natural experiment type papers are able to isolate one component of this variation which can separately be used to identify the effects of UI.

The main idea for one of the natural experiment papers that we use as a prototype can be seen by examining Figure 3, which displays a typical state schedule relating the weekly UI (or WC) benefit amount to previous earnings. The solid line is the schedule prior to a change in a state law which raises the minimum and maximum weekly benefit amount (WBA). The dashed line is the schedule after the benefit increase. Between the minimum and the maximum, the weekly benefit amount is a constant fraction of previous earnings (in the case of UI in most states, the highest quarter of earnings during the first four of the last five calendar quarters prior to the date of filing for benefits).

For people with previous earnings of at least E_3 (the High earnings group), one can compare the mean weeks of UI received and reemployment earnings of people who filed for UI benefits just prior to and just after the change in the benefit schedule.²⁶ Those who file before the

²⁶In principle, one could also examine the effects of increases in the minimum weekly benefit amount. However, in many cases few people receive the minimum benefit and it is raised

increase receive WBA_{\max}^B while those filing afterwards receive WBA_{\max}^A . An individual's filing date generally determines his UI benefit amount for his entire benefit year (the one year period following date of claim). Thus, two individuals with quarterly earnings greater than E_3 will receive different weekly benefits for their entire period of receipt if one filed a few days before and the other a few days after the effective date of the benefit increase. This is the main idea of this approach. Most of the remaining methodological issues in the approach involve correcting for possible differences between the individuals filing just before and just after the benefit increase. One may also need to account for the dependence between observations from a given earnings group for a given year. In this example, one can use as a comparison group those with earnings between E_1 and E_2 (the Low earnings group) who file just before and just after the benefit increase. The benefits these individuals receive are unaffected by the increase in the maximum benefit amount. The so-called difference-in-differences estimator would then be used. In studies of this type, an additional comparison group may come from states that did not experience a benefit increase.

One should not construe this argument as saying that all studies that use this type of approach are convincing, and studies that do not are not convincing. Rather, this example shows that one can make clear the sources of variation that allow the estimation of program effects, and that one can then make a case for their exogeneity (or lack thereof).

infrequently.

(b) Unemployment Insurance and Unemployment or Claim Incidence

There is a substantial literature that finds a large effect of UI on the incidence of unemployment or the incidence of UI claims. Table 3 summarizes some of these studies. These studies are mostly concerned with labor demand, but we include them for completeness. Feldstein (1978) examines the effect of benefits on layoffs, finding a large effect. The subsequent studies focus on how incomplete experience rating interacts with benefit generosity to affect layoffs. In these studies a key variable is the marginal tax cost of a layoff, denoted by e , which is the fraction of the UI cost of an additional layoff (in present value) that a firm can expect to pay in future taxes. The extent to which e is below one, then, is a measure of the degree to which experience rating is incomplete. The three studies, Topel (1983), Card and Levine (1994), Anderson and Meyer (1994) all find large effects of incomplete experience rating on layoffs. The first two studies find substantially larger effects using state by industry proxies for the tax cost than is found by the third study which employs firm level tax costs. It is hard to translate these results into effects of the level of benefits, but it should be clear that incomplete experience rating could not have an effect on layoffs unless there were substantial UI benefits. In a paper that is explicitly about labor demand, Anderson (1993) finds that UI induced adjustment costs have a substantial effect on the seasonality of employment.

A second group of studies, summarized in Table 4, examines how UI benefits and other variables affect the frequency of claims for UI conditional on unemployment or a job separation. Corson and Nicholson (1988) and Blank and Card (1991) both examine aggregate data and

Panel Study of Income Dynamics (PSID) microdata. They both find substantial effects of the level of benefits in aggregate data, but come to conflicting results using the microdata. Anderson and Meyer (1997) find substantial effects in administrative microdata. Overall, an elasticity of unemployment or claims with respect to benefits in the neighborhood of .5 is a reasonable summary of these studies.

(c) Unemployment Insurance and Unemployment Durations

The results of many of the more recent studies of unemployment durations as well as some older studies that rely on changes in benefits for identification are reported in Table 5. Focusing on the U.S. studies first, the studies imply an elasticity of duration with respect to the level of benefits in excess of 0.5. Several of the studies, including Classen (1979), Solon (1985), and Meyer (1989, 1990) find elasticities over 0.5. The elasticity estimates with respect to the potential duration (length) of benefits tend to be much lower.

The non-American results reported in Table 6 are more varied. Very large effects of potential duration in Canada but no benefit level effect is found by Ham and Rea (1987), while Hunt (1995) finds very large effects of the level and potential duration of benefits in Germany. The studies of Sweden (Carling et al., 1996) and Norway (Roed and Zhang, 2000) find much smaller effects, though the sources of identification in the former study are far from clearly exogenous. A very thoughtful recent study by Carling, Holmlund and Vejsiu (2001) examines data before and after a benefit cut in Sweden and finds an elasticity over 1.0. The authors discuss

a paper written in Swedish that analyzes an earlier cut and also finds large effects. Other work by Abbring, van den Berg, and van Ours (2000) suggests large effects of benefit cuts on unemployment duration in the Netherlands, but it is difficult to separate out benefit cuts from other policies in their work. An elasticity of unemployment duration with respect to benefits of 0.5 is not an unreasonable rough summary, though there is a wide range of estimates in the literature. Such an elasticity is not very different from the central tendency of the duration elasticities reported in the Atkinson (1987) survey.

One should note that the elasticity of unemployment with respect to benefits is the sum of the layoff/claim elasticity and the duration elasticity. To see this result, let weeks unemployed W be the product of incidence, I , and duration, D . Then, letting the UI benefit be B , we have $W=I \cdot D$, and

$$[dW/dB][B/W]=[B/W][DdI/dB + IdD/dB]=[B/I][dI/dB] + [B/D][dD/dB].$$

Overall, the combined effect of benefits on unemployment through incidence and duration is suggested to be near one by these studies. This result is consistent with the aggregate analysis of twenty OECD countries by Nickell (1998) who finds an elasticity of unemployment with respect to the replacement rate of close to one.

Besides cross-sectional regression analyses of benefit effects on duration, we also have evidence from a recent series of randomized social experiments in the U. S. that are surveyed in Meyer (1995b). Four cash bonus experiments made payments to UI recipients who found jobs quickly and kept them for a specified period of time. Six job search experiments evaluated combinations of services including additional information on job openings, more job placements,

and more extensive checks of UI eligibility. The bonus experiments show that economic incentives do affect the speed with which people leave the unemployment insurance rolls. As a result, UI is not a completely benign transfer, but rather it affects claimants' behavior as shown by the declines in weeks of UI receipt found for all of the bonus treatments. The job search experiments found that various combinations of services to improve job search and increase enforcement of work search rules reduce UI receipt. It is hard to extrapolate from these experimental results to elasticities since the treatments were very different from benefit changes, but the estimates probably suggest moderate effects of UI. Individuals clearly were able to change the speed with which they went back to work when faced with financial incentives to do so, but the effects were not particularly large. The experiments also indicated that job search assistance and reporting requirements have a substantial effect on unemployment duration.

(d) Unemployment Insurance Spillovers

An important issue on which more evidence is needed is the degree of spillover effects from UI recipients to other unemployed individuals. Might the spells of non-recipients become shorter, if UI recipients cut back on search activities and thus competed less strenuously for available jobs? The possibility of such spillovers has been emphasized by Atkinson and Micklewright (1985) and others. Levine (1990) examines this question empirically using the CPS and the National Longitudinal Survey of Youths. He finds that increases in the generosity of UI benefits appear to decrease the unemployment of those who do not receive UI. This is

important work that suggests that previous work on UI and unemployment durations may have overestimated the overall effects of UI on unemployment rates. There is little other direct evidence on the question of whether general equilibrium effects of UI are much smaller than partial equilibrium effects. We should note that it is also possible that the adverse unemployment effects of UI will be magnified in general equilibrium. Carling et al. (2001) argue that UI will raise wage pressure in economies where wage bargaining is pervasive, thus reinforcing its adverse incentive effects on job search.

