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## Alternative Measures of State UI Systems

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2000

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## **ALTERNATIVE MEASURES OF STATE UI SYSTEMS**

January 2000

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## **ALTERNATIVE MEASURES OF STATE UI SYSTEMS**

### **Abstract**

Comparisons among state unemployment insurance (UI) systems can be misleading. Frequently quoted indicators of benefit generosity, tax cost, and adherence to the experience-rating principle are influenced by the relative economic conditions of states. Such comparisons thereby obscure underlying structural differences in state UI systems. A business considering alternative states in which to locate a production facility should be cautious when interpreting UI information in an economic developer's marketing pitch. This paper offers alternative indicators based on how representative firms, with a well specified unemployment experience, would fare in different states.

The authors use a micro-simulation approach to model the experiences of representative workers and firms to compare 28 states and contrast the results with those obtained from more conventional indicators. In closing, the authors consider whether a business location decision would be influenced differently by the alternative measures of state UI systems.

## ALTERNATIVE MEASURES OF STATE UI SYSTEMS

Christopher J. O’Leary, Robert Tannenwald, Wei-Jang Huang, and Pei Zhu

Imagine the following scenario. Economic development officials in Massachusetts are close to signing a deal with a large (fictitious) Midwest-based financial service firm that will create an estimated 5,000 new jobs in the Bay State. Negotiations hit a last-minute snag when officials from North Carolina, also competing for the employer, caution the firm’s negotiating team that Massachusetts’ unemployment insurance (UI) tax burden is high. As evidence, they point out that UI tax collections per employee are 275 percent higher than in North Carolina, while the ratio of UI tax collections to wages paid to covered employees is 167 percent higher (Table 1). Continuing with their pitch, the North Carolinians note that, even though their state’s tax burden is lower, their UI benefits are slightly more generous. On average, North Carolina replaces a larger fraction of the lost wages of the unemployed than Massachusetts does (Table 2). As a counterattack, Massachusetts’ recruiters consider citing North Carolina’s low Experience Rating Index (ERI) in order to stir fears that the firm would have to heavily subsidize cyclically sensitive firms, especially construction companies, during and after recessions. Trouble is, Massachusetts’ ERI is pretty low, too.

Is Massachusetts as undesirable in UI tax-cost terms as North Carolina’s contingent makes it out to be? Could the Commonwealth’s recruiters cite alternative indicators that would cast the state’s UI system in a more favorable light? This paper argues that inter-regional differences in economic conditions bias traditional indicators, thereby obscuring underlying structural differences. It presents alternative indicators, based on a micro-simulation approach, which are subject to fewer biases.

### 1. Traditional UI Measures

#### 1.1 Measuring UI Tax Competitiveness

Those concerned about the competitiveness of New England’s states in attracting new employers lament that, except for New Hampshire, all the states collect relatively high UI taxes. These taxes appear to be high whether measured in terms of dollars per UI-covered employee or per \$1,000 of wages paid to UI-covered workers. In 1998, Maine, Massachusetts, and Rhode Island ranked among the top 15 according to both measures. Connecticut and Vermont also had UI tax burdens that were well above the national median (Table 1).<sup>1</sup>

However, states’ rankings according to these two indicators are strongly affected by the relative strength of their labor markets. Given that all states practice experience rating, the rankings in Table 1 depend in part on prior rates of insured unemployment (IUR). Consider, for

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<sup>1</sup>We are citing numbers for Calendar Year 1998 because the micro-simulations reported in Section 2 are based on 1998 UI provisions. Latest available data (1999:2) reveal similar competitive rankings for the New England states, although the tax burdens of Connecticut and Massachusetts have declined markedly in both absolute and relative terms. See Appendix Table 1.

example, the relationship between IUR and UI taxes as a percentage of wages paid to covered workers. A sharp spike in IUR usually pushes employers into higher UI tax brackets, where they remain for several years. If tax rates rise faster than taxable payrolls, or if taxable payrolls decline, then the ratio of UI tax contributions to wages will rise. As a result, an increase in a state's UI tax-to-wage ratio relative to those of competing states may reflect a temporary deterioration in its relative economic strength rather than in its long-run competitive standing.

The direct relationship between insured unemployment and UI tax burdens can be seen in Figure 1 and in the six panels of Figure 2. Note in Figure 2 that in 1989, at the end of a long regional economic boom, two New England states (Connecticut and Massachusetts) posted their lowest IUR since the 1950s. For 1989, their UI tax burdens ranked 43<sup>rd</sup> and 34<sup>th</sup>, respectively (U.S. Department of Labor 1993). After a recession began in the early 1990s, layoffs increased and tax rates rose due to experience rating. By 1994, the average UI tax burdens of employers in Connecticut and Massachusetts were respectively the tenth and third highest in the nation (U.S. Department of Labor, *UI Data Summary*). These increases in relative UI tax burdens were caused largely by cyclical rather than structural influences.

## 1.2 Measuring UI Benefit Generosity

A commonly used measure of UI benefit generosity is the benefit-to-wage ratio. Cyclical influences also complicate interpretation of this measure. In general, the average prior wage of UI benefit recipients is lower than that for currently employed UI-covered workers (Vroman 1980, p. 170). However, when a state's economy contracts, the percentage of layoffs occurring in cyclically sensitive sectors, such as manufacturing and construction, tends to rise. These sectors offer higher-than-average wages. Since a worker's weekly UI benefit varies with his or her most recent wage rate (up to a state-specific maximum), a state's average weekly UI benefit tends to rise at the beginning of an economic recession. At the same time, the percentage of employment accounted for by relatively stable industries, which generally pay wages lower than either manufacturing or construction, tends to rise. Furthermore, the demand for labor is weak in such periods. Consequently, the average weekly wage of employees tends to increase more slowly than during times of economic expansion.<sup>2</sup> With UI benefit payments increasing and wage growth slowing, the benefit-wage ratio rises.

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<sup>2</sup>It does not necessarily follow that the average wage received by unemployed workers prior to losing their jobs is higher than that received by those who remain employed. In fact, several studies have found that the opposite is true (see Vroman 1980 and Advisory Council on Unemployment Insurance 1995). The cyclicity of the benefit-wage ratio reflects a *narrowing* of the gap between the prior wages of the unemployed and the wages of the employed during economic contractions. As a result, the average weekly benefit rises relative to the average weekly wage.

Evidence that the average wage of unemployed workers prior to being laid off is lower than that of workers who remain employed has led some economists to argue that the benefit-wage ratio, apart from its cyclical biases, is an invalid measure of benefit generosity. A more appropriate measure, not currently reported by the U.S. Department of Labor, would be the ratio of the average benefit to the average wage earned by the unemployed before losing their job (see O'Leary and Rubin, 1997, pp. 172-76, and Advisory Council on Unemployment Insurance 1995, pp. 21, 126, 138).

The cyclical pattern of the benefit-to-wage ratio for the nation as a whole is evident in Figure 2. Cyclical influences are also generally visible in each New England state, especially in Massachusetts and Rhode Island (Figure 3). These fluctuations limit generalizations about the region that can be drawn from interstate comparisons of benefit-to-wage ratios. For example, in 1982, Massachusetts' average weekly benefit amount (AWBA) was 36.5 percent of its average weekly wage (AWW). This ranked the Bay State's benefit-to-wage ratio (AWBA/AWW) 38<sup>th</sup> among the states. This relatively low ranking reflected its low insured unemployment rate (ranked 36<sup>th</sup>) in that year. In 1990, the Commonwealth's ratio of 42.5 percent ranked seventh in the nation, largely because its insured unemployment rate ranked fourth (U.S. Department of Labor 1993). In 1998, the Commonwealth's benefit-to-wage ratio ranked 21<sup>th</sup> (Table 2), about the same rank as its insured unemployment rate (18<sup>th</sup>). If these cyclical influences were to be removed, would the Commonwealth's benefits be relatively generous or stingy? One cannot tell from these simple comparisons.

### 1.3 Measuring UI Experience Rating

According to the experience-rating principle, an employer's UI tax rate should move in close step with its pattern of worker layoffs. Adherence to the experience-rating principle promotes several policy goals. As discussed in Tannenwald and O'Leary (1997) and Tannenwald, O'Leary, and Huang (1999), it enhances inter-industry allocative efficiency by equalizing ratios of UI contributions to benefit payments across industries. Dissimilar ratios indicate cross-industry subsidization and, therefore, allocative distortions. Furthermore, up to a point, employment is stabilized because firms are discouraged from laying off workers and encouraged to expand their employment cautiously because they will be penalized if they must eventually issue pink slips (Brechling and Laurence 1995).<sup>3</sup>

In order to evaluate the degree to which each state adheres to the experience-rating principle, the U.S. Department of Labor annually publishes an Experience Rating Index. The index equals the percentage of total UI benefits paid by a state that is "effectively charged," that is, charged to specific employers for the purpose of determining their experience-rated tax rate. Although a large fraction of a firm's UI tax bill is determined by its experience rating, in most states UI taxes also include assessments levied on all firms at a uniform rate. These assessments cover benefits paid to workers laid off by insolvent firms, benefits charged to firms already paying the state's maximum tax rate, benefits whose costs the state feels should be shared by all employers (such as dependents' allowances), and supplementary infusions to UI trust funds when experience-rated taxes fail to replenish them adequately (solvency assessments).

Like other indicators, states' experience-rating indices exhibit cyclical variation (Figure 4). When a state's economy contracts, an increasing fraction of employers already at the state's maximum tax rate continue to lay off workers, and bankruptcy becomes more widespread. These

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<sup>3</sup>According to Topel (1984), this effect is weakened when experience rating is imperfect. Also, rigid adherence to the principle can be destabilizing if toward the end of a recession it causes UI taxes on struggling firms to rise too sharply, inducing them to postpone rehiring or to close their doors.

events result in rising UI benefit payments that are either slowly or never recouped from the firms responsible for them. UI trust fund reserves are drawn down, triggering solvency assessments that are rarely imposed in proportion to a firm's experience rating. For all these reasons, a state's experience rating as measured by the ERI is inversely related to its insured unemployment rate.

Regional differences in economic cycles around the country have caused state ERI rankings to change dramatically since the index was first reported in 1988 (see Figure 4). For example, in 1991, when New England's economy was relatively weak, Massachusetts' ERI was 40, the lowest of the 49 states assigned an index value in that year. Connecticut's ERI was 47, ranked 46<sup>th</sup>. By 1997 (the latest year for which the index is available), the Commonwealth's ERI had climbed to 55 and ranked 28<sup>th</sup> among 44 reporting states (Table 3). Connecticut's ERI, at 66, ranked 15<sup>th</sup> of 44 (Table 3). Was the increase in each state's ERI attributable to its relatively rapid decline in unemployment or to policy changes that increased the degree to which the UI tax systems are experience-rated? Alternative measures are required to answer this question.

## **2. Alternative Measures Based on a Simulation Model**

This study uses a "hypothetical firm" approach to specify a new set of UI system indicators that are not affected by swings in the business cycle. We do this using the Unemployment Insurance Micro Simulation Model (UIMSM), which is a computer simulation model of state UI systems. UIMSM was originally developed during the 1980s at the W.E. Upjohn Institute for Employment Research under the direction of Timothy Hunt.<sup>4</sup>

### **2.1 Overview of the Simulation Model**

UIMSM is designed to simulate the UI tax liabilities paid by a hypothetical firm and the UI benefits given to the workers it has laid off. We use the UIMSM to estimate interstate differences in UI tax liabilities and benefit levels resulting solely from differences in state UI laws and regulations. This is done by holding the firms' annual wages, insured unemployment rate (IUR), and other characteristics constant, and by assuming that a recession causes the IUR of firms in all states to rise by the same amount.<sup>5</sup>

To permit examination of several diverse issues, we do simulations using six different hypothetical firm types. The firms differ in their average annual wages paid, the percentage of their workforce unemployed during nonrecessionary years (the firm's initial IUR), and the response of the firm's IUR to the onset of a recession (the "spike" in the firm's IUR). The first case (1) is typical of a firm in the services industry. It is characterized by an average wage level for 1998 (\$28,000), a low initial IUR (1.15 percent), and a small IUR spike (1.15 percentage points). This example is reasonable for an enterprise like a bank or an insurance agency. Three cases (2-4) were styled to represent manufacturers, since state and local

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<sup>4</sup>Technical details about UIMSM are given in Hunt, O'Leary, and Huang (1990).

<sup>5</sup>Each firm is assumed to have a workforce employed over the course of each year, with a certain percentage not working because of layoffs. That percentage is the firm's IUR.



governments vie most intensely for manufacturing jobs. The national average wage for manufacturing production workers in 1998 was \$28,000.<sup>6</sup> Our examples also include a lower average wage (\$16,000) and a higher average wage (\$40,000). Like a typical manufacturer, all three cases have a low initial IUR (1.15 percent) but a large spike in the IUR (3.45 percentage points). The fifth case is a hypothetical firm with a low wage level, moderate initial IUR (2.3 percent), and a moderate spike in IUR (2.3 percentage points); this example resembles a prototypical retailer. The sixth case has a high wage, high initial IUR, and a large spike of IUR (4.6 percentage points); this example fits the profile of a construction firm. Simulations were performed for 28 states, two of which are in New England (Connecticut and Massachusetts).<sup>7</sup>

Most of the interstate differences revealed by the simulations are determined by: (1) the method for determining an employer's experience rating, (2) the state taxable wage base, (3) the range of statutory tax rates applied to this base as determined by a firm's experience rating, and (4) solvency assessment rates.

All 28 states use either a "reserve ratio" or "benefit ratio" approach to determine a firm's experience rating. Under the reserve ratio approach, the state keeps track of each firm's cumulative UI tax payments (those made since the firm's creation) and the cumulative benefits effectively charged to the firm. Each year, the state divides the difference between the firm's cumulative UI tax payments and benefit charges (the balance in the firm's reserve account) by the firm's payroll paid to covered employees. Using the state UI tax schedule, the reserve ratio determines the firm's UI tax rate. Between state minimum and maximum UI tax rates, the lower the reserve ratio, the higher the tax rate.

