Essays on Interstate Competition in the-Unemployment Insurance System

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INTRODUCTION

This volume of the Occasional Paper series presents two studies of interstate competition in the Unemployment Insurance (UI) system.

Determining the extent of economic competition among states is an extremely difficult undertaking. The papers in this volume attempt to shed light on this topic and quantify the effects of some aspects of competitive behavior. In particular, both studies attempt to measure the degree to which geographically adjacent states influence the UI tax rates of their neighbors.

Using yearly UI state administrative data, Laurie Bassi and Dan McMurrer construct an economic model to explain the change in state UI tax rates and how much interstate competition might be affecting those rates. In the second paper, Wayne Vroman provides a critique of the Bassi-McMurrer methodology and then constructs a different model to measure competitive effects on UI tax rates. Vroman also offers an analysis of interstate competition in the Workers' Compensation Program.

A set of closing comments provides an opportunity for Bassi and McMurrer to reply to the critique in Vroman's work.

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UNEMPLOYMENT INSURANCE IN A FEDERAL SYSTEM: A RACE TO THE BOTTOM?

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ABSTRACT

The structure of the federal-state Unemployment Insurance (UI) system in the United States creates incentives for states to reduce UI tax rates levied on businesses in an effort to develop or maintain a competitive economic advantage in relation to other states-particularly nearby states that may compete to attract or retain businesses. The existence of such incentives creates the potential for a damaging "race to the bottom" in the setting of state tax rates over time. Using a panel state database, we test whether there is empirical evidence of such competitive behavior by states in setting UI tax rates. We find that there is indeed evidence that the level of states' UI tax rates is responsive to the level of previous year's tax rates in other states. In particular, an observed state's tax rate is more likely to be reduced when other states' rates are lower than the rate in the observed state. Further, tax rates are more responsive to rates in contiguous states than to rates in states that are not in geographical proximity, and are more responsive to the largest contiguous state than to any other. Finally, results suggest that the intensity of tax competition in the UI program has increased over time. It is likely that competition of this sort has contributed significantly to the slow decline over time in the percentage of the unemployed who receive UI benefits.

Introduction

The nation's system of publicly-provided Unemployment Insurance (UI), a federal-state program created by the Social Security Act of 1935, serves two primary economic functions. First, it provides workers with insurance against the risk of involuntary unemployment. Second, by maintaining the purchasing power of the unemployed, the system serves as an automatic economic stabilizer during economic downturns. [1] The system's capacity to achieve both of these functions is, in large part, a function of the percentage of the unemployed who actually receive unemployment insurance benefits.

Considerable effort has been devoted to analyzing a variety of incentives that the system creates both for workers and firms. [2] Less attention, however, has been devoted to analyzing the long-term decline in the percentage of the unemployed who actually receive unemployment insurance benefits in the United States. During the 194Os, almost 50 percent of the unemployed received UI benefits. By the 198Os, however, fewer than 30 percent of the unemployed were receiving benefits. This decline has reduced the UI system's capacity to provide insurance and to serve as an automatic stabilizer.

Although some research has been done on the decline in UI receipt among the unemployed during the early 1980s virtually no research has examined the longer-term decline in the system. [3] This paper explores this long-term decline by examining the hypothesis that states compete with one another to keep employer-financed UI payroll taxes low in an attempt to attract and retain employers, and that this dynamic has contributed to the decline in the system.

Unemployment Insurance in the United States: An Overview

Unemployment Insurance Financing

The tax provisions for financing the unemployment insurance system are contained in the Federal Unemployment Tax Act (FUTA). Under this law, a federal unemployment insurance tax (currently 6.2 percent of the first $7,000 earned by each employee) is imposed on employers, with a partial credit (currently 5.4 percent of the taxable wage base) provided to employers in those states that have a UI system that meets minimum federal standards. The employer credit is significant (currently $378 per worker earning at least~$7,000 per year), and it has ensured that all states have enacted and maintained UI systems that meet the minimum federal standards.

The federal standards that states must meet are quite general in scope. In order to qualify their employers for the FUTA tax credit, states must do the following: (1) levy a separate state tax that is used only to finance UI benefits, (2) impose this tax on a UI taxable wage base that is at least as high as the federal taxable wage base, and (3) have a maximum tax rate of at least 5.4 percent, which is adjusted for individual employers only on the basis of that employer's experience with unemployment (i.e., an "experience rated" tax). [4] Beyond these minimal requirements, states retain almost complete discretion in designing their UI systems.