(e) Other Labor Supply Effects of Unemployment Insurance

Table 7 summarizes two studies of other aspects of labor supply that are affected by UI. Cullen and Gruber (2000) find that higher unemployment benefits are associated with less work by the wives of unemployed men. The authors find that there is substantial crowd-out of this form of family “self-insurance.” Their estimates suggest that for every dollar of UI received by the husband, wives earnings fall by between 36 and 73 cents. McCall (1996) examines the effects of UI on part-time work. He finds that the level of the disregard (the amount of earnings allowed before benefits are reduced) has a significant effect on the probability of part-time employment during the first three months of joblessness. There is also some work on the extent to which the presence of UI shifts out labor supply of those who are employed (Anderson and Meyer, 1997) and those whose benefits are about to run out (Katz and Meyer, 1990). The first paper finds some support for potential workers’ valuing the benefits (and labor supply thus

shifting out), but the estimates are imprecise. The second paper finds little support for the hypothesis that higher UI benefits raise job-finding just prior to benefit exhaustion.

IV. WORKERS' COMPENSATION: PROGRAM FEATURES AND LABOR SUPPLY

1. Main Features of U.S. Workers' Compensation Programs

States have complete discretion in designing their workers' compensation programs. Nevertheless, state programs have many standard features. Coverage under workers compensation in the U.S. is about as universal as under UI. Approximately 97 percent of the non-federal UI covered workforce is covered, plus all federal employees. Unlike UI, a worker is eligible for WC benefits immediately when she starts work, even without a previous earnings history.

State WC programs cover the medical costs of a work-related injury or illness as well as four main types of cash benefits (also called indemnity benefits). First, 'temporary total' benefits are paid to workers who are totally unable to work for a finite period of time. All workers' compensation claims are initially classified as temporary total cases and temporary total benefits are paid; if the disability persists beyond the date of maximum medical improvement, the case is reclassified as a permanent disability.²⁷ About 70 percent of all claims are for temporary total

²⁷The date of maximum medical improvement is the time at which a doctor determines that an injured worker will not recover further from an injury.

disabilities. Second, if a worker remains totally disabled after reaching maximum medical improvement, she is eligible for ‘permanent total’ benefits. In most states, permanent total and temporary total benefits provide the same weekly payment, but in some states there is a limit on cumulative permanent total benefits. Benefits equal a fraction (typically two-thirds) of the worker’s pre-disability average weekly wage, subject to a minimum and maximum payment. Figure 3, described earlier, displays a typical state benefit schedule. The maximum allowable benefit varies substantially across states, and is often linked to the worker’s number of dependents. Approximately half of workers earned a high-enough wage that if they incurred a temporary total disability their benefit would be limited by the maximum level in their state. Third, workers who suffer a disability that is partially disabling but is expected to last indefinitely qualify for ‘permanent partial’ benefits. An employee who loses the use of a limb, for example, would receive permanent partial benefits. These benefits are typically determined on the basis of a schedule that links benefits to specific impairments. For example, an employee who lost the use of an arm in a work-related accident in Illinois in 2000 was entitled to a maximum benefit of \$269,943. Finally, dependents of workers who are killed on the job are paid survivors’ benefits.

Each state law requires a waiting period ranging from three to seven days before indemnity benefit payments begin. However, workers are compensated retroactively for the waiting period if their disability persists beyond a specified time period. Table 8 illustrates the interstate variation in workers’ compensation benefit minima, maxima, replacement rates, waiting periods, and retroactive periods for twelve states. Comparing this table to Table 1 , one will notice that WC has much higher replacement rates and maximum benefits than UI. A

typical state has a WC replacement rate of two thirds, but a UI replacement rate of just over one-half. The typical state has a maximum WC benefit nearly twice that of its maximum UI benefit. Furthermore, workers' compensation benefits are not subject to income or payroll taxes.

The high replacement rates combined with the exclusion of WC from income taxation often leads to after-tax replacement rates near or above one. A couple of representative examples illustrate this point. Suppose an individual's taxable family income was under \$43,850 in 2000 and she was subject to a 5 percent state income tax. Then, the combination of state income, federal income, and OASDHI payroll taxes implied a 27.65 percent total marginal tax rate. For someone whose benefit was not limited by the maximum benefit and who had a pre-tax replacement rate of two-thirds, the after-tax replacement rate was 92 percent. If income was over \$43,850, the family was in a higher federal income tax bracket with a total marginal tax rate of 40.65 percent and the implied after-tax replacement rate was 112 percent. When a worker has higher take home pay not working than working, there is a strong disincentive to work.

These sharp work disincentives also apply to those who were working full-time, but are considering part-time or temporary work after their injury, likely leading a fifth type of benefits, 'temporary partial benefits,' to be uncommon. A WC recipient with low earnings upon reemployment typically loses two dollars in benefits for every three dollars earned. Given that WC is not subject to income or payroll taxes, the return to working part-time or at a much lower wage than previously earned is negligible or even negative.

2. Workers' Compensation Financing

Workers' Compensation is mostly financed through insurance premiums paid by firms. WC experience rating is much tighter than UI experience rating, with large firms almost perfectly experience rated. The premium rates as a fraction of payroll range from .1 percent in banking to over 20 percent in construction and trucking in some states. To determine its premium, a firm is placed in one or more of 600 classifications that are a mixture of industry and occupation codes. These classifications determine manual rates, which when multiplied by payroll, give the premium for a small firm. A large firm's rate is a weighted average of the manual rate and the firm's incurred loss rate, typically over a 3 year period in the past. The weight put on the firm's incurred loss rate increases with firm size, with the weight equaling one for very large firms.

3. Comparisons of UI and WC Program Costs in the U.S.

Some striking patterns are evident in Table 9, which reports aggregate benefits and revenues for UI and WC during the past twenty years. The cyclicity of UI benefit payments is pronounced, with benefit payments high in 1982-1983 and 1992-1993 in response to the downturns near the beginning of those periods. Any cyclicity is less apparent for WC, but a secular rise in WC benefit payments and costs followed by a decline after 1993 is evident. Why WC costs rose so quickly and then fell is only partly understood. The rise was likely associated with benefit increases and associated behavioral responses, as well as the rise in medical costs,

while the recent fall is partly due to a decline in injury rates.

4. Workers' Compensation Outside of the U.S.

We should emphasize that there are often very different institutions in other countries to compensate those injured on the job. Moreover, programs for the injured are often combined with other programs, and those eligible for one type of benefit are often eligible for another in certain circumstances. In particular, there is often no easy translation from the U.S. workers' compensation program to an equivalent in another country, since the U.S. lacks national health insurance and WC provides medical benefits.

In Canada, WC is fairly similar to the U.S, with substantial variation in programs across provinces. Replacement rates are typically 90 percent of earnings net of income taxes, pension contributions, and UI contributions. The waiting period and retroactive period are typically just one day, and firms in most cases must purchase insurance through a provincial fund.

In the United Kingdom, those who suffer an industrial accident or contract an industrial disease are generally eligible for the Industrial injuries disablement benefit (IIDB), about half of whom also receive an additional allowance for reduced earnings. These benefits vary with the degree of disablement, but do not vary with previous earnings. The benefits are capped at a low level: IIDB benefits in 2000 were a maximum of £109.30 (\$161) per week. As a result, these benefits provide little insurance to middle and upper income workers in the U.K. The program appears to be more of a backstop akin to U.S. welfare programs, and expenditures are fairly

modest.

5. Theoretical Responses of Labor Supply to Workers' Compensation

Workers' compensation affects at least four dimensions of labor supply. First, WC can affect the likelihood of an on-the-job injury. Much research on the labor supply effects of WC has focused on this issue. Second, program characteristics affect the likelihood that workers will make a claim given an injury. Once a claim has been made, we expect that labor supply will be affected by the adverse incentives of WC. Third, once on the program, WC can extend the time a person is out of work. Finally, the availability of compensation for on the job injuries can shift labor supply by changing the value to a worker of various jobs. We discuss these four effects in turn.

There is an extensive literature on how the provision of benefits can possibly make the occurrence of an injury more likely. This research is motivated by the idea that workers' (and firms) will take fewer actions to prevent an injury when the injury becomes less costly due to the availability of benefits that compensate workers. Krueger (1990) provides a simple model of this situation. Let expected utility on the job be written as

$$(1) E[U] = [1 - p(e)]U(W) + p(e)V(B) - e,$$

where e is the workers' effort devoted to injury prevention (care taken, or use of ear plugs, etc).