Under the benefit ratio approach, a firm's experience rating depends solely on the benefits charged to it relative to its payroll, or benefit ratio, during a specified period (typically three to five years). Its history of UI tax payments is irrelevant. In some benefit ratio states, a firm's benefit ratio is the firm's experience-rated tax rate. Other benefit ratio states have schedules stipulating how a firm's tax rate varies with its benefit ratio.

An important difference between the reserve ratio and benefit ratio approaches is the speed with which the state recovers the costs of an increase in benefits charged to a firm. Under the reserve ratio approach, a firm's tax liability rises gradually after a surge in charged benefits, remains at an elevated level for several years, and then falls slowly with improving economic conditions. By contrast, under the benefit ratio approach, surges in charged benefits are paid for relatively rapidly and tax rates fall quickly once costs have been recovered.

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<sup>6</sup>The average hourly wage for production workers of U.S. manufacturers in September 1998 was \$13.60, and their average workweek was 41.6 hours. \$13.60 per hour x 41.6 hours x 50 working weeks in a year equals \$28,288 per year. Source: Federal Reserve Bank of Boston 1998, p. 15.

<sup>7</sup>The 28 states are identical to those comprising the sample in Hunt, O'Leary, and Huang (1990). They were included in that sample because in 1990 they accounted for most of the nation's manufacturing employment. Hunt, O'Leary, and Huang were primarily concerned with the manufacturing sector.

These differences are evident in a comparison of two UIMSM simulations, one involving a firm located in Massachusetts, a reserve ratio state, and the other involving a firm located in Connecticut, a benefit ratio state (Figure 5). In both simulations, the firm experiences an unemployment shock in year 11. In both states, the firm's UI tax bill rises slightly in that period and continues to rise in year 12. While the tax bill of the Massachusetts firm peaks in year 12, one year earlier than that of its Connecticut counterpart, the difference between its peak-year tax bill and its pre-shock tax bill is smaller. Moreover, this difference does not disappear in the Massachusetts scenario until year 18. By contrast, the shock-induced increase in the Connecticut firm's tax bill vanishes by year 16.

The federal government imposes few restrictions on state UI tax structures. State taxable wage bases must be at least as large as the first \$7,000 of each employee's annual wages. The highest tax rate imposed under any experience-rated tax schedule must be at least 5.4 percent. Otherwise, states have considerable leeway in designing their UI tax systems.<sup>8</sup> Consequently, as shown in Table 4, in 1998 UI tax rate schedules and taxable wage bases differ sharply among states. Most states have minimum tax rates greater than 0 in order to get firms with low propensities to lay off workers to help cover the costs of ineffectively charged benefits. States also differ sharply in their solvency assessment rates. In only 5 of the 28 states—Connecticut, Florida, Missouri, North Carolina, and Wisconsin—does an employer's solvency assessments rate reflect its experience rating; in the other 23, assessments are imposed at a uniform rate. UIMSM also incorporates state-specific UI features. These include the time lag between the date on which firms' tax rates are set and the date on which they become effective, rounding provisions, lower and upper boundaries on reserve ratios and benefit ratios, and the one-week lag between the termination of employment and benefit eligibility.<sup>9</sup>

While UIMSM captures considerable detail, it fails to take into account some important realities. It does not incorporate the special tax rate provisions that some states apply to firms in certain industries or in certain size groups. Finally, UIMSM does not anticipate how tax rate

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<sup>8</sup>The federal government also gives the states a powerful financial incentive to incorporate the experience-rating principle into their UI tax regimes. It imposes its own UI tax on employers, on top of the state tax, equal nominally to 6 percent of the first \$7,000 of annual wages paid to each covered employee. The federal tax finances the administrative costs of the whole federal/state UI system and loans to states that have exhausted their own reserves. Provided certain conditions are met, the federal government gives a credit against 90 percent of its tax, leaving an effective federal tax rate of 0.6 percent. The employer must not be delinquent on its state UI taxes. Furthermore, the state in which the employer is located must not have any outstanding debt to the federal unemployment account, and its UI laws must conform to federal laws. According to federal law, a state must have experience-rated UI tax structures for its employers to qualify for the 90 percent credit. Currently, the federal government levies an additional 0.2 percentage-point surtax, making the effective federal UI tax rate equal to 0.8 percent.

<sup>9</sup>The effect of this one-week wait on an employer's benefit charges depends on its average duration of unemployment and its average exhaustion rate (the percentage of its laid-off workers who exhaust the UI benefits for which they are eligible). For the simulations reported in this article, a uniform duration of unemployment of 16.1 weeks and a uniform exhaustion rate of 32.3 percent were assumed. These values equal their actual national averages in 1998:Q1 (U.S. Department of Labor, *UI Data Summary*).

schedules and solvency assessments might change in response to a particular spike in unemployment.

## 2.2 Derivation of Alternative Measures

As illustrated in Figure 5 for Connecticut and Massachusetts, the tax liabilities and the benefits paid were simulated for a 30-year period under each state's UI laws and regulations. Two different simulations were performed for each of the six hypothetical firm types. In the “control run,” the firm’s IUR remains unchanged throughout the entire period. In the “spike run,” the firm confronts an adverse economic shock that causes its IUR to jump in period 11 by its pre-designated amount, leading to a surge in paid-out benefits. Benefit payments fall to their “pre-spike” level in period 12 and stay there for the remainder of the simulation

To undertake comparisons of state UI tax systems, for each state we computed the present value of total UI tax liabilities in the spike run over a 30-year simulation period discounted back to period 11 for each firm type. A ratio we call the “tax burden” is one measure of interstate competitiveness. It uses Massachusetts as a reference state and is computed as

$$(TaxBurden)_s^{i,x} = \frac{\sum_{t=11}^{30} [T_s^{i,x}/(1+r)^{t-11}]}{\sum_{t=11}^{30} [T_s^{i,\bar{x}}/(1+r)^{t-11}]}$$

where:  $T$ =UI taxes paid

$t$ =year

$s$ =spike run

$c$ =control run

$i$ =the  $i$ th firm

$x$ =the  $x$ th state

$r$ =discount rate<sup>10</sup>

$\bar{x}$ =Massachusetts, the reference state against which others are compared.

The numerator in the tax burden is the discounted value of tax payments in a state, and the denominator is the similar value for Massachusetts. Values greater or less than one mean employers in a state have tax burdens greater or less than Massachusetts employers in similar circumstances.

We also use Massachusetts as the reference to evaluate state UI “benefit generosity.” The present value of UI compensation paid to workers laid off by firms during the spike simulation run for each hypothetical firm type in each state is divided by the similar quantity for Massachusetts. For a hypothetical firm  $i$ , the relative generosity of UI benefits in each state,  $x$ , relative to Massachusetts,  $\bar{x}$ , is estimated according to the following formula:

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<sup>10</sup> A discount rate,  $r$ , of 5 percent was used.

$$(\text{BenefitGenerosity})_s^{i,x} = \frac{\sum_{t=1}^{30} [B_s^{i,x}/(1+r)^{t-11}]}{\sum_{t=1}^{30} [B_s^{\bar{i},x}/(1+r)^{t-11}]}$$

where  $B$  = UI benefits paid to laid off workers.

To evaluate the allocative neutrality of states' UI systems, we used the spike run simulation and divided the present value of each firm's total UI tax liabilities by the present value of the total benefits paid to its laid-off workers:

$$(\text{TaxBenefitRatio})_s^{i,x} = \frac{\sum_{t=1}^{30} [T_s^{i,x}/(1+r)^{t-11}]}{\sum_{t=1}^{30} [B_s^{i,x}/(1+r)^{t-11}]}$$

Within a given state, the narrower the dispersion in the “tax-benefit ratio” across the six firm types, the less the degree of interindustry subsidization and, therefore, the more allocatively neutral the state's UI system.

In evaluating the degree to which each state's UI system adheres to the experience-rating principle, we estimate the “marginal tax cost” to the firm of an additional benefit dollar. Specifically, we compute the present value of the total taxes charged to the firm in the control run over the entire 30-year period, discounted to year 11. In a similar fashion, we compute the present value of the firm's total taxes in the spike run and the total benefits paid to its laid-off workers in both runs. We divide the difference between the present values of the two tax streams by the difference between the present values of the two benefit streams to arrive at an estimate of the firm's marginal tax cost (MTC):

$$(\text{MTC})_s^{i,x} = \frac{\sum_{t=1}^{30} [(T_s^{i,x} - T_c^{i,x})/(1+r)^{t-11}]}{\sum_{t=1}^{30} [B_s^{i,x} - B_c^{i,x})/(1+r)^{t-11}]}$$

## 2.3 Results

For the six hypothetical firms, indicators of tax competitiveness, benefit generosity, allocative neutrality, and adherence to the experience-rating principle are provided in Tables 5 through 8.

### ***Measures of Relative Tax Competitiveness***

Simulated UI tax burdens borne by each case firm, indexed to the values for Massachusetts, are presented and ranked by state in Table 5, columns 1 through 6. For purposes of comparison, column 7 presents UI taxes collected per covered employee, also indexed to Massachusetts.

Each of the first six columns in Table 5 is highly correlated with column 7, suggesting that the traditional indicator has some validity. Nevertheless, some states' ranking in column 7 differs significantly from their rankings according to the six simulation-based indicators. These differences are generally consistent with the hypothesis that, as an indicator of tax competitiveness, UI taxes per covered worker is cyclically biased. States whose ranking according to this traditional indicator is significantly lower than their rankings according to the simulation-based indicators have experienced relatively low rates of insured unemployment over the past several quarters. Examples of such states include Florida, North Carolina, and Texas. Conversely, states whose ranking according to UI taxes per worker is noticeably higher than their rankings according to the indexes produced by the six simulations (for example, California, Michigan, and New Jersey) have had relatively high rates of insured unemployment in recent quarters (U.S. Department of Labor, *UI Data Summary*).<sup>11</sup>

### ***Measuring Benefit Generosity***

Total benefits paid by representative firms in each of the 28 states (indexed to Massachusetts values) are presented and ranked in Table 6, columns 1 through 6. For purposes of comparison, wage replacement ratios (also indexed to Massachusetts' ratio) are reported and ranked in column 7. The wage replacement is positively correlated with each of its six UIMSM-based counterparts. However, this correlation is not as strong as that between UI taxes per covered employee and the simulation-generated indicators of tax burden. The relative weakness of the correlation among indicators of generosity reveals more problems with the simulations than with the wage replacement ratio. In particular, unrealistic assumptions embedded in UIMSM concerning the number of dependents per worker may bias the simulation results. The simulations assume that the average worker of each firm has one dependent.<sup>12</sup> The ratio of workers to dependents' nationwide is probably considerably higher than one.<sup>13</sup> Restricting the highest annual

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<sup>11</sup>We average each state's tax burden index over the six simulations and divide this average by its index of UI taxes per covered employee. The resulting ratios are regressed on the states' average insured unemployment rate for 1998:Q2, 1998:Q1, and 1997:Q4. The estimated coefficient on the average unemployment rate is -0.55, significant at the .001 level.

<sup>12</sup>Specifically, the simulations assume that half the workers of each employer are single with no dependents and half are married with two dependents.

<sup>13</sup>In 1997 the United States had 122.7 million employees. In that year 84.2 million Americans were between the ages of 0 and 21. Many of them were not dependents. Most dependents fall within this age bracket. In 1994 total establishment payroll in the U.S. was 114.1 million, while in that year, the 107.3 million tax filing units filing for the U.S. personal income tax (86 percent of whom reported wage income) claimed a total of 70.0

wage to \$40,000 for the hypothetical firms raises questions about the representativeness of the hypothetical firms in states with relatively high wages.

Workers in higher-paying firms, not represented among the hypothetical firms, are most likely to feel the constraint of maximum benefit limitations and therefore to have low replacement ratios; Connecticut, Massachusetts, Illinois, New Jersey, and New York are cases in point.

### ***Tax/Benefit Ratios and Interindustry Allocative Neutrality***

Simulation results presented in Table 7 suggest that most states' UI systems tend to be allocatively neutral. The variation in ratios across firm types is small for most of the 28 states. In 19 of these states, the inter-firm standard deviation is less than 0.1, while in more than half of them it is less than 0.05 (Table 7, column 8). In those states where such variation is relatively large, the prototypical construction firm (column 6) enjoys far lower tax/benefit ratios than the other five cases, indicating a relatively high degree of subsidization. On average, the representative financial service provider (column 1) and the representative low-wage manufacturer (column 2) have somewhat higher tax/benefit ratios than the other representative manufacturers (columns 3 and 4) and the representative retailer (column 5, bottom line of the table).

Most states in the sample have a mean tax/benefit ratio for the six prototypes that exceeds 1.0 (column 7). The high ratios of many states show that their UI tax systems are currently designed to build up reserves depleted during the recession of the early 1990s. States with the highest average ratios also tend to subsidize the representative construction firm most heavily, suggesting a desire to shield firms suffering the highest incidence of unemployment from the rigors of aggressive reserve-building efforts. States with low ratios, such as Georgia and Virginia, tend to have a high level of reserves in their UI trust funds.

### ***Adherence to Experience Rating—Measuring Marginal Tax Costs***

Most of the tax/benefit ratios displayed in Table 7 exceed the value of 1.0. However, 115 of the 168 marginal tax costs shown in Table 8 are below 1.0, in many instances far below. Thus, while over the long run states may recoup benefits by imposing taxes of equal or greater value, they generally do not match *increases* in benefit payments with comparable *increases* in UI tax liability. Evidently, most states keep their UI trust funds solvent largely by imposing high minimum rates on firms when their employment is stable or expanding. When firms increase their propensity to lay off workers, states tend not to increase the firms' UI tax burdens proportionately and subject those burdens to a maximum. Thus, on the whole state UI systems do not effectively force firms to internalize the social costs generated by unemployment.

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million exemptions for dependents. Of these, 64.6 million were claimed for children living at home. Thus, most elderly Americans are independent. Sources: U.S. Bureau of Labor Statistics web site (<http://stats.bls.gov>), U.S. Bureau of the Census web site (<http://census.gov/population/estimates/state/stats/ag9797.txt>), and Keenan and Curry (1995).

