This is the last in a commissioned series of survey articles from distinguished academics covering the economic issues in public spending.

Unemployment and Workers’ Compensation Programmes: Rationale, Design, Labour Supply and Income Support

BRUCE D. MEYER*

Abstract

I examine the unemployment insurance (UI) and workers’ compensation (WC) insurance programmes, concentrating on labour supply, insurance and income redistribution. UI and WC increase the time employees spend out of work. Elasticities of lost work time that incorporate both the incidence and duration of claims are centred at 1.0 for UI and between 0.5 and 1.0 for WC. These elasticities are larger than elasticities typically found in studies of wage effects on hours worked by men, probably because UI and WC lead to short-run variation in wages with mostly a substitution effect and the programmes alter the participation margin. Some good evidence suggests that UI smooths the consumption of the unemployed and more clearly indicates that UI progressively redistributes resources. There is substantial evidence that injured workers suffer material hardships even with WC programmes, but research has not provided an overall picture of the insurance and redistributive aspects of WC.

JEL classification: J28, J64, J65.

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I. INTRODUCTION

Social insurance programmes are costly, making up the largest single component of government expenditures in many countries. These programmes are also not without controversy. Different sets of commentators view them 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) programmes which 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 programmes because the other main components of social insurance — retirement and health benefits — have been covered in earlier articles in this series. UI and WC are also of interest in their own right for several reasons. Since the programmes are for able-bodied individuals or those who are generally expected to return to work, the trade-offs between insurance and moral hazard are potentially more pronounced than in the case of other programmes. While the costs of UI and WC are lower than those for retirement or health programmes, they are still very large. As is discussed below, UI and WC expenditures are typically several per cent of GDP.

UI and WC share many attributes. Both programmes are primarily for workers who are temporarily unable to work. Both programmes condition benefits on past earnings and generally discontinue benefits once a worker returns to work. Because of these basic similarities, the dimensions on which the programmes 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 programmes. In other cases, the differences provide alternative models for policy-makers to follow, since the current programme structures have partly come about through historical accident. For researchers, the differences in how the programmes have been studied often suggest new approaches and topics, as researchers have often acted opportunistically given handy data and have not analysed 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, and these are explored in Section II. I then describe, in Sections III and IV, the design of the US programmes in detail and provide some more limited information on the programmes in other countries.

I also discuss the main distortion generated by the programmes — namely, the effect of the programmes on labour supply. One may ask, ‘Why can’t the labour supply parameters estimated in the voluminous labour economics...

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2There are other distortions that should be mentioned, such as the effect of UI on precautionary saving. See Engen and Gruber (2001), for example.
literature just be plugged into the social insurance formulae?’. In my view, a separate consideration of the labour supply effects of UI and WC is justified for at least three reasons. First, the labour supply parameters estimated in the public finance and labour economics literatures may not apply to social insurance programmes because people are imperfectly informed as to the rules of the programmes, or because the preferences of those who are eligible for social insurance programmes may be different from those of the population at large. For example, a severe disability may change the way an individual trades off labour for leisure. More generally, the people who are on the margin of going on a social insurance programme are likely to have different preferences from the wider population.

Second, the labour supply elasticities estimated in the labour 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 labour supply elasticities. A major shortcoming in the broader labour supply literature is that it is difficult to identify exogenous changes in wages or incomes that can be used to estimate labour supply responses. The variation in social insurance programmes may provide natural experiments with which to estimate labour supply parameters and test the relevance of labour supply models.

Third, the design of social insurance programmes raises theoretical labour supply issues that are not often dealt with in the labour economics literature. For example, most of the labour supply literature deals with how workers adjust their number of hours worked per week, whereas the incentives of social insurance programmes often affect the decision of whether to participate at all in the labour force. In addition, programmes such as UI influence job search intensity, which does not figure in standard labour supply models. I will discuss the theoretical effects of UI and WC on labour supply as well as the empirical literature. While the literature is most extensive for the US evidence, I will bring in empirical evidence from several other countries.

In Section V, I discuss the main positive effect of UI and WC. The classic rationale for the programmes 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, as discussed in Section VI. Support during unemployment may allow the unemployed to find

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3A reason for the disproportionate effect of social insurance programmes on the work/non-work decision is that the programmes 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 per cent.
better jobs and, in the case of WC, may allow the injured to recover more fully from their injuries.

I should emphasise that this is not the first survey of UI and WC. There are excellent prior surveys of the effects of unemployment insurance and the effects of workers’ compensation.

II. ECONOMIC RATIONALE FOR THE PROGRAMMES

1. Unemployment Insurance

The main rationale for UI is that it provides insurance for workers who may lose their jobs, which may cause a substantial loss in earnings for these individuals. 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 UI 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 jobs. This reason is probably not central in a UI system like the USA’s, under which 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 lay-off of a large fraction of a firm’s workforce may greatly exceed the size of 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 UI tend to be concentrated in recessions. A severe recession could involve claims of even $100 billion over a few years, which would financially strain and potentially bankrupt private insurance companies.


For 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).
Another argument for government-mandated UI that is more difficult to evaluate is that subsidising job 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 for the value of the job match to society being different from that to the individual searching for a job and the firm seeking employees.

The other common rationale for UI is that it provides an automatic stabiliser 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. 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 UI might be income redistribution. If this goal is to be attained, it requires that the actual programme be implemented in a way that distributes more benefits net of taxes to lower income groups.

2. Workers’ Compensation

To understand the rationale for WC, it is useful to think first about information, wages and compensating differentials in an abstract economy. Consider a simplified world where labour 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 for 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 WC system is that by making injury compensation routine (and

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7See Christiano (1984) for a discussion of such effects.
8This issue is briefly discussed in Section V below.
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: PROGRAMME FEATURES AND LABOUR SUPPLY EFFECTS

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

1. Main Features of US Unemployment Insurance Programmes

UI programmes differ sharply across states in the USA due to the provisions of the Social Security Act of 1935, which created the current system and gave states great latitude in designing their programmes. State UI programmes 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 12 state programmes in 2000. It is apparent from this table that there are large differences in programme 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 programmes.