$U(W)$ is utility when working at wage W , and $V(B)$ is the utility of the WC benefit B when injured. The first-order condition for the choice of e that maximizes utility, assuming an interior solution, is

$$(2) \quad p'(e)[V(B)-U(W)]-1=0.$$

By differentiating (2) and using the second-order condition, one can show that

$$(3) \quad \frac{\partial e}{\partial B} = \frac{p'V'}{p''(U-V)} < 0, \text{ assuming } p' < 0, p'' > 0, \text{ and } U-V > 0.$$

Thus, the provision of workers' compensation benefits may reduce effort at injury reduction (a dimension of labor supply) and increases the probability of an injury. On the other hand, we should note that more generous WC benefits could decrease injuries through its effect on firm incentives, as discussed by Ruser (1985) and Ehrenberg (1988).

Second, the generosity of WC benefits may affect the probability that a person claims benefits conditional on having an injury. As the generosity of benefits rises, it is more likely that the benefits of receiving WC will outweigh the costs, which consist of lost earnings plus the transaction costs of establishing eligibility and possibly the stigma of WC receipt. As a result of higher benefits, there may also be more claims in marginal cases where it is unclear whether the

injury is work related and more cases involving outright fraud.²⁸ Furthermore, whether someone initially receives WC is partly related to how long they are out of work. A WC claimant cannot receive benefits until after a waiting period of typically 3 days. It is more likely that an injured worker will be out of work longer than this waiting period when benefits are high. Once a person is then on the WC rolls, they become subject to the implicit taxes on work and the consequent work disincentives. Therefore, additional claims will lead to a labor supply response as well as higher costs.

Third, the duration of time out of work is affected by WC. Like UI, this issue is one on which a substantial part of WC research has focused. The duration of time out of work while receiving WC can be thought of as determined by a sequence of decisions. Each period following an injury, an individual compares the benefits received from WC (and the leisure time when not working) to the earnings received when working. A worker's decision would also reflect the disutility of working with an injury (which would tend to fall as an individual recovers) and the increase in productivity with recovery. An additional factor in a person's decision is that a longer stay out of work might facilitate a full recovery, reducing future pain and increasing future productivity. In this setting, higher WC benefits would tend to delay a return to work, but make a full recovery more likely, just as higher UI could lead to a better job match.

One should note that permanent benefits under WC have an income effect, but no substitution effect. Permanent partial benefits, which are frequently paid as a lump sum

²⁸For anecdotal evidence that higher benefits may also lead to fraud and overstated claims see the New York Times, December 29, 1991, p. 1.

settlement, also do not affect the marginal incentives to return to work; they only reduce work by increasing income.

One additional labor supply response is the extent to which labor supply shifts out in response to WC benefits because they make employment more attractive. This issue is examined theoretically and empirically in Gruber and Krueger (1991).²⁹

6. Empirical Evidence on WC Labor Supply

There are excellent surveys that include summaries of the labor supply effects of WC, such as Ehrenberg (1988), Krueger (1989), Moore and Viscusi (1990), and Kniesner and Leeth (1995). The empirical research on the labor supply effects of workers' compensation, while extensive, is probably less developed than the research on UI. Furthermore, while European researchers have recently produced many convincing studies of UI, research on WC outside the U.S. has lagged.

(a) The Incidence of Injuries and Workers' Compensation Claims

Table 10 summarizes a large number of studies that examine the effect of workers' compensation program parameters on the incidence of injuries or the incidence of WC claims. Most of these studies, especially the early ones, examine aggregate data at the state-by-year level,

²⁹Also see Holmlund (1983).

or industry by state-by-year level. These studies tend to find that more generous WC is associated with higher injury rates, but the effect is usually small. This may be an accurate estimate or a result of the use of aggregate variables and proxies that are required when researchers use state or state by industry data. These studies also tend to find higher claims elasticities than injury elasticities, a result that is expected given the additional effect of higher benefits on claims conditional on an injury. The estimated benefit elasticities cluster around 0.2 or 0.3, though the only studies that use individual microdata, Krueger (1990) and Butler, Gardner and Gardner (1997), find appreciably larger elasticities of the claims rate with respect to benefits. There is also a short literature examining whether claims for hard to diagnose injuries and injuries for which treatment can be delayed are more common when benefits are higher and on days when the injury is more likely a non-work injury (such as Mondays). The evidence on these issues is quite mixed.³⁰

(b) The Duration of Time Out of Work After an Injury

Most work on incentive effects of workers' compensation has focused on the program's effect on injury rates or the number of claims rather than the duration of claims. However, there has been a great deal of recent research on the effects of WC on the duration of time out of work

³⁰See Smith (1990), Card and McCall (1996) and Ruser (1998).

that we summarize in Table 11. Early work by Butler and Worrall (1985) examined low-back injuries in Illinois. They found elasticities between 0.2 and 0.4, depending on the statistical technique used. When they examined data pooled from 13 states, however, they did not find a consistent relationship between the level of benefits and the length of spells.

Meyer, Viscusi and Durbin (1995) examined data from a natural experiment provided by two very large increases in benefit levels in Kentucky and Michigan. This natural experiment enables them to compare the behavior of people who are injured before the benefit increases to those injured after the increases. By using the approach outlined in Section 2.5.1., the paper provides a test of the effect of benefit changes on the duration of claims where the sources of identification are readily apparent. Meyer, Viscusi and Durbin (1995) find that a 60 percent increase in the benefit level is associated with an increase in spell duration of approximately 20 percent. The elasticities range from .27 to .62, with most clustering between .3 and .4. Overall, the elasticity estimates are very similar in the two states. These results suggest substantial labor supply effects of workers' compensation benefits. Subsequent papers which have followed this natural experiment approach and examined the effects of benefit increases have found large effects. Krueger (1990), Gardner (1991) and the Curington (1994) results for severe impairments all imply duration elasticities over 0.7. On the other hand, the minor impairment results in Curington (1994) and the recent work of Neuhauser and Raphael (2001) suggest smaller effects, though that latter paper argues that the elasticities are understated due to claim composition changes.

Again, note that the elasticity of lost work time with respect to benefits is the sum of the

injury or claims elasticity and the duration elasticity as we indicated in Section 2.5.3. Combining the injury or claims elasticity estimates with the duration elasticity estimates suggests an elasticity of lost work time with respect to WC benefits of between .5 and 1.0. This elasticity is probably slightly smaller than the UI elasticity, but implies large effects on work time.

(c) Other Labor Supply Effects of Workers' Compensation

Gruber and Krueger (1991) examine the extent to which WC makes employment more attractive for those currently not receiving benefits, leading labor supply to shift out. They find a substantial shift in their study, concluding that workers value a dollar of WC benefits at about a dollar. This increase in labor supply may dampen the labor supply reductions of WC, particularly for high injury jobs that would otherwise be less desirable.

V. Income Support and Consumption Smoothing

The insurance provided by UI and WC and their distributional effects are probably their most important benefits. Nevertheless, the U.S. literature on income support and poverty reduction due to UI is quite slim. Work on the insurance value of UI is even less common. Unfortunately, like other benefits of social insurance, the insurance value of UI is difficult to analyze. It is much easier to analyze the disincentive effects of UI and WC than it is to quantify the beneficial effects of the programs. The disincentive effects can often be analyzed with

program data, but the benefits typically require more in depth information such as long histories of earnings, income and consumption.

Danziger and Gottschalk (1989) examine how UI fits in the safety net for the unemployed in the U.S. They emphasize that since a large fraction of those with the lowest earnings are ineligible, the role of UI is quite limited. However, while UI is received by a minority of the unemployed, it does play a significant role in poverty reduction. Older studies found that UI benefits are fairly progressive.³¹ Examining both benefits and taxes, Anderson and Meyer (2001) show that despite being financed through a regressive tax, the net benefits of UI are disproportionately received by those in low income deciles.