The widespread subsidization of employers such as the prototypical construction firm evident in Table 7 results from the firm's low marginal tax cost in most states. Under the laws and regulations of 19 out of the 28 states, the construction firm enjoys a lower marginal tax cost than the other five firms (Table 8). In eight of those states, the construction firm's marginal tax cost per dollar of UI benefits paid is five cents or less (column 6). This type of firm tends to be heavily subsidized because it is at or near most state's maximum UI tax rate before experiencing the unemployment shock. The shock, therefore, has little or no effect on its statutory rate.

For purposes of comparison, states' Experience Rating Index (ERI) values for 1997 are presented in Table 8, column 9. These values are uncorrelated with the marginal tax costs of any of the six hypothetical firms. Given the cyclical influences on ERI discussed in Section 2 of this paper, the correlations between ERI and marginal tax costs should be stronger after one has controlled for lagged values of state insured unemployment rates. In fact, this is not the case. Yet, the ranking of many states' marginal tax cost differs dramatically from their ERI ranking. Some states imposing low marginal tax costs had high ERI values, including Virginia, Kentucky, New York, and Georgia. In other states, such as North Carolina and Texas, the opposite was true.

While the authors cannot account for all divergent rankings, some expose a weakness in the methodology for computing the ERI index—it fails to take into account the extent to which solvency assessments are experience-rated. For example, North Carolina, which had the second lowest ERI in the sample, is one of only five sample states whose solvency assessment is experience-rated (20 percent of an employer's basic experience-rated tax rate). Because this tax is not part of the state's "regular" experience-rated tax structure, it is not taken into account in computing the state's ERI. As the result of a similar omission, the marginal tax costs simulated for Connecticut are between 39 percent and 65 percent above that of the median state (columns 1 through 6), while Connecticut's 1997 ERI (66) was only 6 percent above the median (62) (column 9).

## 2.4 Model Development

UIMSM is a flexible model capable of simulating alternative statutory features and economic conditions. The results reported in this paper are based on simulations of a 30-year experience of hypothetical employers. The model initializes employers at a steady-state level of insured unemployment and imputes the UI tax rate which would apply for such an employer in alternative states. Employers in these simulations may be regarded as mature rather than as new "start-up" firms.

We have recently examined the sensitivity of UIMSM estimates to changing this important assumption. In particular, we have examined the implications of setting the firm's initial UI tax rate at the state new-employer rate in the first year of the simulation, as opposed to setting it the rate for a mature firm with a steady prior IUR experience. For the great majority of states, this change in assumption did not appreciably alter the main simulation results. The change does not

affect marginal tax cost estimates in benefit ratio states at all. Results change appreciably in only a handful of reserve ratio states. The peculiarities of rules in these states will be investigated in future work. A full presentation of the sensitivity analysis is given in the Appendix to this paper.

### 3. Conclusion

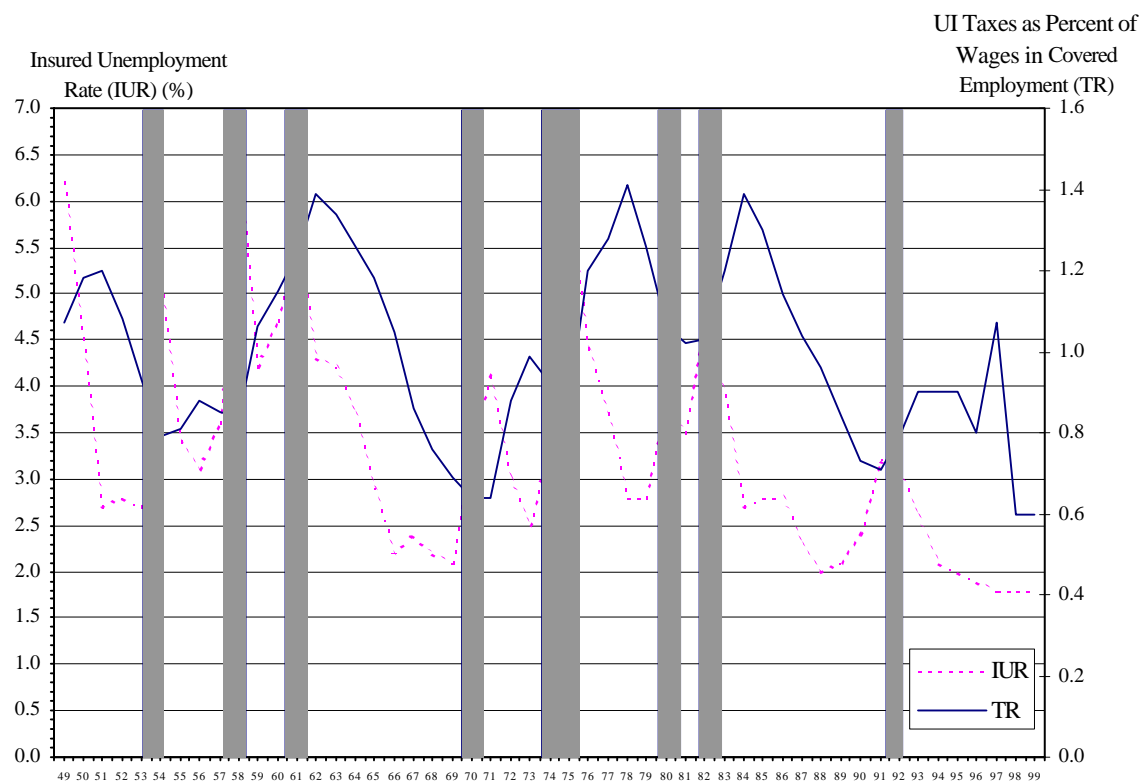
Let's pick up where we left off at the end of the introduction. During a recess in the negotiations, an anonymous team of economists delivers Section 2 of this paper to both teams of state business recruiters and to negotiators for the employer. After discussions resume, the Massachusetts officials, pointing to column 1 in Table 5, argue that North Carolina's relative UI tax burden on financial service firms isn't as low as traditional indicators of statewide UI tax competitiveness suggest. While UI tax collections per covered employee in North Carolina are 22 percent of those in Massachusetts (Table 5, column 7), the present value of the prototypical financial services firm's UI simulated tax liability in the Tar Heel state is 64 percent of that in Massachusetts. The 22 percent figure reflects in large part the mildness of the early 1990s recession in North Carolina relative to the more severe contemporaneous contraction in the Bay State.

Moreover, the Massachusetts' delegation notes that, according to the simulation results reported in Table 6, column 1, North Carolina's UI benefits are *not* more generous than Massachusetts for a representative financial services firm. The present value of the benefits paid to laid off workers from the firm in North Carolina are 85 percent of the present value of those which would be paid in Massachusetts. The North Carolinian's argue that this result reflects the interaction of North Carolina's relatively low dependents' allowance and the simulation's unrealistically high assumption that each worker has a dependent. The Massachusetts team counters by noting how the simulations expose an especially unattractive feature of North Carolina's North Carolina's benefit structure—its low dependents' allowance.

The team from the Tar Heel state notes that, when located in North Carolina, most representative firms in the simulations, including the financial services firm, enjoy a lower ratio of taxes paid to benefits charged than when located in Massachusetts. Furthermore, they crow about the uniformity of this ratio across firm types, suggesting very little, if any, cross-industry subsidization in the state (Table 7). In Massachusetts, by contrast, there is a relatively wide dispersion across industries in benefit-tax ratios and an indication that financial service firms subsidize the UI benefits paid to construction companies and certain manufacturing firms. Why, the North Carolinians ask? Because, as shown by the relative lack of variation across North Carolina's representative firms in Table 8, UI experience rating in the Tar Heel state requires employers to repay benefit charges fairly quickly. The contingent from the Tar Heel state argues that the ERI index is biased because it fails to reflect the fact that North Carolina is one of the few with experience-rated solvency assessments. The new set of indicators shake up the meeting, causing the employer to ask for a new comprehensive assessment of the issue based on the micro-simulation approach.



**Figure 1. The Cyclicality of UI Taxes as a Percent of Total Wages in Covered Employment in the United States**

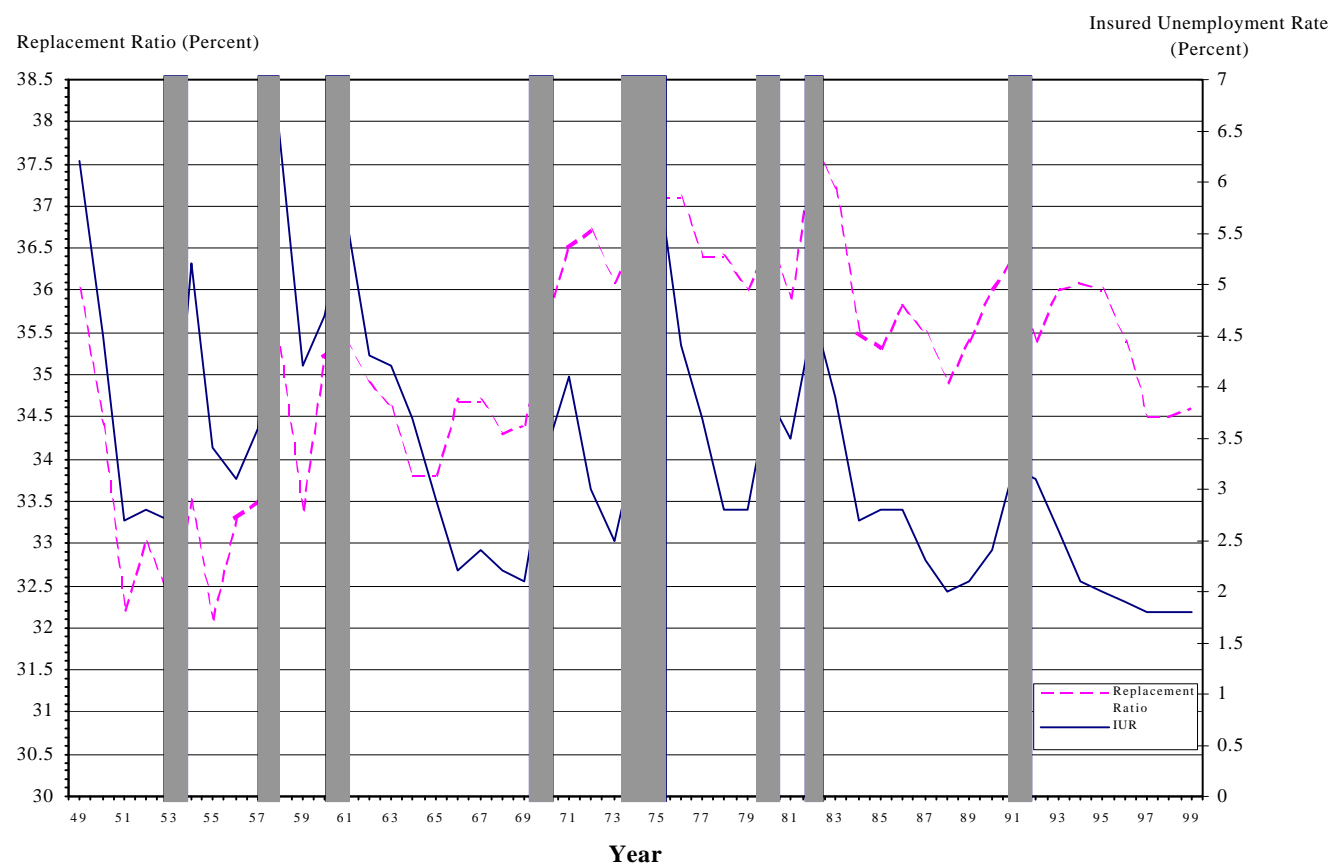


Data from four quarters ending 1949:Q5 through four quarters ending 1999:Q2.

*Note:* Shaded areas are periods of recession.

*Sources:* U.S. Department of Labor, *UI Data Summary*, various issues, and *ET Handbook 394, 1938-1993*.

**Figure 2. The Cyclicity of the Ratio of UI Benefits to Wage Replacement Ratio in the United States**

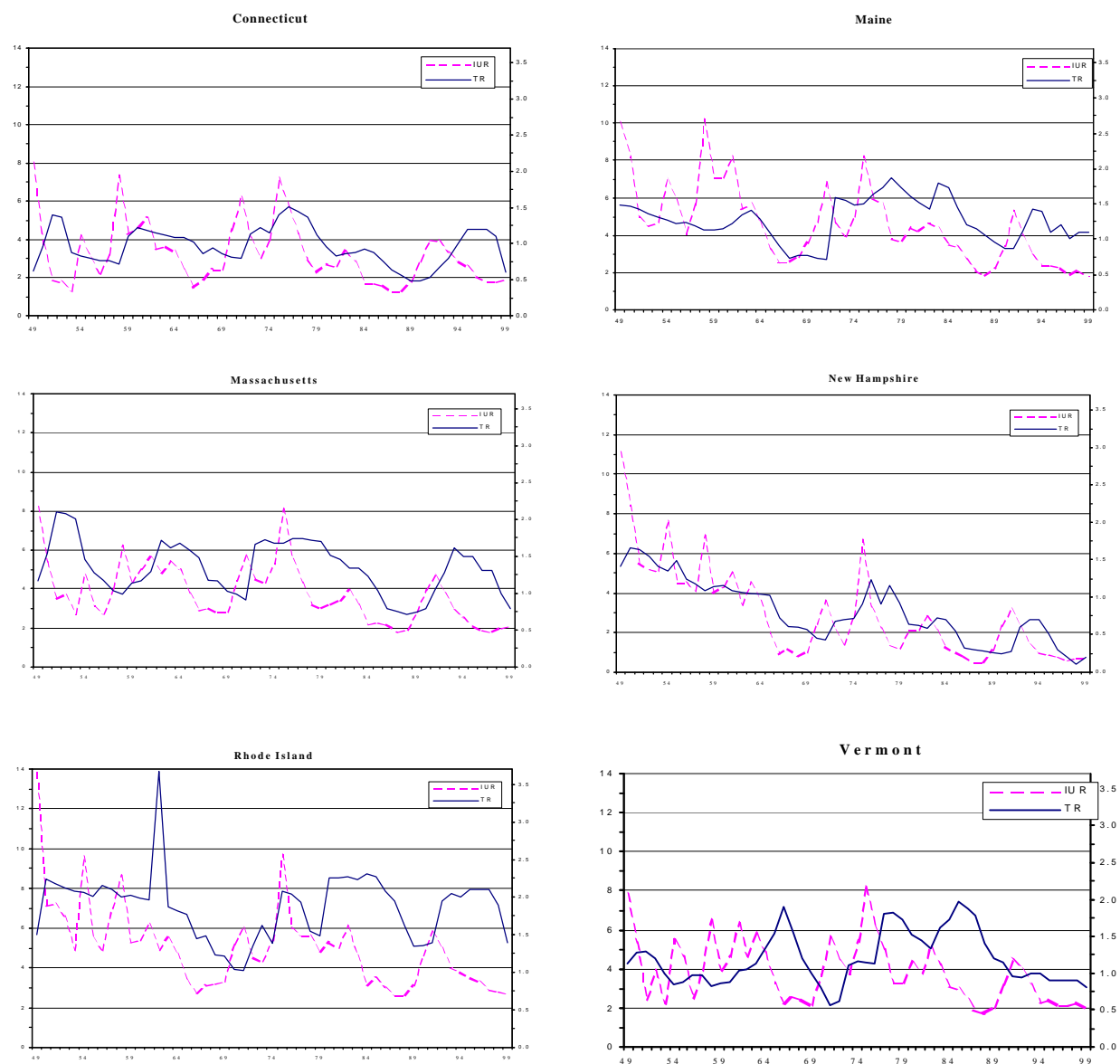


Data from four  
quarters ending 1949: Q4 through four quarters ending 1999:Q2.