Approximately 97 per cent of all wage and salary workers are in jobs that are covered by UI. 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 40 per cent of the unemployed received UI in many recent years. The cause of this low rate of receipt is largely that individuals who are new entrants or re-entrants to the labour force, individuals 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.

UI benefits are paid on a weekly basis and, except for minimum and maximum benefit amounts, are usually between 50 and 60 per cent of previous earnings.

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9See Blank and Card (1991) and Anderson and Meyer (1997b) 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.
<table>
<thead>
<tr>
<th>State</th>
<th>Base period earnings required ($)</th>
<th>Replacement rate&lt;sup&gt;a&lt;/sup&gt; (%)</th>
<th>Minimum weekly benefit ($)</th>
<th>Maximum weekly benefit ($)</th>
<th>Quarters of work required for 26 weeks of benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>California</td>
<td>1,125</td>
<td>39–57</td>
<td>40</td>
<td>230</td>
<td>1.56–2.28</td>
</tr>
<tr>
<td>Florida</td>
<td>3,400</td>
<td>50</td>
<td>32</td>
<td>275</td>
<td>4</td>
</tr>
<tr>
<td>Illinois</td>
<td>1,600</td>
<td>49.5&lt;sup&gt;b&lt;/sup&gt;</td>
<td>51</td>
<td>296–392</td>
<td>1.38</td>
</tr>
<tr>
<td>Massachusetts</td>
<td>2,400</td>
<td>50–61.9&lt;sup&gt;b&lt;/sup&gt;</td>
<td>24–36</td>
<td>431–646</td>
<td>2.77–3.44</td>
</tr>
<tr>
<td>Michigan</td>
<td>3,090</td>
<td>67&lt;sup&gt;c&lt;/sup&gt;</td>
<td>88</td>
<td>300</td>
<td>2.67</td>
</tr>
<tr>
<td>Mississippi</td>
<td>1,200</td>
<td>50</td>
<td>30</td>
<td>190</td>
<td>3</td>
</tr>
<tr>
<td>Missouri</td>
<td>1,600</td>
<td>52</td>
<td>40</td>
<td>220</td>
<td>3.12</td>
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<tr>
<td>Nebraska</td>
<td>1,600</td>
<td>52–65</td>
<td>36</td>
<td>214</td>
<td>3–3.9</td>
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<tr>
<td>New Jersey</td>
<td>2,060</td>
<td>60&lt;sup&gt;b&lt;/sup&gt;</td>
<td>61</td>
<td>429</td>
<td>2.67</td>
</tr>
<tr>
<td>New York</td>
<td>2,400</td>
<td>50</td>
<td>40</td>
<td>365</td>
<td>1.5</td>
</tr>
<tr>
<td>Texas</td>
<td>1,776</td>
<td>52</td>
<td>48</td>
<td>294</td>
<td>3.85</td>
</tr>
<tr>
<td>Median state</td>
<td>1,576</td>
<td>52</td>
<td>39</td>
<td>292</td>
<td>3.12</td>
</tr>
</tbody>
</table>

<sup>a</sup>Where a range is given, a benefit schedule is used in which the replacement rate is higher for lower-paid workers.

<sup>b</sup>Illinois, Massachusetts and New Jersey have dependants’ allowances.

<sup>c</sup>Of average after-tax weekly wage.

All states have a maximum weekly benefit amount, which varies from a low of $190 in Mississippi to over $600 in Massachusetts if dependants’ allowances are included. The median state had a maximum benefit of about $292 in 2000. About 35 per cent of claimants receive the maximum benefit. For these individuals, the fraction of their previous earnings replaced by UI can be much lower than 50 per cent. The minimum weekly benefit is typically very low; the median state has a minimum 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 three 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. 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 programme 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 per cent 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 individuals, and in 1987 benefits became taxable for all recipients. 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 a half. As recently as 1986, some people had replacement rates near one (often those lifted

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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 quarters prior to the quarter an individual files for benefits.

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.

13In 1979, UI benefits became taxable for married taxpayers filing jointly with income over $25,000 and for single filers with income over $20,000. In 1982, the cut-offs changed to $18,000 and $12,000 respectively.
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by the minimum benefit), implying that they would receive from UI nearly what they would earn if they returned to work. 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. Unemployment Insurance Financing

UI financing in the USA is unique in that a firm’s tax rate depends on its lay-off history. In other countries, benefits are funded through general revenues or payroll taxes that are not determined by a firm’s lay-offs. The dependence of a firm’s tax rate on previous UI use is called experience rating. Federal law levies a 6.2 per cent tax on the first $7,000 in wages a year paid to an employee. The law provides for a credit of 5.4 per cent to employers that pay state taxes under an approved UI system, so that all employers pay at least 0.8 per cent.

State experience rating systems take many forms, but the two most common are reserve ratio (30 states and District of Columbia) and benefit ratio (17 states) experience rating. 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 rate 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 lay-off history has no effect on its tax payments. This provides an incentive to lay off workers temporarily and subsidises 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 per cent of taxable wages and 0.6 per cent of total wages.

3. Unemployment Insurance Programmes Outside the USA

We should emphasise that there are often very different institutions in other countries to insure the unemployed. Moreover, programmes for the unemployed

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14See Feldstein (1974) for an earlier discussion and evidence on high replacement rates.
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.
16See Anderson and Meyer (2001) for an analysis of the distributional effects of UI taxes and benefits.
are often combined with other programmes, 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 for seven countries. Analogous expenditures on compensation for work injuries are reported for comparison. There are pronounced differences across countries. Among the countries shown, the UK has the lowest share of GDP devoted to UI expenditures, at 0.25 per cent, while four other countries have shares at least 10 times as big. Part of the explanation for the low GDP share in the UK is that UI expenditures 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 £52.20 ($77) in 2000. This amount is about a quarter of the typical maximum benefit in the USA.