Gruber (1997) examines the consumption smoothing benefits of UI. Since unemployment is a risky event, risk averse people would want to purchase insurance against it (at a fair price). One can save to self-insure, but pooling risks for a given person over time is not as efficient as pooling risks across people at a point in time. Such self-insurance would be incomplete as an optimizing individual would not save enough to cover the losses of unemployment because that would leave too few resources for consumption most of the time.

Using U.S. Panel Study of Income Dynamics data for 1968-87, Gruber examines if consumption falls less upon unemployment when UI is more generous. He finds a large consumption smoothing role for UI, concluding that a 10-percentage point rise in the replacement rate reduces the fall in food consumption upon unemployment by 2.65 percent.

³¹See Hutchens (1981), and Feldstein (1977) which corrects and updates Feldstein (1974).

In other papers, Gruber has examined the extent to which families self-insure against unemployment and how these efforts are crowded out by government provided UI. Engen and Gruber (2001) find that more generous UI leads to lower savings, though the magnitudes are small. Given the consumption loss in self-insuring through precautionary saving, a small response might not be too surprising. On the other hand, the work of Cullen and Gruber (2000) that was previously discussed, suggests substantial ability to self-insure by those with a spouse and substantial crowding out of this behavior as UI becomes more generous. They find that each dollar of UI receipt reduces spousal earnings by 63-73 cents. This last result suggests that further research should explore whether the effects of UI on consumption and savings are sharply different for the unmarried. Further work should try to reconcile the large spousal labor supply crowdout effect with the large remaining effect of UI on consumption.

These results for the U.S. are very different from recent work on Canada by Browning and Crossley (2001) who find much smaller effects of UI on consumption smoothing. They argue that their most important finding is that the benefit effect is very heterogeneous. Most households are insensitive to the level of benefits, while those without liquid assets or with a spouse that is not employed are very sensitive to the level of benefits. This last result also partially disagrees with the interaction effects implied by the results of Gruber and co-authors. While the authors try to reconcile their results with those of Gruber, they are not able to offer much to explain the differences.

A recent paper by Bentolila and Ichino (2001) provides evidence on unemployment and consumption smoothing from a broader group of countries. The authors examine the U.S and the

U.K, as well as Germany, Italy and Spain. The authors find that consumption falls less with unemployment in Italy and Spain. This result is not attributed to UI, as it is argued that UI is less generous in Italy and Spain, rather it is attributed to more extensive transfers from family members.

In other work related to the insurance value of UI, Dynarski and Gruber (1997) examine the extent to which families are able to smooth variation in labor earnings. They find that the most important smoothing mechanisms are the government tax and transfer system and self-insurance through saving. Sullivan (2001) examines the ability of the unemployed to smooth their consumption using unsecured debt. He finds evidence that unsecured debt plays a substantial role for most people, but that those with low initial assets or low income are unwilling or unable to borrow. We should also note that Meyer and Rosenbaum (1996) find that the same people tend to receive UI year after year, but the number of weeks received each year varies greatly over time even for these regular users. This result gives a somewhat mixed picture about the degree of predictability of unemployment and the need for insurance, but overall suggests substantial uncertainty.

Research on the distributional and insurance value of workers' compensation in the U.S. is even less common than similar work on UI. There are many studies that examine the fraction of lost income replaced by WC (see Boden and Galizzi 1998 for a nice survey). In the case of temporary injuries, the statutory rules imply that in most cases 80 to 100 percent of prior after-tax earnings are replaced in the short run, though the percentage is often lower or higher. However, so-called temporary claims often have long-term effects. Galizzi, Boden and Liu (1998) examine

a sample of people with back injuries in Wisconsin. Their results suggest that a substantial share of those who receive only temporary total benefits have earnings losses that persist long after full recovery supposedly occurred and benefit payments ended.

In the case of injuries classified as permanent, the earnings losses are often very large. Using data from California, Reville and Schoeni (2001) estimate that four to five years after an injury, earnings are about twenty-five percent lower than they otherwise would have been. Galizzi, Boden and Liu (1998) also find evidence that those with permanent injuries are more likely than comparison groups to have had a car or home repossessed or suffer other financial difficulties. This evidence strongly suggests that injured workers often suffer large adverse shocks to their financial well-being, as well as the pain and loss of functioning due to an injury. However, there is currently no research that examines the well-being of injured workers and the extent to which the WC system in combination with other programs insures them against being injured. In other words, studies have yet to combine information on the pattern of WC payments after an injury (that are often front-loaded) with earnings information, information on transfers from other programs such as the Supplemental Security Income (SSI) program and the Social Security Disability Insurance (SSDI) program. This information has also not been combined with information on consumption or other measures of well-being as has been done in the UI literature. In addition the distributional aspects of WC programs have not been extensively examined.

VI. Job Search and Injury Recovery

The research on the effect of UI on the level of earnings upon re-employment is not very developed and what has been written is not very definitive. UI should allow a worker to raise her reservation wage and be more selective in the job taken. There is some suggestion from Classen (1979) and Meyer (1992a) that policy changes that encourage longer unemployment spells do not lead to higher wages, and some evidence from the U.S. UI experiments (Meyer 1995b) that encouraging shorter unemployment spells through various incentives does not significantly reduce wages.

The work on injury recovery effects of WC is also not well-developed. Higher WC benefits should allow a worker to spend more time out of work and more fully recover from an injury. There is some research on worker conditions several years after injuries, such as Galizzi, Boden and Liu (1998), but the relationship between benefit parameters and recovery is not explored. This issue is briefly examined in Reville and Schoeni (2001), who compare long-term earnings losses before and after temporary total benefits were raised 21 percent in California. They find small and insignificant effects of the benefit change on later earnings, but suggest that their test has little statistical power.

VII. Conclusions

The empirical work on unemployment insurance and workers' compensation insurance

reviewed in this chapter finds that the programs tend to increase the length of time employees spend out of work. Most of the estimates of the elasticities of lost work time that incorporate both the incidence and duration of claims are close to 1.0 for unemployment insurance and between 0.5 and 1.0 for workers' compensation. These elasticities are substantially larger than the labor supply elasticities typically found for men in studies of the effects of wages or taxes on hours of work; such estimates are centered close to zero (see, e.g., Killingsworth, 1983 and Pencavel, 1987). They are also larger than the consensus range of estimates of the labor supply elasticity for women, which is highly dispersed but centered near 0.4. These seemingly disparate results may, in part, be reconciled by the likelihood that elasticities are larger when a response can easily occur through participation or weeks worked, rather than an adjustment of the number of hours worked per week. Labor supply responses to WC and UI benefits occur mainly through decisions about weeks worked, and labor supply responses of women mainly concern participation and weeks worked. Male labor supply elasticities by contrast are primarily determined by an adjustment of the number of hours worked per week, a margin on which employees may have relatively little flexibility. These observations suggest that it would be misleading to apply a universal set of labor supply elasticities to diverse problems and populations.

Temporary total WC insurance benefits and UI benefits also may generate relatively large labor supply responses because they lead to only a short-run change in the returns to working. For example, receipt of benefits under UI is not for an indefinite period. Thus, workers may inter-temporally substitute their labor supply while benefits are available, generating larger work

responses than predicted by long-run labor supply elasticities.

In addition, UI and temporary total WC benefits make the net wage (after-tax wage minus after-tax benefits) very low, often close to zero in the case of WC benefits. This situation is different from a typical cut in wages for two reasons. First, the income effect does not counterbalance the substitution effect to the usual extent since benefits are provided and income often does not fall appreciably. In the case of a replacement rate of 0.8, the net wage falls by 80 percent, but current earnings only fall by 20 percent. In the usual case of wage variation, a drop in the wage dramatically lowers income, and thus, the income effect tends to mitigate the substitution effect. Second, the level of the net wage may be so low that it is out of the range of typical variation in cross-section wages or wage variation due to taxes. Thus, estimates based on other sources of wage variation may be less applicable to UI and WC.

Despite labor supply responses to social insurance programs, it should be clear that the desirability of social insurance depends on the *intended* as well as unintended effects (or, more appropriately put, undesired side effects) of the programs. Thus, a finding of labor supply responses to incentives is not necessarily cause for abandoning a program. The undesired side effects must be balanced against the improved welfare from providing income maintenance to those in need. These two effects have been explicitly balanced in some research such as Gruber (1997).