*Note:* Shaded areas are periods of recession.

*Sources:* U.S. Department of Labor, *UI Data Summary*, various issues, and ET Handbook 394, 1938-1993.

**Figure 3. The Cyclicalities of UI Taxes as a Percent of Total Wages in Covered Employment in the New England States**



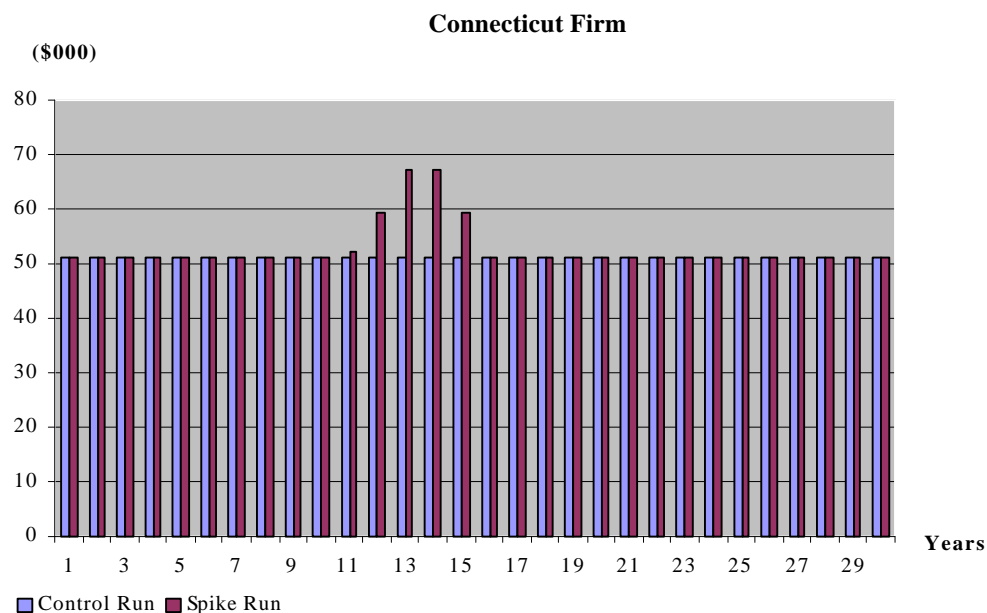
Data from four quarters ending 1949:Q5 through four quarters ending 1999:Q2.

*Note:* Shaded areas are periods of recession.

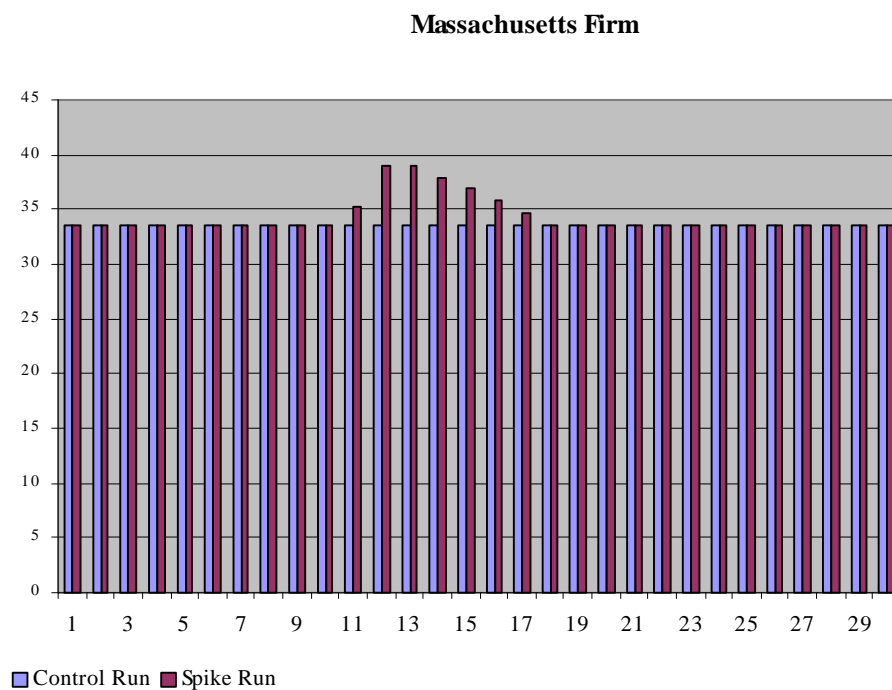
*Sources:* U.S. Department of Labor, *UI Data Summary*, various issues, and *ET Handbook 394, 1938-1993*.

**Figure 5. Simulated Response of UI Taxes of Hypothetical Firms in Connecticut and Massachusetts to a Spike in Insured Unemployment**

### UI Taxes



### UI Taxes



*Note:*

Hypothetical firm's initial insured unemployment rate (IUR) assumed to equal 1.15 percent, spike in IUR assumed to equal 2.3 percentage points. Average annual wages of firm's employees assumed to equal \$28,000.

*Source:* Author's calculations using the Unemployment Insurance Micro Simulation Model.

**Table 1. Two Measures of “UI Tax Competitiveness” by State, 1998** (New England states in bold)

UI Taxes per Covered Worker				
State	Amount(\$)	Rank	Amount (%)	Rank
Alabama	101.69	38	0.4	37
Alaska	486.56	1	1.3	2
Arizona	103.89	35	0.3	43
Arkansas	168.45	20	0.8	11
California	221.84	13	0.7	18
Colorado	95.41	41	0.4	37
<b>Connecticut</b>	<b>388.01</b>	<b>4</b>	<b>0.6</b>	<b>24</b>
Delaware	165.68	22	0.6	24
District of Columbia	234.27	11	0.5	29
Florida	74.19	46	0.2	46
Georgia	83.72	44	0.1	51
Hawaii	290.52	8	1.2	3
Idaho	140.14	27	0.8	11
Illinois	209.01	15	0.7	18
Indiana	83.40	45	0.4	37
Iowa	101.93	37	0.5	29
Kansas	35.20	52	0.5	29
Kentucky	159.82	23	0.7	18
Louisiana	102.66	36	0.5	29
<b>Maine</b>	<b>231.04</b>	<b>12</b>	<b>1.1</b>	<b>6</b>
Maryland	140.49	26	0.5	29
<b>Massachusetts</b>	<b>320.68</b>	<b>7</b>	<b>0.8</b>	<b>11</b>
Michigan	240.07	10	0.8	11
Minnesota	153.64	24	0.5	29
Mississippi	98.06	39	0.6	24
Missouri	134.53	28	0.3	43
Montana	168.74	19	0.9	10
Nebraska	37.18	51	0.2	46
Nevada	210.67	14	0.8	11
<b>New Hampshire</b>	<b>47.07</b>	<b>47</b>	<b>0.2</b>	<b>46</b>
New Jersey	393.49	3	0.8	11
New Mexico	151.35	25	0.7	18
New York	196.80	17	0.6	24
North Carolina	85.57	42	0.3	43
North Dakota	103.89	34	0.6	24
Ohio	130.77	29	0.5	29
Oklahoma	44.28	49	0.2	46
Oregon	320.74	6	1.2	3
Pennsylvania	280.11	9	1.0	8
<b>Rhode Island</b>	<b>431.01</b>	<b>2</b>	<b>1.4</b>	<b>1</b>
South Carolina	97.21	40	0.4	37
South Dakota	38.80	50	0.2	46
Tennessee	112.81	32	0.4	37
Texas	112.35	33	0.4	37
Utah	83.82	43	0.5	29
<b>Vermont</b>	<b>181.36</b>	<b>18</b>	<b>0.8</b>	<b>11</b>
Virgin Islands	115.59	31	1.1	6
Virginia	46.33	48	0.1	51
Washington	337.38	5	1.2	3
West Virginia	202.11	16	1.0	8
Wisconsin	166.28	21	0.7	18
Wyoming	117.84	30	0.7	18

Source: U.S. Department of Labor, Unemployment Insurance Services, Division of Fiscal and Actuarial Services, UI Data Summary, various issues.

**Table 2. Wage Replacement Ratio by State, 1998**

Average Weekly Benefit Amount as Percent of Average Weekly Wage in Covered Employment			Average Weekly Benefit Amount as Percent of Average Weekly Wage in Covered Employment		
STATE	VALUE(%)	RANK	STATE	VALUE(%)	RANK
Alabama	29.86	42	Missouri	29.70	43
Alaska	27.71	46	Montana	40.79	8
Arizona	26.64	49	Nebraska	33.75	34
Arkansas	39.98	10	Nevada	35.94	26
California	22.83	51	<b>New Hampshire</b>	<b>30.94</b>	<b>39</b>
Colorado	36.59	22	New Jersey	33.78	33
<b>Connecticut</b>	<b>27.23</b>	<b>47</b>	New Mexico	35.23	29
Delaware	30.24	41	New York	26.33	50
District of Columbia	26.69	48	North Carolina	38.46	15
Florida	38.39	16	North Dakota	43.72	3
Georgia	30.65	40	Ohio	37.13	20
Hawaii	49.54	1	Oklahoma	39.90	11
Idaho	41.45	6	Oregon	38.22	18
Illinois	34.14	32	Pennsylvania	39.41	13
Indiana	36.16	25	<b>Rhode Island</b>	<b>39.60</b>	<b>12</b>
Iowa	44.43	2	South Carolina	34.93	30
Kansas	41.95	4	South Dakota	37.66	19
Kentucky	36.47	24	Tennessee	32.14	37
Louisiana	28.96	45	Texas	34.53	31
<b>Maine</b>	<b>29.66</b>	<b>44</b>	Utah	38.29	17
Maryland	32.72	35	<b>Vermont</b>	<b>35.62</b>	<b>27</b>
<b>Massachusetts</b>	<b>36.87</b>	<b>21</b>	Virginia	31.07	38
Michigan	35.39	28	Washington	41.14	7
Minnesota	41.83	5	West Virginia	39.19	14
Mississippi	32.38	36	Wisconsin	36.59	23
			Wyoming	40.54	9

Source: U.S. Department of Labor, Unemployment Insurance Services, UI Data Summary, various issues, and author's calculations.

**Table 3. Experience Rating Index by State, 1997** (New England states in bold)

STATE	ERI 1997	RANK	STATE	ERI 1997	RANK
Alabama	51	36	Nebraska	48	38
Alaska	n.a.	n.a.	Nevada	76	5
Arizona	77	3	<b>New Hampshire</b>	<b>82</b>	<b>2</b>
Arkansas	61	22	New Jersey	59	24
California	59	24	New Mexico	63	20
Colorado	56	27	New York	85	1
<b>Connecticut</b>	<b>66</b>	<b>15</b>	North Carolina	44	42
Delaware	n.a.	n.a.	North Dakota	52	35
District of Columbia	77	3	Ohio	62	21
Florida	71	9	Oklahoma	50	37
Georgia	67	13	Oregon	54	31
Hawaii	45	41	Pennsylvania	55	28
Idaho	53	32	Puerto Rico	n.a.	n.a.
Illinois	75	6	<b>Rhode Island</b>	<b>66</b>	<b>15</b>
Indiana	60	23	South Carolina	57	26
Iowa	64	19	South Dakota	47	40
Kansas	68	11	Tennessee	65	17
Kentucky	67	13	Texas	53	32
Louisiana	70	10	Utah	n.a.	n.a.
<b>Maine</b>	<b>55</b>	<b>28</b>	<b>Vermont</b>	<b>48</b>	<b>38</b>
Maryland	n.a.	n.a.	Virgin Islands	n.a.	n.a.
<b>Massachusetts</b>	<b>55</b>	<b>28</b>	Virginia	74	7
Michigan	n.a.	n.a.	Washington	a	a
Minnesota	74	7	West Virginia	53	32
Mississippi	42	44	Wisconsin	65	17
Missouri	68	11	Wyoming	43	43

n.a.= not available.

<sup>a</sup> Washington data from 1991 to 1997 are under review.*Sources:* U.S. Department of Labor and authors' calculations.