Incentives AfSecting State Tax: Rates

Prior to the passage of the Social Security Act, only the state of Wisconsin had a UI program, and even that program operated on an extremely limited basis. Although other states were interested in creating UI programs, they chose not to do so, in large part because of

concerns that an employer-financed UI system would put their employers at a competitive disadvantage relative to states that did not have a UI system: "the perceived threat of competitive disadvantage [proved to be] an effective barrier to individual state action on unemployment insurance." (Blaustein, 1993, 128). The genius of the FUTA tax structure was that it reversed this situation, with the federal employer tax credit creating a situation in which employers in states that do *not* have a UI program are actually at a competitive disadvantage.

Nevertheless, within this framework, states can still gain a competitive advantage for their employers by only *minimally* satisfying federal standards (thereby qualifying for the FUTA tax credit) while still creating a system that keeps state employer taxes low. Because of the direct relationship between state taxes and benefits in the UI system, any effort to keep taxes low will, necessarily, have some effect on the benefit side of the system. This effect can take a number of different forms, including the restricting of eligibility for benefits, lower benefit levels for recipients, or lower potential durations of benefits. It is likely that concerns about the well-being of involuntarily unemployed workers deter states from reducing their UI program to the absolute minimum allowed by federal law. Competition among states, to attract and retain employers and jobs, however, may put states under considerable pressure to have smaller UI programs than they would have chosen in the absence of these competitive pressures. It is even possible that interstate competition could set off a "race to the bottom," as some states cut UI payroll taxes to gain a competitive edge, precipitating responses by other states, leading ultimately to another round of tax cutting.

Hoyt (1995) and Weaver (1995) have outlined economic and political science models that suggest the possibility of such interstate competition developing within the UI system. Weaver

(1995, 9) states that pernicious competition of this sort is most likely to develop in circumstances similar to those that prevail in the UI system, in which "deviation from the norm . . . places those states at a distinct competitive disadvantage vis-a-vis other states with regard to tax rates. " Based on a theoretical analysis, Hoyt (1995, 10) concludes that such dynamics would result in "inefficiently low levels of UI benefits. "

As an example of such an effect, the overall impact of external economic pressures on the Aid to Families with Dependent Children (AFDC) program has been described as "a powerful convergence factor that shapes policy outcomes. If a stateIs benefits are higher than those of its peers, pressures increase on policymakers to adjust their benefits downward" (Peterson and Rom 1990, 81). Oates (1972, 225) suggests that this tendency may increase over time: "Public officials are likely to become increasingly sensitive to tax competition among jurisdictions . . . inefficiencies associated with decentralized taxation may become magnified over time. "

The desire of states to avoid positions of competitive disadvantage is reflected in the debate about AFDC in Wisconsin during the 1980s. Peterson and Rom (1990, 33-35) note that public discussion in that state focused almost exclusively on its "business climate." Further, "in the debate over what the appropriate benefit levels should be, almost never did one hear moral questions concerning, for example, whether the poor 'deserve' welfare. Instead, the issues revolved around the consequences for Wisconsin's economic position. " Thus, competitive economic pressures can channel state policy making efforts in different directions than those that might be taken if interstate competition were not a factor.

It should also be noted that external economic pressures for lower state UI taxes have a direct effect even on states generally disposed toward simply *maintaining* benefit or eligibility