There is some evidence that UI substantially smooths consumption of the unemployed. These estimates suggest a substantial insurance value to UI. The evidence also shows that the UI program is fairly redistributive. Nevertheless, the benefits of the UI program are not as firmly

established as the labor supply distortions and merit extensive further study. These issues are even more apparent for WC. There is substantial evidence of material hardship on the part of those suffering workplace injuries even after the effects of the current WC system and other transfers. However, a clear and comprehensive picture of the benefits of the WC program cannot be extracted from the pieces of information that we currently have.

A final point worth highlighting is that less research has been conducted on WC than on UI, despite its much larger size (at least in the U.S.). In our view, WC is under researched relative to its importance to the economy and merits further study. WC programs exhibit substantial variability over time or across states, and large data sets are available that can be analyzed, so there is potential for many valuable research projects. Also, while the UI literature for Europe is rapidly catching up to the American literature, relatively little work has been done on WC-like programs outside the U.S.

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Figure 1
The Job Finding Rate and Unemployment Benefits

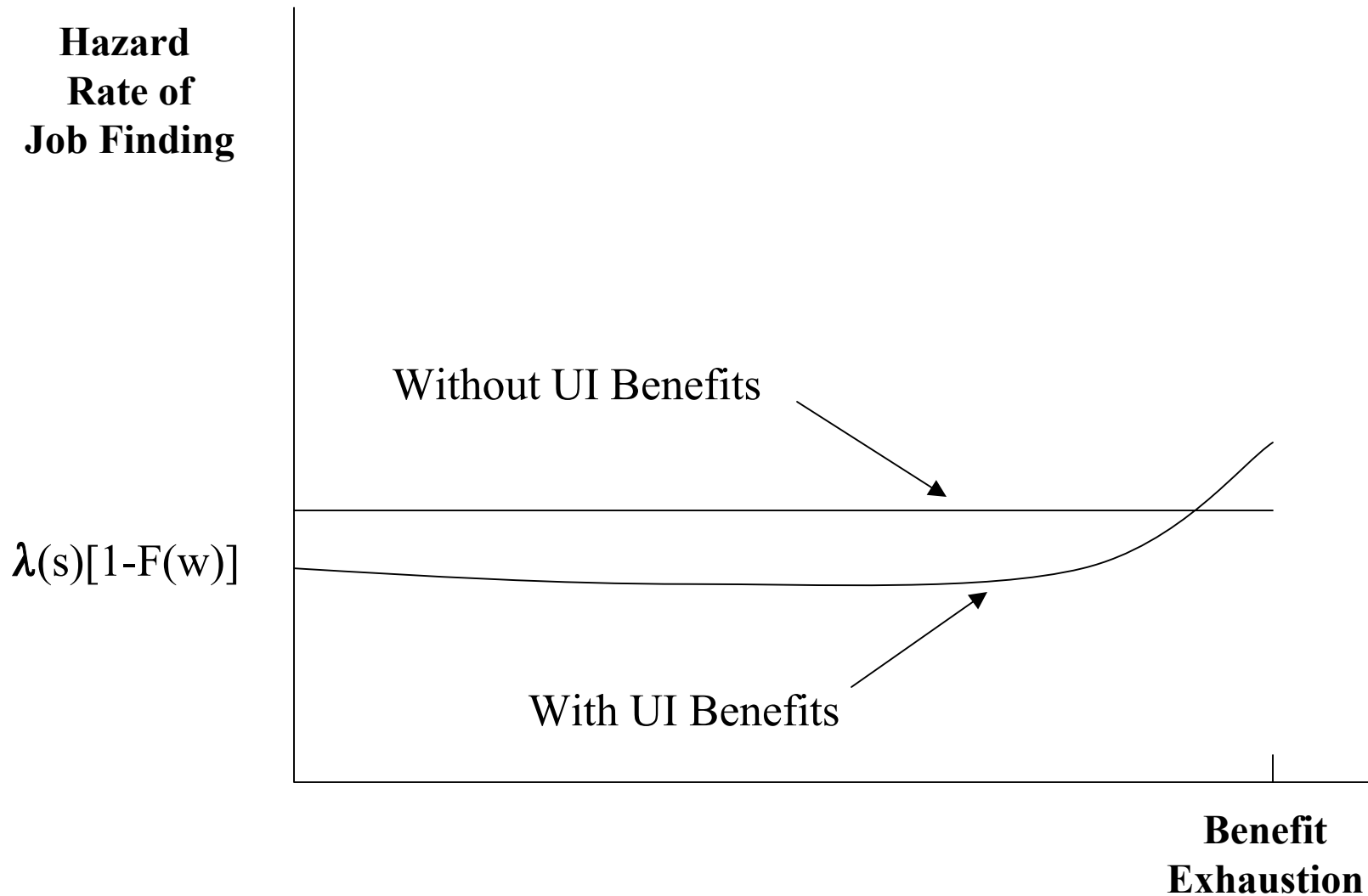


Figure 2

How Unemployment Insurance Alters the Budget Constraint

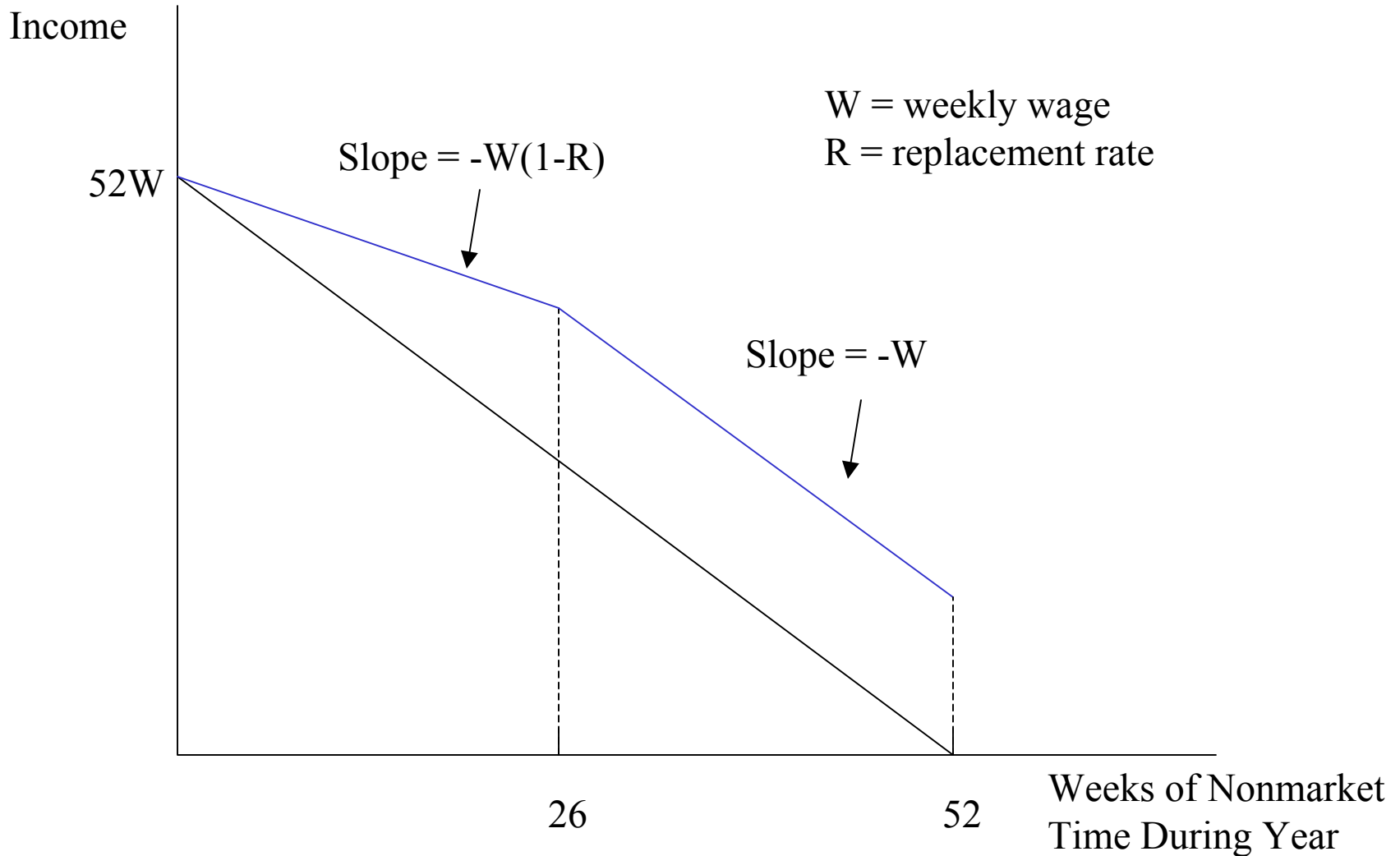


Figure 3

UI or WC Benefit Schedule in a Common Natural Experiment Study Approach

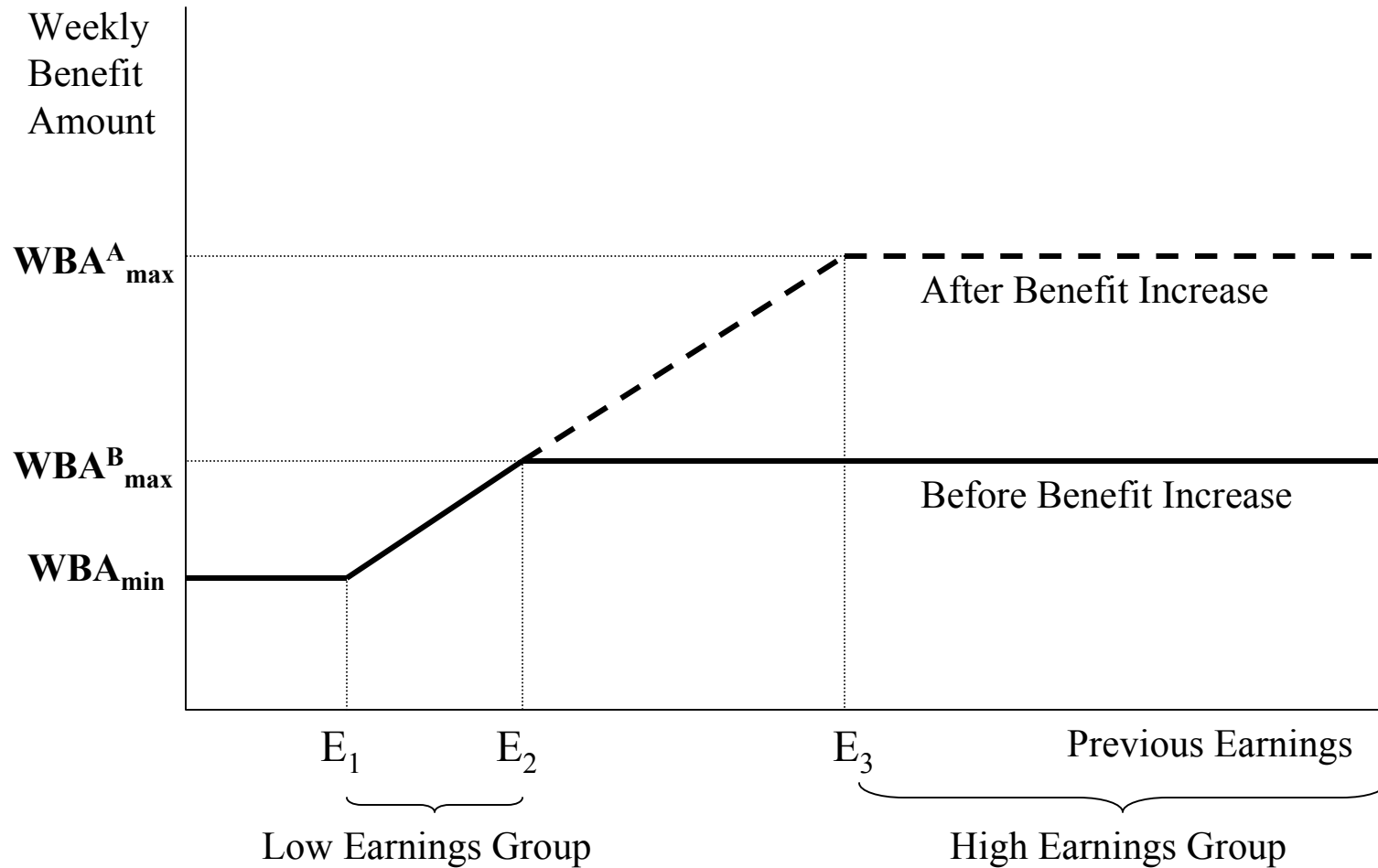


Table 1**Main Characteristics of State Unemployment Insurance Programs in the U.S.**

State	Base Period Earnings Required	Replacement Rate ⁽¹⁾	Minimum Weekly Benefit	Maximum Weekly Benefit	Quarters of Work Required for 26 Weeks of Benefits
California	\$1,125	39-57%	\$40	\$230	1.56-2.28
Florida	3,400	50	32	275	4
Illinois	1,600	49.5 ⁽²⁾	51	296-392	1.38
Massachusetts	2,400	50-61.9 ⁽²⁾	24-36	431-646	2.77-3.44
Michigan	3,090	67 ⁽³⁾	88	300	2.67
Mississippi	1,200	50	30	190	3
Missouri	1,500	52	40	220	3.12
Nebraska	1,600	52-65	36	214	3-3.9
New Jersey	2,060	60 ⁽²⁾	61	429	2.67
New York	2,400	50	40	365	1.5
Texas	1,776	52	48	294	3.85
Median State	1,576	52	39	292	3.12

Source: Highlights of State Unemployment Compensation Laws, January 2000.

Notes: (1) Where a range is given, a benefit schedule is used in which the replacement rate is higher for lower paid workers. (2) Illinois, Massachusetts, and New Jersey have dependent allowances. (3) Of average after tax weekly wage.

Table 2
International Comparisons of Expenditures on Unemployment Insurance and Workers Compensation

Country	Unemployment Insurance		Employment Injuries (Workers' Compensation)	
	% of GDP	\$US millions	% of GDP	\$US millions
Canada	2.52	13,776	0.85	4,624
Denmark	4.54	6,113	0.24	325
Germany	3.40	65,049	0.60	11,427
Japan	0.46	19,788	0.25	10,744
Sweden	2.95	5,460	0.81	1,502
United Kingdom	0.25	2,445	--	--
United States	0.50	28,334	0.74	41,654

Sources: International Labour Organization, Cost of Social Security 1990-96.