**Table 4. Characteristics of 1998 State Experience Rating System (New England state in bold)**

State	Type of Experience Rating <sup>a</sup>	State Taxable Wage Base (Dollars)	Range of Experience Rates (Percent)	Solvency Assessment Rate (Percent)
Alabama	BR	8,000	0.29–5.4	-0.06
Arkansas	RR	9,000	0.1–6.0	0.4
California	RR	7,000	0.9–5.4	.10 <sup>b</sup>
Connecticut	<b>BR</b>	<b>13,000</b>	<b>0.5–5.4</b>	<b>1.50<sup>c</sup></b>
Florida	BR	7,000	0.0–5.4	VAF + FAF <sup>d, e</sup>
Georgia	RR	8,500	0.02–5.4	none
Illinois	BR	9,000	0.2–6.4	0.4
Indiana	RR	7,000	0.2–5.4	none
Iowa <sup>f</sup>	BR	15,700	0.0–7.0	0.1
Kentucky	RR	8,000	0.3–9.0	none
Maryland	BR	8,500	0.3–7.5	none
Massachusetts	<b>RR</b>	<b>10,800</b>	<b>1.4–7.3</b>	<b>0.76</b>
Michigan <sup>g</sup>	BR	9,500	0.1–8.1	0.2
Minnesota	BR	17,200	0.2–9.1	0.20 <sup>b</sup>
Mississippi	BR	7,000	0.5–5.4	0.5
Missouri	RR	8,500	0.0–6.0	20% of basic tax rate
New Jersey	RR	19,300	0.4–5.4	none
New York	RR	7,000	0.0–5.4	1.00
North Carolina	RR	12,600	0.0–5.7	20% of basic tax rate
Ohio	RR	9,000	0.1–6.5	none
Oregon <sup>f</sup>	BR	21,000	1.0–5.4	none
Pennsylvania <sup>g</sup>	BR	8,000	0.0–7.7	1.50
South Carolina	RR	7,000	0.54–5.4	0.06 <sup>e</sup>
Tennessee	RR	7,000	0.0–10.0	none
Texas	BR	9,000	0.0–6.0	0.27
Virginia	BR	8,000	0.0–5.4	none
Washington <sup>f</sup>	BR	22,500	0.48–5.4	0.17
Wisconsin	RR	10,500	0.0–8.9	0.05 - 0.85 <sup>h</sup>

<sup>a</sup>BR = Benefit Ratio, RR = Reserve Ratio.

<sup>b</sup>The rate additions apply only to positive balance employers in California and Minnesota.

<sup>c</sup>Besides 1.5 percent Fund Balance Tax, Connecticut has a special bond assessment of 51.3 percent of basic tax rate.

<sup>d</sup>Variable Adjustment Factor(VAF) = 0.4526 \* (benefit ratio)

Final Adjustment Factor (FAF) = 0.01 or ( 5.4 - BR - VAF), whichever is smaller.

<sup>e</sup>The rate additions cannot increase the maximum experience tax rates in Florida and South Carolina.

<sup>f</sup>Iowa, Oregon and Washington use a Benefit Ratio Ranking System. See the text.

<sup>g</sup>Michigan and Pennsylvania also include a reserve ratio in computing a portion of the tax rate.

<sup>h</sup>The additional tax rate in Wisconsin depends on the employer's basic experience tax rate, and is set by a schedule.

Sources: Commerce Clearing House (1998) and data from employment security agencies of the individual states.



**Table 5. Indexes of Present Value of UI Taxes (TAX) for Hypothetical Forms by State, 1998**  
**(Massachusetts' value = 100; New England states on bold)**

Initial IUR <sup>a</sup> IUR Spike AAW <sup>b</sup>	(1) 1.15%		(2) 1.15%		(3) 1.15%		(4) 1.15%		(5) 2.30%		(6) 3.45%		(7) Index of UI Taxes Per Covered Employee <sup>c</sup>	
	+1.15%		+3.45%		+3.45%		+3.45%		+2.30%		+4.60%			
	\$28,000		\$16,000		\$28,000		\$40,000		\$16,000		\$40,000			
STATE	TAX	RANK	TAX	RANK	TAX	RANK	TAX	RANK	TAX	RANK	TAX	RANK	INDEX	RANK
Alabama	47.0	23	49.6	11	48.6	22	40.0	21	73.3	16	45.5	20	25.9	22
Arkansas	54.4	17	44.9	15	55.1	18	45.7	18	68.0	20	48.2	19	46.4	12
California	54.9	16	27.8	27	55.6	17	39.4	23	46.6	27	44.5	23	65.1	9
Connecticut	<b>155.6</b>	<b>2</b>	<b>123.8</b>	<b>1</b>	<b>157.7</b>	<b>3</b>	<b>155.0</b>	<b>2</b>	<b>156.2</b>	<b>1</b>	<b>139.6</b>	<b>2</b>	<b>106.6</b>	<b>2</b>
(w/o bond assessment)	<b>(106.2)</b>	<b>(3)</b>	<b>(124.6)</b>	<b>(1)</b>	<b>(118.8)</b>	<b>(3)</b>	<b>(124.9)</b>	<b>(3)</b>	<b>(123.5)</b>	<b>(2)</b>	<b>(100.0)</b>	<b>(2)</b>	<b>(106.6)</b>	<b>-2</b>
Florida	77.4	9	46.5	12	78.4	9	66.8	11	80.8	10	44.5	23	23.1	26
Georgia	46.0	25	35.6	23	46.6	25	38.4	25	61.1	22	45.4	21	24.7	24
Illinois	95.7	5	62.3	7	97.0	5	82.6	6	100.0	4	72.1	9	58.5	10
Indiana	47.0	23	37.0	21	47.6	24	39.2	24	69.6	17	44.5	23	24.3	25
Iowa	53.7	18	46.5	12	58.2	16	51.8	16	82.0	9	54.3	16	28.6	21
Kentucky	53.5	19	41.6	17	54.2	19	44.9	19	76.8	13	56.1	15	45.0	13
Maryland	74.8	11	55.9	8	75.8	11	62.8	14	91.8	7	69.0	11	40.4	15
Massachusetts	<b>100.0</b>	<b>4</b>	<b>100.0</b>	<b>4</b>	<b>100.0</b>	<b>4</b>	<b>100.0</b>	<b>4</b>	<b>100.0</b>	<b>4</b>	<b>100.0</b>	<b>3</b>	<b>100.0</b>	<b>3</b>
Michigan	61.1	15	41.2	18	61.9	15	54.2	15	68.1	19	60.4	13	70.4	7
Minnesota	78.1	8	50.5	10	79.1	8	77.3	7	80.4	11	89.6	4	44.9	14
Mississippi	39.9	27	35.8	22	40.4	27	33.5	27	59.8	23	38.4	27	25.8	23
Missouri	43.0	26	39.0	19	43.5	26	36.1	26	68.8	18	44.9	22	38.1	16
New Jersey	73.3	13	42.4	16	74.3	13	69.3	10	74.7	15	87.6	5	107.1	1
New York	76.7	10	72.9	6	77.7	10	70.4	9	78.4	12	52.8	17	65.2	8
North Carolina	64.4	14	38.1	20	65.3	14	64.8	12	67.8	21	79.6	6	22.2	27
Ohio	52.2	20	30.6	26	52.9	20	48.3	17	55.4	26	56.8	14	36.7	17
Oregon	157.8	1	108.2	3	166.2	1	136.7	3	127.6	3	75.8	7	86.5	5
Pennsylvania	94.5	6	74.7	5	95.8	6	97.1	5	96.0	6	73.4	8	78.9	6
South Carolina	47.6	22	33.7	24	48.2	23	40.0	21	57.4	25	44.3	26	30.3	20
Tennessee	50.9	21	31.8	25	51.5	21	42.7	20	59.7	23	52.4	18	31.1	19
Texas	85.1	7	54.4	9	86.2	7	71.5	8	87.4	8	66.5	12	32.6	18
Virginia	34.1	28	22.5	28	34.6	28	28.7	28	41.4	28	37.4	28	14.7	28
Washington	149.6	3	116.6	2	164.3	2	171.7	1	143.4	2	150.0	1	93.2	4
Wisconsin	73.9	12	46.0	14	74.9	12	63.8	13	76.5	14	72.1	9	47.0	11

<sup>a</sup> IUR--Insured Unemployment Rate

<sup>b</sup> AAW--Average Annual Wage

<sup>c</sup> Average for 1997:Q3 through 1998:Q2

Sources: U.S. Department of Labor, *UI Data Summary*, October 1998, and authors' calculations using UIMSM.

**Table 6. Indexes of Total UI Benefit Paid (BEN) to Employees for Hypothetical Firms by State, 1998**  
**(Massachusetts' Value = 100; New England states in bold)**

Initial IUR <sup>a</sup> IUR Spike AAW <sup>b</sup>	(1)		(2)		(3)		(4)		(5)		(6)		(7)	
	1.15%		1.15%		1.15%		1.15%		2.30%		3.45%		Wage	
	+1.15%		+3.45%		+3.45%		+3.45%		+2.30%		+4.60%		Replacement	
	\$28,000		\$16,000		\$28,000		\$40,000		\$16,000		\$40,000		Ratio (%)	
STATE	BEN	RANK	BEN	RANK	BEN	RANK	BEN	RANK	BEN	RANK	BEN	RANK	Rate <sup>c</sup>	RANK
Alabama	63.5	27	92.1	11	63.4	27	45.9	27	91.5	11	45.4	27	78.7	24
Arkansas	66.4	26	80.2	21	66.3	26	47.9	26	80.3	21	47.9	26	105.2	5
California	86.0	10	65.0	28	86.0	10	52.7	23	65.1	28	52.7	23	61.4	28
Connecticut	<b>93.5</b>	<b>7</b>	<b>90.5</b>	<b>14</b>	<b>93.5</b>	<b>7</b>	<b>89.8</b>	<b>4</b>	<b>89.8</b>	<b>14</b>	<b>88.9</b>	<b>4</b>	<b>71.8</b>	<b>26</b>
Florida	85.4	14	80.2	21	85.4	14	63.1	15	80.3	21	63.1	15	107.2	4
Georgia	74.8	23	91.6	13	74.8	23	54.1	21	90.9	13	53.5	21	81.7	23
Illinois	98.4	4	93.1	10	98.4	4	71.6	10	93.1	10	71.6	10	90.5	18
Indiana	74.9	22	94.4	9	74.9	22	54.1	21	94.4	9	54.1	21	94.4	13
Iowa	84.8	18	102.5	4	84.0	18	61.2	17	99.4	4	60.6	17	111.9	1
Kentucky	85.5	13	104.8	3	85.4	13	61.8	16	104.1	3	61.2	16	95.4	11
Maryland	83.5	19	96.6	7	83.4	19	60.3	18	95.9	7	59.8	18	88.3	19
Massachusetts	<b>100.0</b>	<b>3</b>	<b>100.0</b>	<b>5</b>	<b>100.0</b>	<b>3</b>	<b>100.0</b>	<b>1</b>	<b>100.0</b>	<b>5</b>	<b>100.0</b>	<b>1</b>	<b>100.0</b>	<b>8</b>
Michigan	95.0	6	95.7	8	95.0	6	72.4	9	95.1	8	71.7	9	92.8	15
Minnesota	85.7	12	80.8	20	85.7	12	76.2	7	80.7	20	76.1	7	108.2	3
Mississippi	57.1	28	80.2	21	57.1	12	41.3	28	80.3	21	41.3	28	84.8	20
Missouri	68.5	25	99.3	6	68.4	25	49.5	25	98.6	6	49.0	25	78.1	25
New Jersey	113.8	1	107.0	2	113.6	1	94.1	3	106.3	2	93.2	3	94.7	12
New York	85.4	14	80.8	19	85.4	14	68.8	12	80.8	19	68.8	12	68.2	27
North Carolina	85.4	14	80.2	21	85.4	14	73.8	8	80.3	21	73.8	8	101.5	7
Ohio	85.1	17	80.2	21	85.1	17	67.5	14	80.3	21	67.5	14	96.5	10
Oregon	106.9	2	107.3	1	106.0	2	77.2	6	104.9	1	77.1	6	99.8	9
Pennsylvania	86.0	10	82.3	18	86.0	10	86.9	5	82.4	18	86.9	5	104.2	6
South Carolina	72.7	24	80.2	21	72.7	24	52.5	24	80.3	21	52.5	24	91.8	17
Tennessee	81.0	20	80.2	21	81.0	20	58.5	19	80.3	21	58.5	19	84.3	21
Texas	93.5	7	88.3	16	93.5	7	67.6	13	87.7	16	66.9	13	92.0	16
Virginia	75.5	21	84.4	17	75.4	21	54.5	20	83.8	17	54.0	20	84.0	22
Washington	97.5	5	92.0	12	96.6	5	96.5	2	89.9	12	96.4	2	111.7	2
Wisconsin	93.5	7	88.3	15	93.5	7	70.0	11	87.7	15	69.3	11	92.9	14

<sup>a</sup> IUR--Insured Unemployment Rate

<sup>b</sup> AAW--Average Annual Wage

<sup>c</sup> Average for 1997:Q3 through 1998:Q2

Sources: U.S. Department of Labor, *UI Data Summary*, October 1998, and authors' calculations using UIMSM.