One of the countries with a GDP share over 2.5 per cent is Canada. The Canadian UI programme provides an interesting comparison, as Canada is a close neighbour of the USA and has similar per capita income and industry base. Surprisingly, Canadian expenditures are almost half those in the USA, despite Canada having a population less than 11 per cent as large. While Canadian weekly benefits are slightly higher and last slightly longer on average than US benefits, the major difference between the countries is in the ratio of the number of UI recipients to the number of unemployed. An unemployed individual is approximately three-and-a-half times more likely to receive benefits in Canada than in the USA. This difference is hard to explain on the basis of the

**TABLE 2**

<table>
<thead>
<tr>
<th>Country</th>
<th>Unemployment Insurance</th>
<th></th>
<th></th>
<th>Employment Insurance</th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% of GDP</td>
<td>$US million</td>
<td></td>
<td>% of GDP</td>
<td>$US million</td>
<td></td>
</tr>
<tr>
<td>Canada</td>
<td>2.52</td>
<td>13,776</td>
<td></td>
<td>0.85</td>
<td>4,624</td>
<td></td>
</tr>
<tr>
<td>Denmark</td>
<td>4.54</td>
<td>6,113</td>
<td></td>
<td>0.24</td>
<td>325</td>
<td></td>
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<tr>
<td>Germany</td>
<td>3.40</td>
<td>65,049</td>
<td></td>
<td>0.60</td>
<td>11,427</td>
<td></td>
</tr>
<tr>
<td>Japan</td>
<td>0.46</td>
<td>19,788</td>
<td></td>
<td>0.25</td>
<td>10,744</td>
<td></td>
</tr>
<tr>
<td>Sweden</td>
<td>2.95</td>
<td>5,460</td>
<td></td>
<td>0.81</td>
<td>1,502</td>
<td></td>
</tr>
<tr>
<td>UK</td>
<td>0.25</td>
<td>2,445</td>
<td></td>
<td></td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>USA</td>
<td>0.50</td>
<td>28,334</td>
<td></td>
<td>0.74</td>
<td>41,654</td>
<td></td>
</tr>
</tbody>
</table>

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


For summary measures of the replacement rate and benefit duration in OECD countries, Nickell (1998) provides a nice overview.
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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 USA. 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 USA 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 explain only a small part of the difference. Furthermore, the timing of when UI became more generous in Canada than in the USA does not fit particularly well with when the two countries’ unemployment rates diverged.18

4. Theoretical Responses of Labour Supply to Unemployment Insurance

UI affects at least five dimensions of labour supply. First, it can increase the probability of unemployment by affecting worker and firm actions to avoid job loss. Second, programme characteristics affect the likelihood that a worker will file a claim for benefits once he or she has been laid off. Once a claim has been made, we expect that labour supply will be affected by the adverse incentives of the UI programme. Third, once on the programme, UI can extend the time a person is out of work. Most research on the labour supply effects of UI has focused on this issue. Fourth, the availability of compensation for unemployment can shift labour 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 effects 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 lay-off. There has been some modelling of this issue; for example, Mortensen (1990) examines the effect of UI on job 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 lay-offs 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 lay off workers and may make employees more willing to work in firms that are prone to lay-offs (see Baily (1977) and Feldstein (1976)). While this response to UI is partly a labour demand effect, it is also


19This classification of the labour supply effects of UI leaves out some effects that can be considered labour supply effects, such as possible improvements in the matching of workers to jobs.
partly a labour supply response as workers are induced to take jobs with higher lay-off risk because of UI.20

Second, the generosity of UI benefits may affect the probability that a person claims benefits conditional on a lay-off. 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. In nearly all states, a UI claimant must be out of work for 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 programme costs, the increased claim rate in turn affects the number of weeks worked, because once a person is on the UI rolls, he or she becomes 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 labour 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 UI.22 Mortensen models workers as choosing a search 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 USA 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 do not qualify for benefits.23

In this framework, the main labour 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 \( \lambda(·) \) 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 our fourth labour 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

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20This effect of UI occurs through an outward shift in the labour supply curve to high lay-off jobs, so it partly falls under the fourth effect of UI below.
21This waiting week can be thought of as the deductible (the excess) in the UI insurance policy.
22See Mortensen (1986), for example.
23See Burdett (1979) for an analysis of a similar model.
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 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 modelled using the standard static labour supply model. In a version of this model, Moffitt and Nicholson (1982) assume people 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 it 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, one 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 at any time at a fixed wage. Their model emphasises the leisure value that a period

![FIGURE 1: The Job Finding Rate and Unemployment Insurance Benefits](image-url)

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

\( \lambda(s)[1-F(w)] \) without UI benefits

\( \lambda(s)[1-F(w)] \) with UI benefits
of unemployment may have if one optimises 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 when it is difficult to take a vacation once a new job has begun.24

We should note that UI affects the labour supply of employed and unemployed workers in other ways. We have 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 labour supply framework, a similar mechanism would shift out the labour supply curve of the unemployed. This type of effect should also apply to the employed. Because UI makes employment more attractive if individuals realise that they may be laid off at some time in the future, the labour supply curve shifts outward (ignoring financing). Anderson and Meyer (1997a), following Summers (1989) and Gruber and Krueger (1991), describe how labour 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 labour supply is

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24Implicit in this discussion is the assumption that the search requirement for UI receipt can be satisfied at low cost.
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, we would expect that when there is a decrease in the allowable earnings before an individual’s benefits are reduced (the disregard), there will be a 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 programme, yet they are disqualified from receiving benefits. This issue has aroused controversy in recent years.

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

5. Empirical Evidence on Unemployment Insurance Labour Supply Effects

There are excellent surveys, as mentioned earlier, that include summaries of the labour supply effects of UI. Atkinson (1987), in particular, provides concise summaries of the literature up to the mid-1980s. In this survey, we will not replough 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 programme 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 programmes with features similar to those in the states — is likely to come from the USA. 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 programme characteristics for one group but not another, providing additional levers to identify the effects of the programmes.

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 US 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

25For example, see Adams (1986) for UI and Besley and Case (1994) for WC.
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, US benefit schedules generally do not provide high benefits for all 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.