Note: Expenditures include cash and in-kind benefits, and administrative and other expenditures. All figures are in nominal dollars and pertain to 1993 (1991 for the United States).

Table 3
Studies of Unemployment Insurance and the Incidence of Layoffs

Empirical Specification	Data and Identification	Findings
Feldstein (1978). Linear regression of temporary layoff probability on the after-tax UI replacement rate, controlling for age, union status, race, marital status, gender, a linear effect of the wage, and industry and occupation (in some specifications).	U.S. March 1971 Current Population Survey (CPS) data for experienced labor force members who were not labor for re-entrants and not self-employed. Identified by differences in benefits across states and individuals within state.	Elasticity of temporary layoff unemployment rate with respect to the replacement rate ranging from .74 to .91. “The average UI benefit replacement rate implied by the current law can account for about half of temporary layoff unemployment.”
Topel (1983). Estimation of time constant layoff and reemployment hazard rate using cross-section data on labor force status and unemployment. Key UI variable is subsidy rate $b((1/1-t))-e$, where b is the benefit, t is the income tax rate and e is fraction of the cost of a marginal layoff that the firm pays through experience rating.	U.S. March 1975 CPS data on full-time, full-year labor force participants. Identified by differences in benefit and experience rating schedules across states interacted with industry unemployment rates.	“...the layoff unemployment rate would have been about 30 percent lower if the subsidy to unemployment caused by the current UI system had been eliminated.” Argues that most of the effect is through incomplete experience increasing layoffs.
Card and Levine (1994). Estimation of annual and seasonal temporary layoff, permanent layoff and other unemployment rates. Linear models for the probability of unemployment with e (see above for definition) as the main regressor are used, with state, state*year and industry*year controls in some specifications.	U.S. CPS outgoing-rotation-group data for 5 industries in 36 states from 1978-1985. Identified by differences in experience rating schedules across states interacted with industry unemployment rates.	“We estimate that a move to complete experience-rating would reduce the temporary layoff unemployment rate by about 1.0 percentage point (or roughly 50 percent) in the trough of a recession, and by about the same amount in the lowest demand months of the year.”
Anderson and Meyer (1994). Linear probability models of temporary job separations and all job separations with firm specific measure of e (see above for definition) and controls for past firm layoffs. Some specifications difference the data to remove firm and individual fixed effects.	U.S. Continuous Wage and Benefit History (CWBH) administrative data on both workers and firms from 6 states during 1978-1984. Identified by the differential effects of changes in state tax schedules on different firms.	“Our preferred estimates imply that incomplete experience rating is responsible for over twenty percent of temporary layoffs.”