**Table 7. Ratio of Present Value of UI Taxes Paid to Present Value of UI Benefits Received (RATIO) for Hypothetical Firms by State, 1998**

	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)	
Initial IUR <sup>a</sup>	1.15%		1.15%		1.15%		1.15%		2.30%		3.45%					
IUR Spike	+1.15%		+3.45%		+3.45%		+3.45%		+2.30%		+4.60%		Tax-Benefit		Standard	
AAW <sup>b</sup>	\$28,000		\$16,000		\$28,000		\$40,000		\$16,000		\$40,000		Ratio		Deviation	
STATE	RATIO	RANK	RATIO	RANK	RATIO	RANK	RATIO	RANK	RATIO	RANK	RATIO	RANK	MEAN	RANK	VALUE	RANK
Alabama	1.18	15	1.24	14	1.14	15	1.14	15	1.14	16	1.13	11	1.16	15	0.042	18
Arkansas	1.33	12	1.36	12	1.25	12	1.25	12	1.21	13	1.11	12	1.25	12	0.089	11
California	1.03	20	1.04	19	0.99	22	1.00	21	1.02	21	1.01	16	1.02	18	0.019	25
Connecticut	<b>3.26</b>	<b>1</b>	<b>2.68</b>	<b>1</b>	<b>2.63</b>	<b>1</b>	<b>2.14</b>	<b>1</b>	<b>2.48</b>	<b>1</b>	<b>1.84</b>	<b>2</b>	<b>2.51</b>	<b>1</b>	<b>0.488</b>	<b>2</b>
Florida	1.46	10	1.45	10	1.37	10	1.37	8	1.44	6	0.84	27	1.32	11	0.239	7
Georgia	1.00	26	0.96	25	0.93	27	0.91	27	0.96	27	0.99	20	0.96	27	0.034	19
Illinois	1.57	6	1.65	7	1.51	5	1.54	4	1.53	5	1.20	5	1.50	6	0.155	8
Indiana	1.03	20	0.97	24	0.95	25	0.93	26	1.05	19	0.98	23	0.99	23	0.046	16
Iowa	1.08	17	1.04	19	1.04	17	1.04	17	1.18	15	1.07	13	1.08	16	0.054	12
Kentucky	1.01	24	0.98	22	0.94	26	0.94	25	1.05	19	1.01	16	0.99	23	0.044	17
Maryland	1.46	10	1.43	11	1.39	9	1.39	7	1.37	11	1.32	3	1.39	10	0.048	14
Massachusetts	<b>1.68</b>	<b>5</b>	<b>2.30</b>	<b>4</b>	<b>1.48</b>	<b>6</b>	<b>1.30</b>	<b>11</b>	<b>1.43</b>	<b>7</b>	<b>1.14</b>	<b>9</b>	<b>1.56</b>	<b>5</b>	<b>0.407</b>	<b>3</b>
Michigan	1.03	20	1.09	17	1.01	19	1.01	19	1.02	21	0.94	25	1.02	18	0.048	14
Minnesota	1.49	7	1.55	8	1.40	8	1.34	9	1.42	8	1.30	4	1.42	7	0.093	10
Mississippi	1.12	16	1.11	16	1.08	16	1.08	16	1.06	17	1.05	14	1.08	16	0.027	21
Missouri	1.01	24	0.98	22	0.98	23	0.98	23	1.00	24	1.00	18	0.99	23	0.013	27
New Jersey	1.04	19	0.95	26	1.00	21	0.99	22	1.00	24	1.04	15	1.00	22	0.034	19
New York	1.47	8	2.08	6	1.36	11	1.32	10	1.38	10	0.92	26	1.42	7	0.375	5
North Carolina	1.21	14	1.18	15	1.19	14	1.19	14	1.21	13	1.19	6	1.20	14	0.012	28
Ohio	0.99	27	0.95	26	0.97	24	0.97	24	0.99	26	0.99	20	0.98	26	0.016	26
Oregon	2.52	3	2.48	3	2.17	3	2.18	3	1.74	3	1.17	8	2.04	3	0.511	1
Pennsylvania	1.81	4	2.15	5	1.65	4	1.45	5	1.66	4	0.96	24	1.61	4	0.396	4
South Carolina	1.05	18	1.05	18	1.01	19	1.01	19	1.02	21	0.99	20	1.02	18	0.024	23
Tennessee	1.02	23	0.99	21	1.02	18	1.02	18	1.06	17	1.00	18	1.02	18	0.024	23
Texas	1.47	8	1.52	9	1.41	7	1.41	6	1.42	8	1.19	6	1.40	9	0.113	9
Virginia	0.73	28	0.66	28	0.70	28	0.70	28	0.71	28	0.73	28	0.71	28	0.026	22
Washington	2.63	2	2.68	1	2.41	2	2.19	2	2.28	2	1.85	1	2.34	2	0.307	6
Wisconsin	1.27	13	1.29	13	1.22	13	1.22	13	1.25	12	1.14	9	1.23	13	0.053	13
MEAN	1.39		1.42		1.29		1.25		1.29		1.11		1.29		0.133	

<sup>a</sup> IUR--Insured Unemployment Rate<sup>b</sup> AAW--Average Annual WageSources: U.S. Department of Labor, *UI Data Summary*, October 1998, and authors' calculations using UIMSM.

**Table 8. Marginal Tax Cost (MTC) of an Additional Benefit Dollar for Hypothetical Firms by State, 1998**

	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)	
Initial IUR <sup>a</sup>	1.15%		1.15%		1.15%		1.15%		2.30%		3.45%				Mean of		Experience	
IUR Spike	+1.15%		+3.45%		+3.45%		+3.45%		+2.30%		+4.60%		Standard		Marginal		Rating	
AAW <sup>b</sup>	\$28,000		\$16,000		\$28,000		\$40,000		\$16,000		\$40,000		Deviation		Tax Cost		Index 1997	
STATE	MTC(\$)	RANK	MTC (\$)	RANK	MTC (\$)	RANK	MTC (\$)	RANK	MTC (\$)	RANK	MTC (\$)	RANK	VALUE	RANK	VALUE	RANK	INDEX	RANK
Alabama	1.17	6	0.76	22	0.93	13	0.93	12	0.71	26	0.73	10	0.176	17	0.872	14	51	22
Arkansas	0.94	14	0.94	13	0.89	15	0.89	14	0.89	16	0.85	6	0.035	27	0.900	13	61	13
California	0.83	18	0.67	24	0.81	20	0.81	20	0.83	17	0.04	22	0.312	9	0.664	23	59	15
Connecticut	<b>1.31</b>	<b>2</b>	<b>1.37</b>	<b>2</b>	<b>1.33</b>	<b>2</b>	<b>1.33</b>	<b>1</b>	<b>1.53</b>	<b>2</b>	<b>0.48</b>	<b>16</b>	<b>0.374</b>	<b>6</b>	<b>1.225</b>	<b>2</b>	<b>66</b>	<b>6</b>
( w/o bond assessment)	<b>(.87)</b>	<b>(16)</b>	<b>-0.91</b>	<b>(13)</b>	<b>(.88)</b>	<b>(16)</b>	<b>(.88)</b>	<b>(16)</b>	<b>(1.02)</b>	<b>(12)</b>	<b>-0.32</b>	<b>(16)<sup>c</sup></b>	<b>-0.374</b>	<b>(6)</b>	<b>(.813)</b>	<b>(17)</b>	<b>-66</b>	<b>-6</b>
Florida	1.31	2	1.29	3	1.00	8	0.94	11	1.30	4	0.03	26	0.493	3	0.978	10	71	5
Georgia	0.69	25	0.69	23	0.59	27	0.49	27	0.74	24	0.27	17	0.176	17	0.577	27	67	6
Illinois	1.29	4	1.26	4	1.23	3	1.22	2	1.28	5	0.04	22	0.497	2	1.053	3	75	2
Indiana	0.58	27	0.78	21	0.56	28	0.44	28	0.75	22	0.04	22	0.269	11	0.525	28	60	14
Iowa	0.74	23	1.09	7	0.87	18	0.87	17	1.27	6	0.03	26	0.427	5	0.812	17	64	11
Kentucky	0.74	23	0.82	20	0.61	24	0.61	25	1.07	10	0.85	6	0.175	19	0.781	18	67	6
Maryland	1.07	8	1.13	6	1.09	5	1.09	5	1.14	8	0.62	13	0.199	15	1.022	6	n.a.	n.a.
Massachusetts	<b>0.46</b>	<b>28</b>	<b>0.25</b>	<b>28</b>	<b>0.61</b>	<b>24</b>	<b>0.81</b>	<b>20</b>	<b>0.79</b>	<b>20</b>	<b>0.60</b>	<b>14</b>	<b>0.210</b>	<b>14</b>	<b>0.587</b>	<b>25</b>	<b>55</b>	<b>18</b>
(with Schedule B)	<b>-0.82</b>	<b>(21)</b>	<b>-0.4</b>	<b>-28</b>	<b>-0.81</b>	<b>-20</b>	<b>-0.81</b>	<b>-20</b>	<b>-0.79</b>	<b>-20</b>	<b>-0.41</b>	<b>-16</b>	<b>-0.211</b>	<b>-14.000</b>	<b>(.672)</b>	<b>-23</b>	<b>-55</b>	<b>-18</b>
Michigan	0.98	12	1.06	8	0.95	12	0.92	13	1.06	11	0.69	11	0.137	20	0.944	11	n.a.	n.a.
Minnesota	0.96	13	1.05	9	0.99	10	1.07	6	0.80	19	1.05	2	0.101	23	0.986	9	74	3
Mississippi	0.99	11	0.89	15	0.89	15	0.89	14	0.93	14	0.64	12	0.120	22	0.871	15	42	24
Missouri	0.80	22	0.83	19	0.82	19	0.82	19	0.83	17	0.90	5	0.034	28	0.833	16	n.a.	n.a.
New Jersey	0.83	19	0.60	26	0.81	20	0.86	18	0.78	21	0.76	9	0.093	24	0.772	19	59	15
New York	0.89	16	0.44	27	0.88	17	0.80	22	0.74	24	0.03	26	0.336	8	0.630	24	85	1
North Carolina	1.03	9	0.90	14	1.06	6	1.04	7	1.08	9	0.99	3	0.065	25	1.016	7	44	23
Ohio	0.90	15	0.84	18	0.92	14	0.89	14	0.91	15	0.14	19	0.308	10	0.765	20	62	12
Oregon	0.81	21	0.85	17	0.63	23	0.64	24	0.40	28	0.14	19	0.268	12	0.578	26	54	20
Pennsylvania	1.00	10	1.02	11	0.97	11	0.97	10	1.02	13	0.52	15	0.196	16	0.917	12	55	18
South Carolina	0.86	17	0.95	12	0.79	22	0.79	23	0.75	22	0.21	18	0.262	13	0.724	21	57	17
Tennessee	0.83	18	0.87	16	1.03	7	1.03	8	1.71	1	0.78	8	0.344	7	1.041	4	65	9
Texas	1.20	5	1.15	5	1.17	4	1.17	4	1.19	7	0.04	22	0.464	4	0.986	8	53	21
Virginia	0.64	26	0.64	25	0.60	26	0.60	26	0.66	27	0.94	4	0.129	21	0.681	22	74	3
Washington	2.18	1	1.69	1	1.46	1	1.22	2	1.32	3	0.05	21	0.710	1	1.320	1	d	d
Wisconsin	1.08	7	1.05	9	1.00	8	0.98	9	1.06	11	1.06	1	0.039	26	1.039	5	65	9
Mean	0.97		0.92		0.91		0.90		0.98		0.48		0.25		0.86		61.88	

n.a.--not available.

Note: All rankings assume that Massachusetts uses schedule C unless otherwise noted.

<sup>a</sup> IUR--Insured Unemployment Rate.<sup>b</sup> AAW--Average Annual Wage.<sup>c</sup> CT ranks 17 if MA uses schedule B.<sup>d</sup> Washington data from 1991 to 1997 are under review.

Sources: U.S. Department of Labor, unpublished data, and authors' calculations using UIMSM.

## APPENDIX

### SIMULATING THE EFFECTS OF STATE NEW-EMPLOYER UI TAX RATES

Most states assign a special “new-employer” UI tax rate to firms during the first few years of their operation. These rates are usually the same for all employers in the state, although some states assign a different new-employer rate to construction firms. New firms are assigned a fixed rate because they have no employment history from which UI officials can evaluate their propensity to lay off workers and, therefore, determine an experience-based tax rate. The results reported in the body of this paper do not account for these new-employer tax rates. It is assumed in the UIMSM that at the beginning of the 30-year simulation period, each hypothetical employer is a mature firm; that is, it has already been in operation for several years. Ten years elapse between the simulation commencement and the imposition of an exogenous macroeconomic shock that induces an increase in the firm’s furlough of workers.

In reality, many firms have operated for less than ten years and properly should be modeled as new establishments. In order to simulate the impact of a particular state’s UI system on such employers, one must stipulate the year in which each firm began operations and modify the model to reflect the UI tax provisions assigned uniquely to new employers. Simulation results could be sensitive to the assumption concerning whether the firm is either mature or a new employer. This appendix reports on efforts to test this sensitivity.

#### **UIMSM’s Rules for Assigning UI Tax Rates in the Pre-Shock Period**

The UIMSM assigns a UI tax rate in the pre-shock period based on the state statutes for experience rating. Among the 28 states in our sample, 9 employ the benefit ratio approach, 14 the reserve ratio approach, 2 (Michigan and Pennsylvania) a hybrid method that combines reserve and benefit ratio approaches, and 3 (Iowa, Oregon, and Washington) use a reserve ratio ranking approach.

As explained in Tannenwald, O’Leary, and Huang (1999), the three reserve ratio ranking states use an approach whereby an employer’s reserve ratio *relative* to those of other employers determines its tax rate. For the simulations reported in the text, we assume for these three states that the economic shock forcing each firm to increase its propensity to lay off workers is unique to the firm, so that the overall distribution of reserve ratios among firms in the state is unchanged. Under this assumption, one can calculate how the shock affects the firm’s relative reserve ratio and, therefore, its UI tax rate. Alternatively, one could embrace the equally plausible assumption that the economic shock affects the reserve ratio of all employers proportionally, leaving relative reserve ratios, and therefore tax rates, unchanged. Given the impossibility of choosing objectively between these two alternatives, we elected to exclude these three states and focus our simulation exercises in this appendix on the other 25 states.

In UIMSM, the initial reserve ratio for each firm in a reserve ratio state depends on the ratio of benefits charged to the total taxable wage base:

$$RR = f(BC/TTWB)$$

where RR is the firm's reserve ratio, BC is its cumulative benefit charges, TTWB is the firm's total taxable wage base, and  $f(\cdot)$  summarizes the UI provisions of each state. An initial UI tax rate (OrigTR) is then determined by this generated RR and the state's UI tax rate schedule. Implicitly, we assume that at the beginning of the simulation period each firm has experienced a fixed insured unemployment rate (IUR) in several previous years. A similar procedure is used for setting initial employer UI tax rates in benefit ratio states.

For new, (as opposed to mature) employers, we assume that the employer initially opens its doors for business at the beginning of the simulation period. We assume that the new-employer tax rate assigned (AssigTR) by each state to businesses in the first few years of their operation apply (Table A.1).

### **Differences in Simulated Marginal Tax Costs of an Additional Benefit Dollar**

The marginal tax cost MTC is the incremental cost of an added dollar of benefits paid. For any year in the simulation it is computed as

$$MTC = \Delta T / \Delta B = (T_s - T_c) / (B_s - B_c)$$

where the T represents taxes, B represents UI benefits, and the subscripts s and c refer to values for the spike and control runs respectively. The simulation sums the present value of this ratio over 30 years. The numerator of this computation is illustrated in Figure 5 in the body of this paper. Which is a bar chart of tax contributions. In this figure, the control and spike tax levels are constant and equal before the spike in the insured unemployment rate (IUR), which occurs in period eleven. That is, a steady state in tax contributions was achieved before the IUR spike was simulated.