This is not to say that US evidence is applicable to all countries or that non-US studies cannot be convincing. Only a narrow range of policies can be directly evaluated using US data because state differences in UI programmes are all within the confines of the parameters of a federal system and because state WC programmes are similar (due in part to influential commissions, the efforts of national insurance organisations, unions and multi-state employers). Furthermore, the economic, cultural and institutional background in other countries may render the US experience not directly transferable. Nevertheless, in the vast majority of non-US studies (and many US studies), it is difficult to see the identifying variation in UI or WC programme characteristics across units that allows researchers to estimate programme 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 programme 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 labour 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 (see Meyer (1995a) for a review of these methods).

A useful place to start is the numerous papers that examine the effects of UI on the length of unemployment spells. In a typical study that does not use exogenous variation from policy changes, the length of unemployment is regressed on the benefit level or the replacement rate, the past wage or earnings, and demographic characteristics. Welch (1977) criticises 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 or 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. This identification problem, which is created by the dependence of programme generosity on an individual’s previous earnings, is common to many social insurance programmes 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 USA, eligibility for UI or benefit generosity is often taken as exogenous even though it depends on an individual’s work history and place of employment. This problem also arises when other outcomes are examined, such as saving.

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, re-employment 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 be used separately 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 that 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 quarter 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 re-employment earnings of people who filed for UI benefits just prior to and just after the change in the
benefit schedule. Those who file before the increase receive $WBA_{max}^A$, while those filing afterwards receive $WBA_{max}^B$. An individual’s filing date generally determines his or her UI benefit amount for his or her entire benefit year (the one-year period following the 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.

\[26\] In 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 infrequently.
One should not construe this argument as saying that all studies that use this type of approach are convincing and that 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 programme effects, and that one can then make a case for their exogeneity (or lack thereof).

(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 summarises some of these studies. They are mostly concerned with labour demand, but we include them for completeness. Feldstein (1978) examines the effect of benefits on lay-offs, finding a large effect. The subsequent studies focus on how incomplete experience rating interacts with benefit generosity to affect lay-offs. In these studies, a key variable is the marginal tax cost of a lay-off, denoted by \( e \), which is the fraction of the UI cost of an additional lay-off (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) and Anderson and Meyer (1994) — all find large effects of incomplete experience rating on lay-offs. 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. A recent study — Anderson and Meyer (2000) — finds substantial effects of experience rating in a study of the reintroduction of experience rating in Washington State in the 1980s. 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 lay-offs unless there were substantial UI benefits. In a paper that is explicitly about labour demand, Anderson (1993) finds that UI-induced adjustment costs have a substantial effect on the seasonality of employment.

A second group of studies, summarised in Table 4, examine 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) micro data. They both find substantial effects of the level of benefits in aggregate data, but they come to conflicting results using the micro data. Anderson and Meyer (1997b) find substantial effects in administrative micro data. Overall, an elasticity of unemployment or claims with respect to benefits in the neighbourhood of 0.5 is a reasonable summary of these studies.
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<thead>
<tr>
<th>Empirical specification</th>
<th>Data and identification</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feldstein (1978). Linear regression of temporary lay-off 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).</td>
<td>US March 1971 Current Population Survey (CPS) data for experienced labour force members who were not labour force re-entrants and not self-employed. Identified by differences in benefits across states and individuals within state.</td>
<td>Elasticity of temporary lay-off unemployment rate with respect to the replacement rate ranging from 0.74 to 0.91. ‘The average UI benefit replacement rate implied by the current law can account for about half of temporary layoff unemployment.’</td>
</tr>
<tr>
<td>Topel (1983). Estimation of time-constant lay-off and re-employment hazard rate using cross-section data on labour 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 the fraction of the cost of a marginal lay-off that the firm pays through experience rating.</td>
<td>US March 1975 CPS data on full-time, full-year labour force participants. Identified by differences in benefit and experience rating schedules across states interacted with industry unemployment rates.</td>
<td>‘... 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 rating increasing layoffs.</td>
</tr>
<tr>
<td>Card and Levine (1994). Estimation of annual and seasonal temporary lay-off, permanent lay-off 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.</td>
<td>US CPS outgoing-rotation-group data for five industries in 36 states from 1978 to 1985. Identified by differences in experience rating schedules across states interacted with industry unemployment rates.</td>
<td>‘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.’</td>
</tr>
<tr>
<td>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 lay-offs. Some specifications difference the data to remove firm and individual fixed effects.</td>
<td>US Continuous Wage and Benefit History (CWBH) administrative data on both workers and firms from six states during 1978–84. Identified by the differential effects of changes in state tax schedules on different firms.</td>
<td>‘Our preferred estimates imply that incomplete experience rating is responsible for over twenty percent of temporary layoffs.’</td>
</tr>
<tr>
<td><strong>Empirical specification</strong></td>
<td><strong>Data and identification</strong></td>
<td><strong>Findings</strong></td>
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<td>Corson and Nicholson (1988). Aggregate claims ratio regressed on replacement rate (= average weekly benefit of recipients divided by average weekly wage of employed). Micro claims data regressed on variable for income taxation of UI, but replacement rate not used.</td>
<td>US state-by-year aggregate data on the fraction of unemployed that receive UI. Panel Study of Income Dynamics (PSID) individual data on UI claims.</td>
<td>Elasticity over 0.5. Large effect of benefit taxation variable.</td>
</tr>
<tr>
<td>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). Micro claims data regressed on state average replacement rate. No variable for income taxation of UI included.</td>
<td>US state-by-year aggregate data on the fraction of unemployed that receive UI. PSID individual data on UI claims.</td>
<td>Replacement rate elasticities of 0.32 to 0.58. Insignificant effect of replacement rate. Coefficient usually of ‘wrong’ sign.</td>
</tr>
<tr>
<td>Meyer (1992b). Difference-in-differences analysis of claim incidence by earnings group, industry and region.</td>
<td>New York administrative data on UI claims from 1988 and 1989. Identification comes from a 36 per cent increase in the maximum benefit.</td>
<td>‘The numbers are consistent with large effects of the higher benefits on the relative incidence of claims.’</td>
</tr>
<tr>
<td>Anderson and Meyer (1997b). 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.</td>
<td>US Continuous Wage and Benefit History (CWBH) administrative data on both workers and firms from six states during 1978–84. Identified by differences in benefit schedules across states, changes in these schedules and changes in income taxation of benefits.</td>
<td>Elasticity of benefit take-up with respect to benefits of 0.33 to 0.60. Slightly smaller elasticities with respect to 1–tax on benefits. Elasticities of take-up with respect to potential duration about half as large as those with respect to the benefit level.</td>
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<td>Empirical specification</td>
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<td>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.</td>
<td>US Continuous Wage and Benefit History (CWBH) administrative data from Arizona from the year before and year after a 1968 benefit increase.</td>
<td>Benefit elasticity of 0.6 in levels and 1.0 in logarithms.</td>
</tr>
<tr>
<td>Solon (1985). Hazard model for exit from unemployment with key variable $b(1-\rho t)$ to capture taxation of benefits, where $b$ is the weekly benefit, $t$ is the income tax rate and $\rho$ reflects incomplete perception of taxes.</td>
<td>US CWBH data for Georgia before and after the introduction of income taxation of UI benefits for high-income families.</td>
<td>After-tax benefit elasticity of duration equal to 1.0.</td>
</tr>
<tr>
<td>Moffitt (1985). Flexible discrete hazard model of exit from unemployment with explanatory variables for benefit level, potential duration of benefits at start of spell, past wages and state unemployment rate.</td>
<td>US CWBH data for 13 states, 1978–83. Identification from differences in benefit schedules across states and changes in benefits and potential duration of benefits over time.</td>
<td>’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 0.4 and a potential duration elasticity of 0.34.</td>
</tr>
<tr>
<td>Meyer (1990) and Katz and Meyer (1990). Hazard model for exit from unemployment with non-parametric 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.</td>
<td>Subset of Moffitt (1985) data with some recoding. Identification same as for Moffitt, but the inclusion of state indicators weights it toward changes in schedules and differential treatment across states of those with different levels of earnings.</td>
<td>Elasticity of duration with respect to weekly benefit of 0.8 and with respect to potential duration of benefits of 0.5.</td>
</tr>
<tr>
<td>Source</td>
<td>Description</td>
<td>Methodology</td>
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<tr>
<td>Meyer (1992a)</td>
<td>Comparisons of durations of those filing three months before and after 17 benefit increases. Most of increases due to automatic cost-of-living adjustments. Estimates with and without controls for demographics.</td>
<td>US 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.</td>
</tr>
<tr>
<td>Meyer (1992b)</td>
<td>Difference-in-differences analysis of claim duration with extensive controls.</td>
<td>See Table 4. Duration elasticities of 0.24 to 0.42, though several estimates are smaller.</td>
</tr>
<tr>
<td>Card and Levine (2000)</td>
<td>Hazard models of exit from unemployment receipt.</td>
<td>US administrative data for New Jersey. Examines programme that offered 13 weeks of &quot;extended benefits&quot; for six months in 1996. The programme was part of a political compromise over funding care for indigent hospital patients. Elasticity of duration with respect to potential duration of benefits of 0.1.</td>
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TABLE 6