Table 4
Studies of Unemployment Insurance and Benefit Takeup

Empirical Specification	Data and Identification	Findings
Corson and Nicholson (1988). Aggregate claims ratio regressed on replacement rate=average weekly benefit of recipients divided by average weekly wage of employed.	U.S. state by year aggregate data on the fraction of unemployed that receive UI.	Elasticity over 0.5.
Micro claims data regressed on variable for income taxation of UI, but replacement rate not used.	Panel Study of Income Dynamics (PSID) individual data on UI claims.	Large effect of benefit taxation variable.
Blank and Card (1991). Aggregate claims ratio adjusted for estimated eligibility regressed on replacement rate=average weekly benefit of recipients divided by average weekly wage of employed.	U.S. state by year aggregate data on the fraction of unemployed that receive UI.	Replacement rate elasticities of 0.32 to 0.58.
Micro claims data regressed on state average replacement rate. No variable for income taxation of UI included.	Panel Study of Income Dynamics (PSID) individual data on UI claims.	Insignificant effect of replacement rate. Coefficient usually of “wrong” sign.
Meyer (1992). Difference in difference analysis of claim incidence by earnings group, industry and region.	New York administrative data on UI claims from 1988 and 1989. Identification comes from a 36 percent increase in the maximum benefit.	“The numbers are consistent with large effects of the higher benefits on the relative incidence of claims.”
Anderson and Meyer (1997). Linear and logit models of UI receipt conditional on separation. Explanatory variables include logarithms of: weekly benefit, 1-tax on benefits, 1-tax on earnings, and potential duration of benefits. Some specifications with flexible controls for past earnings, state, and state*time.	U.S. CWBH data on both workers and firms from 6 states during 1978-1984. Identified by differences in benefit schedules across states, changes in these schedules, changes in income taxation of benefits.	Elasticity of benefit takeup with respect to benefits of 0.33 to 0.60. Slightly smaller elasticities with respect to (1-tax on benefits). Elasticities of takeup with respect to potential duration about half as large as those with respect to the benefit level.

Table 5
Studies of Unemployment Insurance and the Duration of Unemployment in the U.S.

Empirical Specification	Data and Identification	Findings
Classen (1979). Linear and log-linear regression of unemployment duration on benefits using deviations of relationship from linearity at benefit maximum as an estimate of benefit effects. Tobit models were also estimated.	U.S. Continuous Wage and Benefit History (CWBH) administrative data from Arizona from the year before and year after a 1968 benefit increase.	Benefit elasticity of 0.6 in levels and 1.0 in logarithms.
Solon (1985). Hazard model for exit from unemployment with key variable b(1-pt) to capture taxation of benefits.	U.S. CWBH data for Georgia before and after the introduction of income taxation of UI benefits for high income families.	After-tax benefit elasticity of duration equal to 1.0.
Moffitt (1985). Flexible discrete hazard model of exit from unemployment with explanatory variables for benefit level, potential duration at start of spell, past wages, and state unemployment rate.	U.S. CWBH data for 13 states 1978-1983. Identification from differences in benefit schedules across states and changes in benefits and potential duration over time.	“The results indicate that a 10-percent increase in the UI benefit increases spells by about half a week and that a 1-week increase in potential duration increases spells by about 0.15 weeks.” These numbers suggest a benefit elasticity of about .4 and a potential duration elasticity of 0.34.
Meyer (1990) and Katz and Meyer (1990b). Hazard model for exit from unemployment with nonparametric baseline hazard and variables for benefit level, and measures of time until benefits run out. Includes controls for state unemployment and past wages, and state indicator variables.	Subset of Moffitt (1985) data with some recoding. Same as Moffitt, but the inclusion of state indicators weights identification toward changes in schedules and differential treatment across states of those with different levels of earnings.	Elasticity of duration with respect to the benefit of 0.8, and with respect to potential duration of 0.5.
Meyer (1992a). Comparisons of durations of those filing 3 months before and after 17 benefit increases. Most of increases due to automatic cost-of-living adjustments. Estimates with and without controls for demographics.	U.S. CWBH data for six states. Identification of benefit effects comes from changes in benefits due to cost-of-living adjustments in period of high inflation.	A range of estimates, but central tendency of elasticity of duration with respect to the benefit amount of 0.6.
Meyer (1992b). Difference in difference analysis of claim duration with extensive controls.	See Table 2.4.	Duration elasticities of .24 to .42, though several estimates are smaller.
Card and Levine (2000). Hazard models of exit from unemployment receipt.	U.S. administrative data for New Jersey. Examines program that offered 13 weeks of ‘extended benefits’ for 6 months in 1996. The program was part of a political compromise over funding care for indigent hospital patients.	Elasticity of duration with respect to potential duration of 0.1.

Table 6
Studies of Unemployment Insurance and the Duration of Unemployment Outside of the U.S.

Empirical Specification	Data and Identification	Findings
Ham and Rea (1987). Models the hazard from unemployment as a function of a polynomial of the duration of unemployment, initial entitlement and its square, weekly benefits and wages, and the provincial and industrial unemployment rates. Estimation is by maximum likelihood.	Canadian Employment and Immigration Longitudinal Labour Force Files with weekly data on men aged 18-64, for 1975-80. Identification comes from legislative changes in the benefit rate, individuals with weekly wages above the maximum earnings, and changes in weeks of entitlement.	Benefit effect of wrong sign or insignificant. The potential duration coefficients were both significant in all specifications. An increase in the initial potential duration of one week was estimated to increase expected duration by .26 to .33 weeks (an elasticity of 1.02 - 1.33).
Hunt (1995). Models exit from unemployment in a competing risks hazard framework, combined with a difference in differences approach. Control variables are an individual's age group, the time period, the interaction of time and age (treatment groups), and various demographic variables. Identification comes from the differential effect of the policy changes on the treatment and control groups.	German Socioeconomic Panel public use file, for the years 1983-88. 2,236 individuals under age 57. One policy change reduced benefits to the childless unemployed, and three policy changes extended the duration of benefits to unemployed individuals that were of a certain age (aged 49+ for the first, aged 44+ for the second, and aged 42+ for the third). The control group consisted of unemployed individuals that were 41 years old or less.	The extension of benefits lowered by 46% the hazard from unemployment for those aged 44-48, but the other benefit extensions had insignificant effects. For those 44-48 the implied elasticity of mean duration with respect to the maximum duration of UI was 2.27. In several cases, the extensions cut escapes to employment and out of the labor force. The cut in benefits for the childless significantly increased employment. The author notes that many of the effects are implausibly large.
Carling, Edin, Harkman, and Holmlund (1996). The hazard of leaving unemployment (to any alternative) is modeled using an unrestricted baseline hazard, and is estimated semiparametrically. Explanatory variables include indicators for receiving UI benefits, or KAS (cash assistance, which gives smaller benefits for a shorter period of time) age, education, training, gender, citizenship, and the regional unemployment rate.	Sweden. Non-disabled unemployed workers under 55 registered at public employment agencies in 3 months of 1991. Identification from variation in claimant status across individuals. UI recipients were members of a UI fund for at least 12 months, and had worked for a certain number of days in the past 12 months. KAS provided compensation for those not covered by UI, and who met work or school requirements and included labor force entrants.	Elasticity of exit to employment with respect to the benefit level is estimated at -.06.
Roed and Zhang (2000). Flexible hazard rate model.	Norway. Register data on all unemployment spells between August 1990 and December 1999. Benefit variation due to changes in indexation over the year is used for identification.	Elasticity of hazard with respect to benefit of 0.35 for men and -0.15 for women.
Carling, Holmlund and Vejsiu (2001), Flexible hazard rate model of exits to employment and competing risks model of exits to employment, labour market programmes, and non-participation.	Sweden. Register-based longitudinal data from 1994-1996. Data from before and after cut in replacement rate from 80% to 75%.	"Our implied elasticity of the hazard rate with respect to benefits is about 1.6..."