Changing the tax rate initialization to the state new-employer rate will raise or lower both the control and spike bars in Figure 5 equally to the new-employer rate for the first one to three years of the simulation, depending on state law. From the formula, it is easy to see that these first years of the simulation add nothing to the MTC. In the subsequent years before a spike in the IUR is simulated, the control and spike tax contributions will remain equal and move in tandem; however, they may not remain constant. The effect on MTC of changing the initial rate from OrigTR to AssigTR depends on how tax contributions during these first ten years of the simulation affect achievement of a steady-state UI tax rate before a spike of IUR is simulated in period eleven. If the tax rate in period eleven when the simulation starts at AssigTR differs from the tax rate in period eleven when starting at OrigTR, then the simulated MTC is likely to be

different. Given the complexity of the tax systems, the magnitude and direction of the difference is difficult to properly predict.

In benefit ratio states, switching to the new employer rate for initialization of the model may change the present value of a firm's total tax contribution, because it may change the tax rate in the first one, two, or three years. However, it will not change the MTC of an IUR spike which occurs in period eleven. This is because the UI tax rate in benefit ratio states depends only on benefit charges, which for any simulation are the same for both mature and new firms in any benefit ratio state. Therefore, employers will be at the same tax rate by period eleven in benefit ratio states whether initialized as either new or mature firms. Since changing the initialization does not affect the MTC in benefit ratio states, we exclude these states when reporting the comparative MTCs in Table A.2.

The results under the column heading MTC<sub>m</sub> in Table A.2 are the same as those reported in the body of the paper which assume initialization for a mature firm. Results under the heading MTC<sub>n</sub> are from simulations with the tax rate initialized at the state new-employer rate. In comparing the MTC estimates from the alternate initializations, it is difficult to generalize about how a change from OrigTR to AssignTR affects the MTC. For most of the 14 reserve ratio states, the MTC estimates barely change, but for Ohio, Massachusetts, and Wisconsin, the effect on MTC is sizeable for all hypothetical firm types.

In some cases, when AssignTR > OrigTR, MTC<sub>n</sub> > MTC<sub>m</sub> (e.g., in Massachusetts for hypothetical firm types 4, 5, and 6); but in other cases, when AssignTR > OrigTR, MTC<sub>n</sub> < MTC<sub>m</sub> (e.g., in Ohio for hypothetical firms 1 through 5). The first pattern, which is observed in Massachusetts, seems reasonable, but what might explain why MTC<sub>n</sub> is much lower than MTC<sub>m</sub> in some cases when AssignTR > OrigTR? According to the reserve ratio approach, a firm's reserve ratio RR equals:

$$(TAX - BC) / TTWB$$

where, TAX equals cumulative UI tax payments. Since by assumption BC is the same in all years for both new and mature firms, differences between MTC<sub>n</sub> and MTC<sub>m</sub> for reserve ratio states are attributable solely to the differences in UI tax payments.

If AssignTR < OrigTR, then the new company usually pays less UI tax in the pre-shock period; that is, TAX<sub>n</sub> (UI tax on new firms) < TAX<sub>m</sub> (UI tax on mature firms). Thus, the same change in BC will cause a bigger change in RR, which induces a bigger change in the UI tax rate for new companies. As a consequence, new companies end up paying more tax for the same IUR shock, even though their initial UI tax rates are lower. If AssignTR > OrigTR, the new company often pays more UI tax in the pre-shock period, which means TAX<sub>n</sub> > TAX<sub>m</sub>. So, the amount of additional tax that new companies need to pay as a result of the shock is less.

However, the results also depend on the width of the tax rate schedule employed by each state. When  $\text{AssigTR} < \text{OrigTR}$ , sometimes the firm's experience rating account (ERA) balance declines, even before a spike is simulated in year 11, to the point where sometimes the new firm faces a higher tax rate than  $\text{OrigTR}$ . As a result, when the same amount of change in BC occurs, the new company pays almost the same or even more taxes for a given IUR shock than the mature firm. On the other hand, when  $\text{AssigTR} > \text{OrigTR}$ , if the  $\text{AssigTR}$  raises the ERA enough to push the firm into a lower tax rate bracket, the amount of tax that new companies pay for the same IUR shock will be higher. This partly explains the mixed results for new firms.

### **Additional Differences in Results between New and Mature firms**

As shown in Tables A.3 and A.4, if a state's  $\text{AssigTR} > \text{OrigTR}$ , then the present value of a new firm's total tax payment generally exceeds the value of a mature firm's total tax payment. Exceptions are Massachusetts, Michigan and Ohio. With the same exceptions, there is also a direct relationship between the change in the initial tax rate and the change in the ratio of taxes to benefit charges.



**Table A.1 Assigned Tax Rate for New Companies by State, 1998**

<b>State</b>	<b>Type of Experience Rating</b>	<b>Assigned Tax Rate</b>	<b>Duration (year)</b>
Alabama	BR	2.70%	1
Arkansas	RR	0.00%	1
California	RR	3.40%	1
Connecticut	BR	1.00%	1
Florida	BR	2.00%	1
Georgia	RR	2.70%	1
Illinois	BR	3.10%	1
Indiana	RR	2.70%	3
Kentucky	RR	9.00%	3
Maryland	BR	2.30%	1
Massachusetts	RR	2.60%	1
Michigan	BR	2.7% *	4
Minnesota	BR	1.00%	5
Mississippi	BR	2.70%	1
Missouri	RR	3.24%	1
New Jersey	RR	0.50%	1
New York	RR	3.70%	1
North Carolina	RR	1.20%	1
Ohio	RR	2.70%	1
Pennsylvania	BR	3.50%	1
South Carolina	RR	2.64%	1
Tennessee	RR	2.70%	1
Texas	BR	2.70%	1.5
Virginia	BR	2.50%	1
Wisconsin	RR	2.70% **	3

\* The initial tax rate is 2.7% for first two years, then the benefit ratio component phases in during the next two years according to the formula.

Third year: tax rate =  $1/3 * \text{CBC} + 1.8\%$

Fourth year: tax rate =  $2/3 * \text{CBC} + 1.0\%$

\*\*There is a solvency charge of 0.9% for the first three years as well.

Sources: Commerce Clearing House (1998).

**Table A.2 Present Value of Marginal Tax Cost (MTC) of an Additional Benefit Dollar Hypothetical "New" Firms vs. "Mature" Firms by Reserve Ratio State**

Initial IUR <sup>a</sup> IUR Spike AAW <sup>b</sup>		(1) 1.15% +1.15% \$28,000			(2) 1.15% +3.45% \$16,000			(3) 1.15% +3.45% \$28,000		
		OrigTRd	MTCn <sup>c</sup> (\$)	MTCm <sup>f</sup> (\$)	OrigTRd	MTCn <sup>c</sup> (\$)	MTCm <sup>f</sup> (\$)	OrigTRd	MTCn <sup>c</sup> (\$)	MTCm <sup>f</sup> (\$)
State	AssigTRc	OrigTRd	MTCn <sup>c</sup> (\$)	MTCm <sup>f</sup> (\$)	OrigTRd	MTCn <sup>c</sup> (\$)	MTCm <sup>f</sup> (\$)	OrigTRd	MTCn <sup>c</sup> (\$)	MTCm <sup>f</sup> (\$)
Arkansas	0.00%	1.60%	0.94	0.92	1.20%	0.91	0.91	1.60%	0.93	0.92
California	3.40%	2.10%	0.84	0.82	1.00%	0.74	0.64	2.10%	0.82	0.81
Georgia	2.70%	1.61%	0.48	0.71	1.16%	0.72	0.67	1.61%	0.42	0.59
Indiana	2.70%	2.00%	0.54	0.72	1.60%	0.76	0.79	2.00%	0.66	0.62
Kentucky	9.00%	2.00%	0.82	0.78	1.50%	0.84	0.83	2.00%	0.67	0.63
Massachusetts	2.60%	1.70%	0.18	0.30	1.40%	0.02	0.29	1.70%	0.50	0.29
Missouri	3.24%	1.44%	0.82	0.82	1.32%	0.83	0.83	1.44%	0.82	0.81
New Jersey	0.50%	1.10%	0.85	0.75	0.80%	0.52	0.59	1.10%	0.84	0.82
New York	3.70%	2.20%	0.91	0.89	2.00%	0.03	0.03	2.20%	0.88	0.88
North Carolina	1.20%	1.30%	0.97	1.07	0.70%	0.90	0.86	1.30%	1.03	1.07
Ohio	2.70%	1.60%	0.92	0.01	0.90%	0.85	0.04	1.60%	0.92	0.12
South Carolina	2.64%	1.94%	0.93	0.83	1.24%	0.82	0.86	1.94%	0.86	0.83
Tennessee	2.70%	2.05%	0.83	0.68	1.45%	0.86	0.87	2.05%	1.03	1.03
Wisconsin	2.70%	1.78%	0.53	1.15	0.95%	0.52	1.05	1.85%	0.54	1.02
Initial IUR <sup>a</sup> IUR Spike AAW <sup>b</sup>		(4) 1.15% +3.45% \$40,000			(5) 2.30% +2.30% \$16,000			(6) 3.45% +4.60% \$40,000		
		OrigTRd	MTCn <sup>c</sup> (\$)	MTCm <sup>f</sup> (\$)	OrigTRd	MTCn <sup>c</sup> (\$)	MTCm <sup>f</sup> (\$)	OrigTRd	MTCn <sup>c</sup> (\$)	MTCm <sup>f</sup> (\$)
State	AssigTRc	OrigTRd	MTCn <sup>c</sup> (\$)	MTCm <sup>f</sup> (\$)	OrigTRd	MTCn <sup>c</sup> (\$)	MTCm <sup>f</sup> (\$)	OrigTRd	MTCn <sup>c</sup> (\$)	MTCm <sup>f</sup> (\$)
Arkansas	0.00%	1.60%	0.93	0.92	2.40%	0.89	0.96	5.00%	0.92	0.86
California	3.40%	1.70%	0.80	0.81	1.90%	0.82	0.84	5.40%	0.08	0.04
Georgia	2.70%	1.61%	0.33	0.49	2.18%	0.58	0.73	4.34%	0.38	0.25
Indiana	2.70%	2.00%	0.63	0.50	4.10%	1.07	0.74	5.40%	0.13	0.04
Kentucky	9.00%	2.00%	0.67	0.63	6.50%	0.44	1.09	6.50%	0.88	0.86
Massachusetts	2.60%	2.30%	0.81	0.26	2.00%	0.80	0.29	6.50%	0.70	0.11
Missouri	3.24%	1.44%	0.82	0.81	2.52%	0.82	0.84	4.32%	0.87	0.91
New Jersey	0.50%	1.30%	0.83	0.87	1.60%	0.87	0.83	4.30%	0.85	0.85
New York	3.70%	2.60%	0.86	0.86	2.80%	0.91	0.91	6.40%	0.03	0.03
North Carolina	1.20%	1.50%	1.05	1.04	1.50%	1.00	1.08	4.10%	1.00	1.01
Ohio	2.70%	1.80%	0.94	0.11	1.80%	0.88	0.03	5.30%	0.15	0.27
South Carolina	2.64%	1.94%	0.86	0.83	2.64%	0.73	0.77	5.09%	0.56	0.12
Tennessee	2.70%	2.05%	1.03	1.03	2.45%	1.59	1.59	5.50%	0.81	0.75
Wisconsin	2.70%	1.85%	0.52	1.00	1.85%	0.57	1.01	5.70%	0.55	0.86

<sup>a</sup>IUR---Insured Unemployment Rate.

<sup>b</sup>AAW---Average Annual Wage.

<sup>c</sup>AssigTR---Assigned Tax Rate for "new" firms.

<sup>d</sup>OrigTR---Original Initial Tax Rate for "mature" firms.

<sup>e</sup>MTCn --- MTC for "new" firm

<sup>f</sup>MTCm --- MTC for "mature" firm

Source: Authors' Calculation.