Studies of Unemployment Insurance and the Duration of Unemployment Outside the USA

<table>
<thead>
<tr>
<th>Empirical specification</th>
<th>Data and identification</th>
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<tr>
<td>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.</td>
<td>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.</td>
<td>Benefit effect of wrong sign or insignificant. The potential duration coefficients were both significant in all specifications. An increase in the initial potential benefit duration of one week was estimated to increase expected duration of unemployment by 0.26 to 0.33 weeks (an elasticity of 1.02 to 1.33).</td>
</tr>
<tr>
<td>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.</td>
<td>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 of a certain age (49+ for the first policy, 44+ for the second and 42+ for the third). The control group consisted of unemployed individuals aged 41 or less. Identification comes from the differential effect of the policy changes on the treatment and control groups.</td>
<td>The extension of benefits lowered by 46 per cent the hazard from unemployment for those aged 44–48, but the other benefit extensions had insignificant effects. For those aged 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 labour force. The cut in benefits for the childless significantly increased employment. The author notes that many of the effects are implausibly large.</td>
</tr>
<tr>
<td>Study</td>
<td>Country/Cohort Description</td>
<td>Elasticity of exit to employment with respect to the benefit level is estimated at –0.06.</td>
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<tr>
<td>Carling et al. (1996).</td>
<td>Sweden. Non-disabled unemployed workers under 55 registered at public employment agencies in three 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 labour force entrants.</td>
<td>Elasticity of exit to employment with respect to the benefit level is estimated at –0.06.</td>
</tr>
<tr>
<td>Roed and Zhang (2000). Flexible hazard rate model.</td>
<td>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.</td>
<td>Elasticity of hazard with respect to benefit of 0.35 for men and –0.15 for women.</td>
</tr>
<tr>
<td>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.</td>
<td>Sweden. Register-based longitudinal data from 1994 to 1996. Data from before and after cut in replacement rate from 80 per cent to 75 per cent.</td>
<td>‘Our implied elasticity of the hazard rate with respect to benefits is about 1.6 ...’</td>
</tr>
</tbody>
</table>
The results of many of the more recent studies of unemployment durations, as well as of some older studies that rely on changes in benefits for identification, are reported in Table 5 for the USA. Several of the studies, including Classen (1979), Solon (1985) and Meyer (1990 and 1992a), find elasticities of duration with respect to the level of benefits in excess of 0.5. The elasticity estimates with respect to the potential duration (length) of benefits tend to be much lower.