Table 7
Studies of Other Unemployment Insurance Effects on Labor Supply

Empirical Specification	Data and Identification	Findings
<p>McCall (1996). The exit from unemployment to full-time or part-time work is modeled using a competing risks hazard model with explanatory variables including an indicator for UI receipt, the replacement rate, the disregard (amount that can be earned without reducing benefits) and interactions of these variables.</p>	<p>U.S. CPS Displaced Worker Supplements from 1986, 1988, 1990, and 1992. Cross-state differences in disregard and changes in disregards (state fixed effects specifications).</p>	<p>Significant effect of disregard on probability of part-time employment during the first three months of joblessness.</p>
<p>Cullen and Gruber (2000). The labor supply of wives modeled as a linear function of potential UI benefits, demographic variables, the unemployment rate, the average wage of women similar to the wife, and lagged husband's job characteristics. Dependent variables are the share of months employed and average hours worked per month. OLS, Tobit and 2SLS estimates with benefits received instrumented for using potential benefits.</p>	<p>U.S. SIPP data from the 1984-88 and 1990-92 waves. Married couples where both husband and wife are between 25 and 54. 2560 spells of unemployment.</p>	<p>Estimates of the implied income elasticity of labor supply for wives ranges from -0.49 using OLS to -1.07 using 2SLS. In a specification check, potential UI benefits also had a significant negative effect on the labor supply of women with employed husbands, suggesting that these estimates may overstate the true effect of UI benefits.</p>

Table 8**Main Characteristics of State Workers' Compensation Programs in the U.S.**

State	Minimum Weekly Benefit	Maximum Weekly Benefit	Replacement Rate	Waiting Period	Retroactive Period
California	\$126.00 ⁽¹⁾	\$490.00	66 2/3 %	3 days	2 weeks
Florida	20.00	541.00	66 2/3	7 days	2 weeks
Illinois	100.90-124.30 ⁽²⁾	899.81	66 2/3	3 days	2 weeks
Massachusetts	149.93	749.69	60	5 days	3 weeks
Michigan	170.00	611.00	80 ⁽⁴⁾	7 days	2 weeks
Mississippi	25.00 ⁽³⁾	303.35	66 2/3	5 days	2 weeks
Missouri	40.00	578.48	66 2/3	3 days	2 weeks
Nebraska	49.00 ⁽¹⁾	487.00	66 2/3	7 days	6 weeks
New Jersey	151.00	568.00	70	7 days	8 days
New York	40.00 ⁽¹⁾	400.00	66 2/3	7 days	2 weeks
Texas	80.00	531.00	70 ⁽⁵⁾	7 days	4 weeks
Median State	100.00	529.00	66 2/3	3 days	2 weeks

Source: 2000 Analysis of Workers' Compensation Laws: U.S. Chamber of Commerce.

Notes: (1) In California the minimum is actual earnings if less than the amount listed. (2) Illinois' minimum benefit increases if additional dependents are present. (3) In Mississippi the minimum does not apply in cases of partial disability. (4) In Michigan the replacement rate is a percent of after-tax earnings. (5) In Texas the replacement rate is 75% if earnings are less than \$8.50 per hour.

Table 9
Financial Characteristics of Workers Compensation and Unemployment Insurance Programs

Year	Workers Compensation		Unemployment Insurance	
	Benefit Payments (\$ millions)	Costs (\$ millions)	Benefit Payments (\$ millions)	Tax Collections (\$ millions)
1980	13,618	22,256	14,070	15,010
1981	15,054	23,014	15,580	15,630
1982	16,407	22,764	21,240	15,950
1983	17,575	23,048	28,850	18,010
1984	19,685	25,122	16,340	24,060
1985	22,470	29,320	14,360	24,450
1986	24,647	33,964	15,700	22,880
1987	27,317	38,095	15,080	24,180
1988	30,703	43,284	13,280	23,820
1989	34,316	47,955	13,500	21,750
1990	38,237	53,123	16,860	21,360
1991	42,170	55,216	24,420	20,630
1992	45,668	57,394	36,770	23,010
1993	45,330	60,820	35,070	25,230
1994	44,586	60,475	26,220	27,960
1995	43,373	57,054	20,990	28,900
1996	42,065	55,057	22,000	28,550
1997	40,586	52,040	20,300	28,200
1998	41,693	52,108	19,410	27,370
1999	--	--	20,720	26,480

Sources: Workers' Compensation: Benefits, Coverage, and Costs (1980-84 Benchmark Revisions, 1985, 1988, and 1997-1998 New Estimates). Committee on Ways and Means Green Book, (1990, 1998, 2000)

Note: All amounts are in nominal dollars.

Table 10
Studies of Workers' Compensation and the Incidence of Injuries or Claims

Study	Unit of Observation and Sample	Dependent Variable	Benefit Elasticity
Chelius (1982)	U.S. State by two-digit SIC manufacturing industry; 36 states from 1972 to 1975.	Injuries per 100 full-time workers.	0.14
Ruser (1985)	U.S. State by three-digit SIC manufacturing industry; unbalanced panel of 41 states from 1972 to 1979.	Injuries per 100 full-time workers. Injuries with lost workdays per 100 full-time workers.	0.062 0.116
Butler (1983)	U.S. Manufacturing industries by year; 15 industries over 32 years in South Carolina.	Closed workers' compensation cases reported in the fiscal year per worker.	0.290
Butler and Worrall (1983)	U.S. State by year: 35 states from 1972 to 1978.	Temporary total claims of non self-insured firms per worker.	0.344
Krueger (1990a)	U.S. Individuals in 47 states in 1984 and 1985.	Workers' compensation claims.	0.45
Krueger and Burton (1990)	U.S. state level data for 29 states in 1972, 1975, 1978, and 1983.	Premiums per employee or manual rate.	Not significantly different from zero.
Butler and Worrall (1991)	U.S. state level data for 1954-1981.	Workers' compensation claim costs.	0.68
Butler, Gardner and Gardner (1997)	U.S. Individuals at a large nationwide firm during 1990-1993.	Frequency of disability claims. Indemnity cost per worker.	-0.45 to 1.24 (with median of 0.78) 0.06 to 2.90 (with median of 1.27)

Table 11
Studies of Workers' Compensation and the Duration of Claims

Study	Unit of Observation and Sample	Dependent Variable	Benefit Elasticity
Butler and Worrall (1985)	Low-back injuries in Illinois.	Length of claim using hazard models.	0.2 - 0.4
Worrall, Butler, Borba and Durbin (1988)	Low-back injuries in 13 states.	Length of claim using hazard models.	0.0
Meyer, Viscusi and Durbin (1995)	All injuries in Kentucky (1979-1981) and Michigan (1981-1982).	Length of claims; comparisons of means and Log(duration).	0.3 - 0.4
Krueger (1990b)	All injuries in Minnesota in 1986.	Length of claims; comparisons of means and Log(duration).	>1.5
Gardner (1991)	All injuries in Connecticut in 1985-1990.	Mean length of claims.	0.9
Curington (1994)	All injuries in New York 1964-1983	Severe impairment durations.	0.7 - 1.3
		Minor impairment durations	0.1 - 0.2
Aiuppa and Trieschmann (1998)	France. Administrative region level data from Caisse Nationale for years 1973-91.	Indemnity costs per injured employee.	0.78
Neuhauser and Raphael (2001)	California Workers' Compensation Institute Administrative Data from 2 years before and after 1994 and 1995 benefit increases.	Duration of temporary disability claims.	0.25 - 0.35, but much larger with selection correction