**Table A3. Present Value of Total UI Tax Payment (TAX), Hypothetical "New Firms vs. "Mature" Firms by State**

Initial IUR <sup>a</sup> IUR Spike AAW <sup>b</sup>		(1)			(2)			(3)		
		1.15%			1.15%			1.15%		
		+1.15%			+3.45%			+3.45%		
		\$28,000			\$16,000			\$28,000		
State	AssigTR <sup>c</sup>	OrigTR <sup>d</sup>	TAXn <sup>e</sup> (\$)	TAXm <sup>f</sup> (\$)	OrigTR <sup>d</sup>	TAXn <sup>e</sup> (\$)	TAXm <sup>f</sup> (\$)	OrigTR <sup>d</sup>	TAXn <sup>e</sup> (\$)	TAXm <sup>f</sup> (\$)
Alabama	2.70%	1.24%	375,477	361,526	1.24%	384,506	370,560	1.24%	393,264.2	79,313
Arkansas	0.00%	1.60%	396,021	20,487	1.20%	329,627	349,791	1.60%	417,445.3	441,873
California	3.40%	2.10%	492,341	426,129	1.00%	43,617	217,705	2.10%	516,502.2	450,467
Connecticut	1.00%	1.30%	1,208,695	1,218,402	0.80%	976,858	970,419	1.30%	1,252,295.6	1,262,003
Florida	2.00%	2.13%	571,655	596,388	1.21%	372,325	367,828	2.13%	596,662.3	621,395
Georgia	2.70%	1.61%	500,913	357,575	1.16%	423,364	280,097	1.61%	511,165.3	371,188
Illinois	3.10%	2.60%	741,292	739,811	1.50%	508,766	91,023	2.60%	782,375.3	780,895
Indiana	2.70%	2.00%	440,218	365,462	1.60%	369,812	291,730	2.00%	459,201.7	380,219
Kentucky	9.00%	2.00%	693,403	414,566	1.50%	629,887	27,131	2.00%	10,843.6	431,000
Maryland	2.30%	2.50%	575,914	580,043	1.80%	450,784	440,472	2.50%	607,618.5	611,747
Massachusetts	2.60%	1.70%	830,364	976,186	1.40%	806,832	891,994	1.70%	853,795.2	985,977
Michigan	2.70%	1.80%	469,007	674,670	1.17%	326,062	525,152	1.80%	500,385.3	699,998
Minnesota	1.00%	1.10%	594,484	607,320	0.70%	440,600	405,112	1.10%	624,314.3	637,150
Mississippi	2.70%	1.40%	320,221	307,553	1.40%	298,156	283,185	1.10%	336,845.2	324,177
Missouri	3.24%	1.44%	459,316	331,760	1.32%	45,083	307,705	1.44%	8,798.4	350,771
New Jersey	0.50%	1.10%	422,541	561,942	0.80%	277,679	329,560	1.10%	455,335.1	595,586
New York	3.70%	2.20%	649,235	97,351	2.00%	95,413	58,496	2.20%	675,050.0	623,369
North Carolina	1.20%	1.30%	497,633	498,375	0.70%	348,669	299,817	1.30%	529,482.3	530,358
Ohio	2.70%	1.60%	435,535	487,089	0.90%	306,711	336,718	1.60%	462,838.4	92,310
Pennsylvania	3.50%	3.40%	736,773	735,457	2.60%	586,247	574,406	3.40%	763,364.8	762,049
South Carolina	2.64%	1.94%	391,257	365,382	1.24%	307,299	263,747	1.94%	412,161.8	386,312
Tennessee	2.70%	2.05%	423,676	390,994	1.45%	321,790	250,558	2.05%	455,672.8	425,154
Texas	2.70%	2.40%	62,367	657,925	1.40%	450,064	430,843	2.40%	699,748.2	695,306
Virginia	2.50%	1.20%	80,525	263,415	0.75%	199,299	176,275	1.20%	295,917.9	278,808
Wisconsin	2.70%	1.78%	857,042	569,657	0.95%	707,521	362,216	1.85%	874,586.8	600,434

Table A3. (continued)

Initial IUR <sup>a</sup> IUR Spike AAW <sup>b</sup>		(4)			(5)			(6)		
		1.15%			2.30%			3.45%		
		+3.45%			+2.30%			+4.60%		
		\$40,000			\$16,000			\$40,000		
State	AssigTR <sup>c</sup>	OrigTR <sup>d</sup>	TAXn <sup>e</sup> (\$)	TAXm <sup>f</sup> (\$)	OrigTR <sup>d</sup>	TAXn <sup>e</sup> (\$)	TAXm <sup>f</sup> (\$)	OrigTR <sup>d</sup>	TAXn <sup>e</sup> (\$)	TAXm <sup>f</sup> (\$)
Alabama	2.70%	1.24%	393,264.2	379,313	2.44%	620,752	622,611	4.14%	991,682	1,016,379
Arkansas	0.00%	1.60%	417,445.3	441,873	2.40%	535,625	575,062	5.00%	960,960	1,074,346
California	3.40%	1.70%	467,911.9	385,455	1.90%	470,777	394,102	5.40%	886,964	1,025,547
Connecticut	1.00%	1.70%	1,469,715.5	1,492,367	1.50%	1,311,349	1,327,493	4.90%	3,051,093	3,179,793
Florida	2.00%	2.18%	611,105.0	638,086	2.42%	645,103	679,163	5.40%	947,587	1,025,547
Georgia	2.70%	1.61%	527,057.7	367,228	2.18%	560,570	517,855	4.34%	754,306	1,035,474
Illinois	3.10%	2.70%	804,830.2	804,830	3.00%	838,937	843,411	6.40%	1,604,540	1,660,409
Indiana	2.70%	2.00%	481,066.5	378,653	4.10%	576,810	583,164	5.40%	766,495	1,025,547
Kentucky	9.00%	2.00%	710,843.6	431,000	6.50%	841,906	640,294	6.50%	1,360,773	1,235,632
Maryland	2.30%	2.50%	607,618.5	611,747	3.30%	753,125	773,934	6.60%	1,465,388	1,555,911
Massachusetts	2.60%	2.30%	993,881.5	1,142,227	2.00%	897,183	1,067,629	6.50%	1,961,962	2,224,689
Michigan	2.70%	1.89%	525,257.1	725,653	2.16%	567,343	773,444	5.04%	1,343,990	1,538,704
Minnesota	1.00%	1.30%	706,297.2	744,888	1.40%	637,427	684,672	3.90%	1,607,708	1,988,144
Mississippi	2.70%	1.10%	336,845.2	324,177	2.40%	504,981	503,818	3.90%	839,952	859,917
Missouri	3.24%	1.44%	478,798.4	350,771	2.52%	651,010	578,823	4.32%	983,017	93,854
New Jersey	0.50%	1.30%	512,370.7	674,557	1.60%	470,834	630,269	4.30%	1,426,945	1,939,815
New York	3.70%	2.60%	717,994.6	678,401	2.80%	706,632	669,315	6.40%	1,172,382	1,227,207
North Carolina	1.20%	1.50%	618,284.1	632,300	1.50%	556,227	569,383	4.10%	1,525,085	1,766,983
Ohio	2.70%	1.80%	500,859.8	530,721	1.80%	489,315	545,354	5.30%	958,411	1,318,827
Pennsylvania	3.50%	4.10%	917,406.2	925,303	3.70%	805,860	808,516	5.80%	1,612,254	1,663,084
South Carolina	2.64%	1.94%	412,161.8	386,312	2.64%	490,250	483,603	5.09%	742,486	1,010,307
Tennessee	2.70%	2.05%	455,672.8	425,154	2.45%	491,212	486,920	5.50%	1,119,513	1,163,968
Texas	2.70%	2.40%	699,748.2	695,306	2.70%	736,813	736,813	6.00%	1,481,166	1,530,995
Virginia	2.50%	1.20%	295,917.9	278,808	1.57%	360,585	348,233	3.52%	799,075	812,765
Wisconsin	2.70%	1.85%	890,063.1	620,467	1.85%	916,900	643,558	5.70%	1,569,961	1,581,526

<sup>a</sup>IUR–Insured Unemployment Rate.<sup>b</sup>AAW–Average Annual Wage.<sup>c</sup>AssigTR–Assigned Tax Rate for “new” firms.<sup>d</sup>OrigTR–Original Initial Tax Rate for “mature” firms.<sup>e</sup>TAXn – TAX for “new” firms.

Source: Author’s calculations.

**Table A4. Ratio of Present Value of UI Taxes Paid to Present Value of UI Benefits Received  
Hypothetical "New" Firms vs. "Mature" Firms by State**

Initial IUR <sup>a</sup> IUR Spike AAW <sup>b</sup>		(1) 1.15% +1.15% \$28,000			(2) 1.15% +3.45% \$16,000			(3) 1.15% +3.45% \$28,000		
State	AssigTR <sup>c</sup>	OrigTR <sup>d</sup>	RATIO <sup>e</sup>	RATIO <sup>m</sup> <sup>f</sup>	OrigTR <sup>d</sup>	RATIO <sup>e</sup>	RATIO <sup>m</sup> <sup>f</sup>	OrigTR <sup>d</sup>	RATIO <sup>e</sup>	RATIO <sup>m</sup> <sup>f</sup>
Alabama	2.70%	1.24%	1.23	1.18	1.24%	1.33	1.29	1.24%	1.20	1.16
Arkansas	0.00%	1.60%	1.24	1.32	1.20%	1.31	1.39	1.60%	1.22	1.29
California	3.40%	2.10%	1.19	1.03	1.00%	1.69	1.07	2.10%	1.16	1.01
Connecticut	1.00%	1.30%	2.68	2.70	0.80%	3.45	3.43	1.30%	2.59	2.61
Florida	2.00%	2.13%	1.39	1.45	1.21%	1.48	1.47	2.13%	1.35	1.41
Georgia	2.70%	1.61%	1.39	0.99	1.16%	1.48	0.98	1.61%	1.32	0.96
Illinois	3.10%	2.60%	1.56	1.56	1.50%	1.75	1.69	2.60%	1.54	1.54
Indiana	2.70%	2.00%	1.22	1.01	1.60%	1.25	0.99	2.00%	1.19	0.98
Kentucky	9.00%	2.00%	1.68	1.01	1.50%	1.92	1.00	2.00%	1.61	0.98
Maryland	2.30%	2.50%	1.43	1.44	1.80%	1.49	1.46	2.50%	1.41	1.42
Massachusetts	2.60%	1.70%	1.72	2.03	1.40%	2.58	2.85	1.70%	1.65	1.91
Michigan	2.70%	1.80%	1.02	1.47	1.17%	1.09	1.75	1.80%	1.02	1.43
Minnesota	1.00%	1.10%	1.44	1.47	0.70%	1.74	1.60	1.10%	1.41	1.44
Mississippi	2.70%	1.40%	1.16	1.12	1.40%	1.19	1.13	1.10%	1.14	1.10
Missouri	3.24%	1.44%	1.39	1.01	1.32%	1.43	0.99	1.44%	1.35	0.99
New Jersey	0.50%	1.10%	0.77	1.03	0.80%	0.83	0.98	1.10%	0.78	1.01
New York	3.70%	2.20%	1.58	1.45	2.00%	2.36	2.21	2.20%	1.53	1.41
North Carolina	1.20%	1.30%	1.21	1.21	0.70%	1.39	1.20	1.30%	1.20	1.20
Ohio	2.70%	1.60%	1.06	1.19	0.90%	1.22	1.34	1.60%	1.05	1.12
Pennsylvania	3.50%	3.40%	1.78	1.78	2.60%	2.28	2.23	3.40%	1.72	1.71
South Carolina	2.64%	1.94%	1.12	1.04	1.24%	1.22	1.05	1.94%	1.10	1.03
Tennessee	2.70%	2.05%	1.09	1.00	1.45%	1.28	1.00	2.05%	1.09	1.02
Texas	2.70%	2.40%	1.47	1.46	1.40%	1.63	1.56	2.40%	1.45	1.44
Virginia	2.50%	1.20%	0.77	0.72	0.75%	0.76	0.67	1.20%	0.76	0.72
Wisconsin	2.70%	1.78%	1.90	1.26	0.95%	2.56	1.31	1.85%	1.81	1.24

Table A4. (continued)

Initial IUR <sup>a</sup> Spike AAW <sup>b</sup>		(4) 1.15% +3.45% \$40,000			(5) 2.30% +2.30% \$16,000			(6) 3.45% +4.60% \$40,000		
State	AssigTR <sup>c</sup>	OrigTR <sup>d</sup>	RATIO <sup>e</sup>	RATIO <sup>f</sup>	OrigTR	RATIO <sup>e</sup>	RATIO <sup>f</sup>	OrigTR <sup>d</sup>	RATIO <sup>e</sup>	RATIO <sup>f</sup>
Alabama	2.70%	1.24%	1.20	1.16	2.44%	1.16	1.16	4.14%	1.08	1.11
Arkansas	0.00%	1.60%	1.22	1.29	2.40%	1.14	1.22	5.00%	0.99	1.11
California	3.40%	1.70%	1.24	1.02	1.90%	1.23	1.03	5.40%	0.83	0.96
Connecticut	1.00%	1.70%	2.29	2.32	1.50%	2.48	2.52	4.90%	1.70	1.77
Florida	2.00%	2.18%	1.36	1.42	2.42%	1.37	1.44	5.40%	0.74	0.80
Georgia	2.70%	1.61%	1.36	0.95	2.18%	1.05	0.97	4.34%	0.70	0.96
Illinois	3.10%	2.70%	1.57	1.57	3.00%	1.53	1.54	6.40%	1.11	1.15
Indiana	2.70%	2.00%	1.24	0.98	4.10%	1.04	1.05	5.40%	0.70	0.94
Kentucky	9.00%	2.00%	1.61	0.98	6.50%	1.38	1.05	6.50%	1.10	1.00
Maryland	2.30%	2.50%	1.41	1.42	3.30%	1.34	1.37	6.60%	1.21	1.29
Massachusetts	2.60%	2.30%	1.39	1.60	2.00%	1.53	1.82	6.50%	0.97	1.10
Michigan	2.70%	1.89%	1.01	1.40	2.16%	1.02	1.39	5.04%	0.93	1.06
Minnesota	1.00%	1.30%	1.30	1.37	1.40%	1.34	1.44	3.90%	1.04	1.29
Mississippi	2.70%	1.10%	1.14	1.10	2.40%	1.07	1.07	3.90%	1.01	1.03
Missouri	3.24%	1.44%	1.35	0.99	2.52%	1.12	1.00	4.32%	0.99	1.00
New Jersey	0.50%	1.30%	0.76	1.00	1.60%	0.75	1.01	4.30%	0.76	1.03
New York	3.70%	2.60%	1.46	1.38	2.80%	1.49	1.41	6.40%	0.84	0.88
North Carolina	1.20%	1.50%	1.17	1.20	1.50%	1.18	1.21	4.10%	1.02	1.18
Ohio	2.70%	1.80%	1.04	1.10	1.80%	1.04	1.16	5.30%	0.70	0.97
Pennsylvania	3.50%	4.10%	1.48	1.49	3.70%	1.67	1.67	5.80%	0.92	0.95
South Carolina	2.64%	1.94%	1.10	1.03	2.64%	1.04	1.03	5.09%	0.70	0.95
Tennessee	2.70%	2.05%	1.09	1.02	2.45%	1.04	1.03	5.50%	0.95	0.98
Texas	2.70%	2.40%	1.45	1.44	2.70%	1.43	1.43	6.00%	1.09	1.13
Virginia	2.50%	1.20%	0.76	0.72	1.57%	0.73	0.71	3.52%	0.73	0.74
Wisconsin	2.70%	1.85%	1.78	1.24	1.85%	1.78	1.25	5.70%	1.12	1.13

<sup>a</sup> IUR–Insured Unemployment Rate.<sup>b</sup> AAW–Average Annual Wage.<sup>c</sup> AssigTR–Assigned Tax Rate for “new” firms.<sup>d</sup> OrigTR–Original Initial Tax Rate for “mature” firms.<sup>e</sup> RATIO<sup>e</sup>–RATIO for “new” firms.<sup>f</sup> RATIO<sup>f</sup>–RATIO for “mature” firms.

Source: Authors’ Calculation.

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