The non-US results reported in Table 6 are more varied. Very large effects of potential duration in Canada but no benefit level effect are 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 earlier research analysing a previous cut which also found 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 are 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 lay-off/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

\[(1) \quad W = ID\]

and

\[(2) \quad \frac{dW}{dB} = \frac{B}{W} \left( D \frac{dI}{dB} + I \frac{dD}{dB} \right) = \frac{B}{I} \frac{dI}{dB} + \frac{B}{D} \frac{dD}{dB}.\]

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 20 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 randomised social experiments in the USA 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 UI rolls. As a result, UI is not a completely benign transfer, but rather it affects claimants’ behaviour, 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 were clearly 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 emphasised by Atkinson and Micklewright (1985) and others. Levine (1993) examines this question empirically using the Current Population Survey (CPS) and the National Longitudinal Survey of Youth. 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, Holmlund and Vejsiu (2001) argue that UI will raise wage pressure in economies where wage bargaining is pervasive, thus reinforcing its adverse incentive effects on job search.
<table>
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<tr>
<td>McCall (1996). The exit from unemployment to full-time or part-time work is modelled using a competing risks hazard model. Explanatory variables include an indicator for UI receipt, the replacement rate, the disregard (amount that can be earned without reducing benefits) and interactions of these variables.</td>
<td>US CPS Displaced Worker Supplements from 1986, 1988, 1990 and 1992. Identification from cross-state differences in disregard and changes in disregards (state fixed effects specifications).</td>
<td>Significant effect of disregard on probability of part-time employment during the first three months of joblessness.</td>
</tr>
<tr>
<td>Cullen and Gruber (2000). The labour supply of wives modelled 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.</td>
<td>US Survey of Income and Program Participation (SIPP) data from the 1984–88 and 1990–92 waves. Married couples where both husband and wife are between 25 and 54. 2,560 spells of unemployment.</td>
<td>Estimates of the implied income elasticity of labour supply for wives range 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 labour supply of women with employed husbands, suggesting that these estimates may overstate the true effect of UI benefits.</td>
</tr>
</tbody>
</table>
(e) Other Labour Supply Effects of Unemployment Insurance

Table 7 summarises two studies of other aspects of labour 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, wife’s 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 the labour supply of those who are employed (Anderson and Meyer, 1997a) and of 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 labour 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: PROGRAMME FEATURES AND LABOUR SUPPLY EFFECTS

1. Main Features of US Workers’ Compensation Programmes

States have complete discretion in designing their workers’ compensation programmes. Nevertheless, state programmes have many standard features. Coverage under WC in the USA is about as universal as that under UI. Approximately 97 per cent of the non-federal UI-covered workforce is covered, plus all federal employees. Unlike UI, a worker is eligible for WC benefits immediately on starting work, even without a previous earnings history.

State WC programmes 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 WC 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. About 70 per cent of all claims are for temporary total disabilities. Second, if a worker remains totally disabled after reaching maximum medical improvement, he or she is eligible for ‘permanent total’ benefits. In most states, permanent total and temporary total benefits

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.
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 number of the worker’s dependants. Approximately half of workers earned a wage high enough 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, dependants 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 WC benefit minima, maxima, replacement rates, waiting periods and retroactive periods for 12 states. Comparing this table with Table 1, we 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 a half. The typical state has a maximum WC benefit nearly twice its maximum UI benefit. Furthermore, WC benefits are not subject to income or payroll taxes.

The high replacement rates combined with the exclusion of WC from income taxation often lead 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 per cent state income tax. Then, the combination of state income, federal income and OASDHI payroll taxes implied a 27.65 per cent 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 per cent. 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 per cent; the implied after-tax replacement rate was 112 per cent. 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, probably causing a fifth type of benefits, for those who work even though they earn much less than previously — ‘temporary partial benefits’ — to be uncommon. A WC
<table>
<thead>
<tr>
<th>State</th>
<th>Minimum weekly benefit ($)</th>
<th>Maximum weekly benefit ($)</th>
<th>Replacement rate (%)</th>
<th>Waiting period</th>
<th>Retroactive period</th>
</tr>
</thead>
<tbody>
<tr>
<td>California</td>
<td>126.00\textsuperscript{a}</td>
<td>490.00</td>
<td>66%</td>
<td>3 days</td>
<td>2 weeks</td>
</tr>
<tr>
<td>Florida</td>
<td>20.00</td>
<td>541.00</td>
<td>66%</td>
<td>7 days</td>
<td>2 weeks</td>
</tr>
<tr>
<td>Illinois</td>
<td>100.90–124.30\textsuperscript{ab}</td>
<td>899.81</td>
<td>66%</td>
<td>3 days</td>
<td>2 weeks</td>
</tr>
<tr>
<td>Massachusetts</td>
<td>149.93</td>
<td>749.69</td>
<td>60</td>
<td>5 days</td>
<td>3 weeks</td>
</tr>
<tr>
<td>Michigan</td>
<td>170.00</td>
<td>611.00</td>
<td>80\textsuperscript{c}</td>
<td>7 days</td>
<td>2 weeks</td>
</tr>
<tr>
<td>Mississippi</td>
<td>25.00\textsuperscript{d}</td>
<td>303.35</td>
<td>66%</td>
<td>5 days</td>
<td>2 weeks</td>
</tr>
<tr>
<td>Missouri</td>
<td>40.00</td>
<td>578.48</td>
<td>66%</td>
<td>3 days</td>
<td>2 weeks</td>
</tr>
<tr>
<td>Nebraska</td>
<td>49.00\textsuperscript{e}</td>
<td>487.00</td>
<td>66%</td>
<td>7 days</td>
<td>6 weeks</td>
</tr>
<tr>
<td>New Jersey</td>
<td>151.00</td>
<td>568.00</td>
<td>70</td>
<td>7 days</td>
<td>8 days</td>
</tr>
<tr>
<td>New York</td>
<td>40.00\textsuperscript{f}</td>
<td>400.00</td>
<td>66%</td>
<td>7 days</td>
<td>2 weeks</td>
</tr>
<tr>
<td>Texas</td>
<td>80.00</td>
<td>531.00</td>
<td>70\textsuperscript{g}</td>
<td>7 days</td>
<td>4 weeks</td>
</tr>
<tr>
<td>Median state</td>
<td>100.00</td>
<td>529.00</td>
<td>66%</td>
<td>3 days</td>
<td>2 weeks</td>
</tr>
</tbody>
</table>

\textsuperscript{a}In California, Illinois, Nebraska and New York, the minimum is actual earnings if less than the amount listed.
\textsuperscript{b}In Illinois, minimum benefit increases if additional dependants are present.
\textsuperscript{c}In Michigan, the replacement rate is a percentage of after-tax earnings.
\textsuperscript{d}In Mississippi, the minimum does not apply in cases of partial disability.
\textsuperscript{e}In Texas, the replacement rate is 75 per cent if earnings are less than $8.50 per hour.

recipient with low earnings upon re-employment typically loses $2 in benefits for every $3 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

WC 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 0.1 per cent in banking to over 20 per cent 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 three-year period in the past. The weight put on the firm’s incurred loss rate increases with firm size, with the weight equalling one for very large firms.

3. Comparisons of UI and WC Programme Costs in the USA

Some striking patterns are evident in Table 9, which reports aggregate benefits and revenues for UI and WC during the past 20 years. The cyclicality of UI benefit payments is pronounced, with benefit payments high in 1982–83 and 1992–93 in response to the downturns near the beginning of those periods. Any cyclicality 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 behavioural 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 the USA

We should emphasise that there are often very different institutions in other countries to compensate those injured on the job. Moreover, programmes for the injured are often combined with other programmes, 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 US WC programme to an equivalent in another country, since the USA lacks national health insurance and WC provides medical benefits.

In Canada, WC is fairly similar to that in the USA, with substantial variation in programmes across provinces. Replacement rates are typically 90 per cent of
### TABLE 9

Financial Characteristics of Workers’ Compensation and Unemployment Insurance Programmes

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

Note: All amounts are in nominal dollars.

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 UK, those who suffer an industrial accident or contract an industrial disease are generally eligible for the industrial injuries disablement benefit (IIDB), and about half of recipients also receive an additional allowance for reduced earnings. The level of benefit varies with the degree of disablement but does not vary with previous earnings. It is capped at a low level: IIDB in 2000 was a maximum of £109.30 ($161) per week. As a result, this benefit provides little insurance to middle- and upper-income workers in the UK. The programme appears to be more of a backstop akin to US welfare programmes, and expenditures are fairly modest.
5. Theoretical Responses of Labour Supply to Workers’ Compensation

WC affects at least four dimensions of labour supply. First, it can affect the likelihood of an on-the-job injury. Much research on the labour supply effects of WC has focused on this issue. Second, programme characteristics affect the likelihood that workers will make a claim, given an injury. Once a claim has been made, we expect that labour supply will be affected by the adverse incentives of WC. Third, once on the programme, WC can extend the time a person is out of work. Finally, the availability of compensation for on-the-job injuries can shift labour 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 (1990a) provides a simple model of this situation. Let expected utility of the job be written as

\[ EU_p = U(W) + p(e)V(B) - e, \]

where \( p(e) \) is the probability of an injury, \( e \) is the worker’s effort devoted to injury prevention (care taken, use of earplugs, etc.), \( U(W) \) is the 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 maximises utility, assuming an interior solution, is

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

By differentiating (4) and using the second-order condition, one can show that

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

Thus, the provision of WC benefits may reduce effort at injury reduction (a dimension of labour supply) and increases the probability of an injury. On the other hand, we should note that more generous WC benefits could decrease injuries through their 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. 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 three 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, he or she becomes subject to the implicit taxes on work and the
consequent work disincentives. Therefore, additional claims will lead to a labour
supply response as well as to higher costs.

Third, the duration of time out of work is affected by WC. As with 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. In each period following an injury, an
individual compares the benefits received from WC (and the leisure time when
not working) with 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 settlement, also do not affect the marginal incentives to return to
work; they only reduce work by increasing income.

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


There are excellent surveys that include summaries of the labour supply effects
of WC, such as Ehrenberg (1988), Krueger (1990a), Moore and Viscusi (1990)
and Kniesner and Leeth (1995). The empirical research on the labour supply
effects of WC, 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 USA has lagged.

28For anecdotal evidence that higher benefits may also lead to fraud and overstated claims, see the New York
29Also see Holmlund (1983).
<table>
<thead>
<tr>
<th>Study</th>
<th>Unit of observation and sample</th>
<th>Dependent variable</th>
<th>Benefit elasticity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chelius, 1982</td>
<td>US state by two-digit SIC manufacturing industry; 36 states from 1972 to 1975.</td>
<td>Injuries per 100 full-time workers.</td>
<td>0.14</td>
</tr>
<tr>
<td>Ruser, 1985</td>
<td>US state by three-digit SIC manufacturing industry; unbalanced panel of 41 states from 1972 to 1979.</td>
<td>Injuries per 100 full-time workers.</td>
<td>0.062</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Injuries with lost workdays per 100 full-time workers.</td>
<td>0.116</td>
</tr>
<tr>
<td>Butler, 1983</td>
<td>US manufacturing industries by year; 15 industries over 32 years in South Carolina.</td>
<td>Closed WC cases reported in the fiscal year per worker.</td>
<td>0.290</td>
</tr>
<tr>
<td>Butler and Worrall, 1983</td>
<td>US state by year; 35 states from 1972 to 1978.</td>
<td>Temporary total claims of non self-insured firms per worker.</td>
<td>0.344</td>
</tr>
<tr>
<td>Krueger, 1990a</td>
<td>US individuals in 47 states in 1984 and 1985.</td>
<td>WC claims.</td>
<td>0.45</td>
</tr>
<tr>
<td>Butler and Worrall, 1991</td>
<td>US state-level data for 1954–81.</td>
<td>WC claim costs.</td>
<td>0.68</td>
</tr>
<tr>
<td>Butler, Gardner and Gardner, 1997</td>
<td>US individuals at a large nationwide firm during 1990–93.</td>
<td>Frequency of disability claims.</td>
<td>−0.45 to 1.24 (with median of 0.78)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Indemnity cost per worker.</td>
<td>0.06 to 2.90 (with median of 1.27)</td>
</tr>
</tbody>
</table>
(a) The Incidence of Injuries and Workers’ Compensation Claims

Table 10 summarises a large number of studies that examine the effect of WC programme 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 or the 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. The 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 micro data — Krueger (1990a) 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 the incentive effects of WC has focused on the programme’s effect on injury rates or the number of claims rather than on 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 which we summarise 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 Worrall et al. (1988) 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 enabled them to compare the behaviour of people who are injured before the benefit increases with that of those injured after the increases. By using the approach outlined in Section III(5a), the paper provides a test of the effect of benefit changes on the duration of claims where the sources of identification are readily apparent. The authors find that a 60 per cent increase in the benefit level is associated with an increase in spell duration of approximately 20 per cent. The elasticities range from 0.27 to 0.62, with most

<table>
<thead>
<tr>
<th>Study</th>
<th>Unit of observation and sample</th>
<th>Dependent variable</th>
<th>Benefit elasticity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Butler and Worrall, 1985</td>
<td>Low-back injuries in Illinois.</td>
<td>Length of claim using hazard models.</td>
<td>0.2–0.4</td>
</tr>
<tr>
<td>Worrall et al., 1988</td>
<td>Low-back injuries in 13 states.</td>
<td>Length of claim using hazard models.</td>
<td>0.0</td>
</tr>
<tr>
<td>Meyer, Viscusi and Durbin, 1995</td>
<td>All injuries in Kentucky (1979–81) and Michigan (1981–82).</td>
<td>Length of claims; comparisons of means and log(duration).</td>
<td>0.3–0.4</td>
</tr>
<tr>
<td>Krueger, 1990b</td>
<td>All injuries in Minnesota, 1986.</td>
<td>Length of claims; comparisons of means and log(duration).</td>
<td>&gt; 1.5</td>
</tr>
<tr>
<td>Gardner, 1991</td>
<td>All injuries in Connecticut, 1985–90.</td>
<td>Mean length of claims.</td>
<td>0.9</td>
</tr>
<tr>
<td>Curington, 1994</td>
<td>All injuries in New York, 1964–83.</td>
<td>Severe impairment durations.</td>
<td>0.7–1.3</td>
</tr>
<tr>
<td>Minor impairment durations.</td>
<td></td>
<td></td>
<td>0.1–0.2</td>
</tr>
<tr>
<td>Aiuppa and Trieschmann, 1998</td>
<td>France. Administrative region-level data from Caisse Nationale for years 1973–91.</td>
<td>Indemnity costs per injured employee.</td>
<td>0.78</td>
</tr>
<tr>
<td>Neuhauser and Raphael, 2001</td>
<td>California Workers’ Compensation Institute administrative data from two years before and after 1994 and 1995 benefit increases.</td>
<td>Duration of temporary disability claims.</td>
<td>0.25–0.35, but much larger with selection correction</td>
</tr>
</tbody>
</table>
clustering between 0.3 and 0.4. Overall, the elasticity estimates are very similar in the two states. These results suggest substantial labour supply effects of WC benefits. Subsequent papers that have followed this natural experiment approach and examined the effects of benefit increases have found large effects. Krueger (1990b), 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 the 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 III(5c). 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 0.5 and 1.0. This elasticity is probably slightly smaller than the UI elasticity, but it implies large effects on work time.

(c) Other Labour 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 labour 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 labour supply may dampen the labour 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 US 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 and WC is difficult to analyse. It is much easier to analyse the disincentive effects of UI and WC than it is to quantify the beneficial effects of the programmes. The disincentive effects can often be analysed with programme data, but the benefits typically require more in-depth information, such as long histories of earnings, income and consumption.

Danziger and Gottschalk (1990) examine how UI fits into the safety net for the unemployed in the USA. They emphasise 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. 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 optimising 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 US Panel Study of Income Dynamics data for 1968–87, Gruber (1997) examines whether 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 per cent.

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), which was discussed earlier, suggests substantial ability to self-insure by those with a spouse and substantial crowding-out of this behaviour as UI becomes more generous. The authors find that each dollar of UI receipt reduces spousal earnings by 36–73 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 labour supply crowd-out effect with the large remaining effect of UI on consumption.

These results for the USA 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 who 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 Browning and Crossley 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 USA and the UK, as well as Germany, Italy and Spain.

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They 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 labour 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 WC in the USA 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 per cent 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 25 per cent 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 a car or home repossessed or to 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 programmes insures them against being injured. In other words, studies have yet to combine information on the pattern of WC payments after an injury (which are often front-loaded) with earnings information and information on transfers from other programmes such as the Supplemental Security Income (SSI) programme and the Social Security Disability Insurance (SSDI)
programme. 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 programmes 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 his or 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 US 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 recover more fully 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 per cent 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 paper finds that the programmes 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 UI and between 0.5 and 1.0 for WC. These elasticities are substantially larger than the labour supply elasticities typically found for men in studies of the effects of wages or taxes on hours of work; such estimates are centred close to zero (see, for example, Killingsworth (1983) and Pencavel (1986)). They are also larger than the consensus range of estimates of the labour supply elasticity for women, which is highly dispersed but centred 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 through an adjustment of the number of hours worked per week. Labour supply responses to WC and UI benefits occur mainly through decisions about weeks worked, and labour supply responses of women
mainly concern participation and weeks worked. Male labour 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 labour supply elasticities to diverse problems and populations.

Temporary total WC insurance benefits and UI benefits may also generate relatively large labour 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 intertemporally substitute their labour supply while benefits are available, generating larger work responses than predicted by long-run labour 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 per cent but current income only falls by 20 per cent. 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 labour supply responses to social insurance programmes, 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 programmes. Thus, a finding of labour supply responses to incentives is not necessarily cause for abandoning a programme. 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 programme is fairly redistributive. Nevertheless, the benefits of the UI programme are not as firmly established as the labour supply distortions, and they 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 programme 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 USA). In my view,
WC is under-researched relative to its importance to the economy and merits further study. WC programmes exhibit substantial variability over time or across states, and large data-sets are available that can be analysed, so there is potential for many valuable research projects. Also, while the UI literature for Europe is rapidly catching up to the US literature, relatively little work has been done on WC-like programmes outside the USA.

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