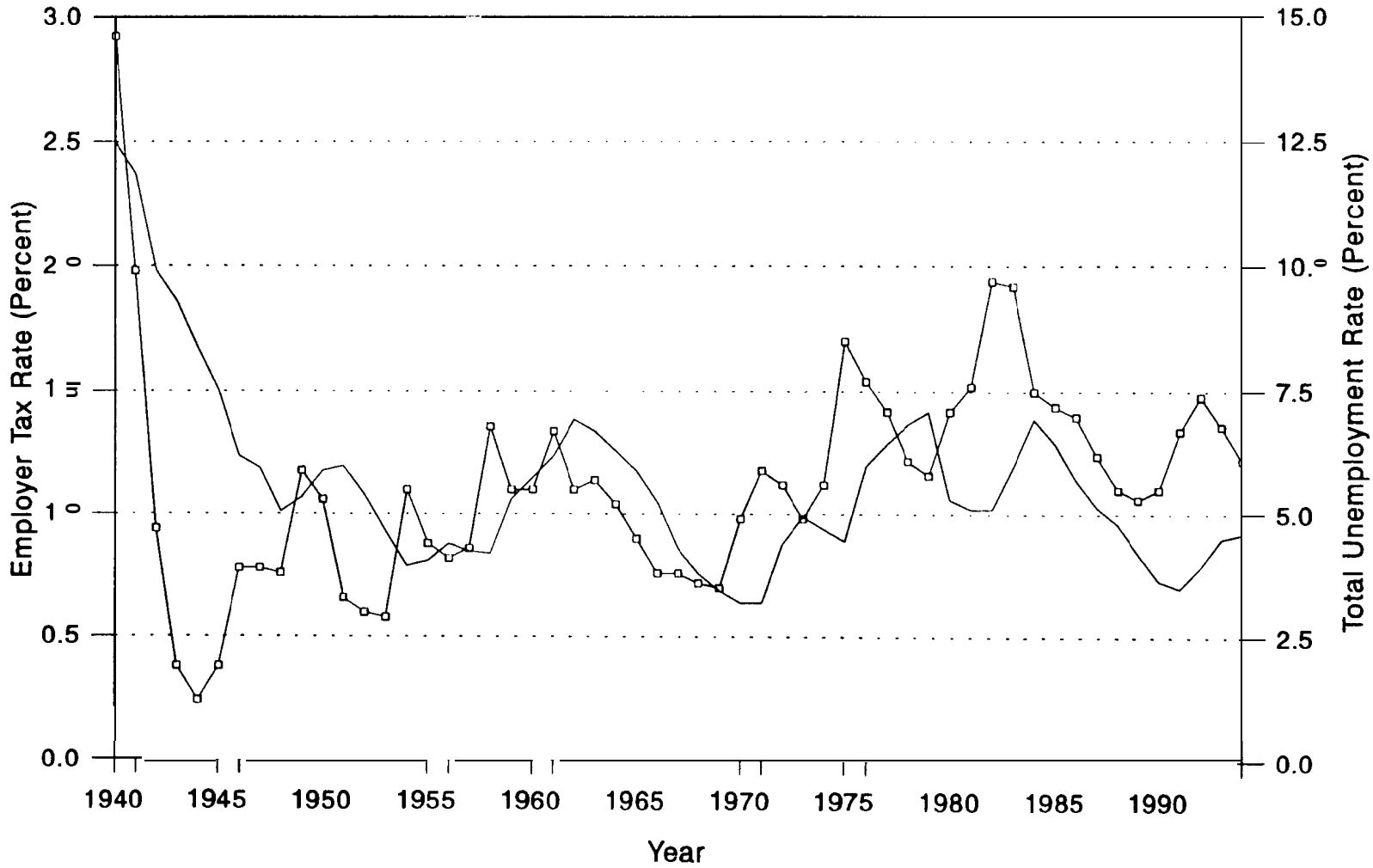
levels. All else being equal, if another state reduced taxes, its neighboring states would have to lower theirs *just to stay at the same relative level of competition.* Thus, maintaining the status quo in such a case would actually result in the deterioration of a state's competitive position.

Trends in State Tax Rates. Figure 1 displays trends in average UI tax rates (as a percentage of total covered wages) and unemployment rates. During the first few years of the program, state UI tax rates were effectively set by federal legislation (because no state tax rates could not be adjusted downward for employer experience until 3 years of benefit experience had been amassed). Once this constraint expired (in 1940 or 1941 for most states), state tax rates plummeted (simultaneously, unemployment rates and the need for high UI tax rates fell dramatically in the short term as the United States entered World War II). Since that early decline in tax rates in the 194Os, average UI payroll taxes as a percentage of total covered wages have remained generally stable around 1 .O percent (with significant cyclical fluctuations). Unemployment rates, on the other hand, have increased over time. As a result, relative to unemployment, UI tax rates have declined. Indeed, the ratio of average UI tax rates to the unemployment rate has declined from an average of 23.3 percent in the 1950s to 14.7 percent in the last ten years (1985 to 1994).

Unemployment Insurance Benejits

By design, UI receipt is highly cyclical. As is evident from Figure 2, the percentage of the unemployed receiving benefits increases sharply during recessions, [5] because a higher

FIGURE 1. Average Employer State Tax Rate (as a Percentage of Total Covered Wages) and Total Unemployment Rate, 1940-1994



— Rate as % of total -o- TUR

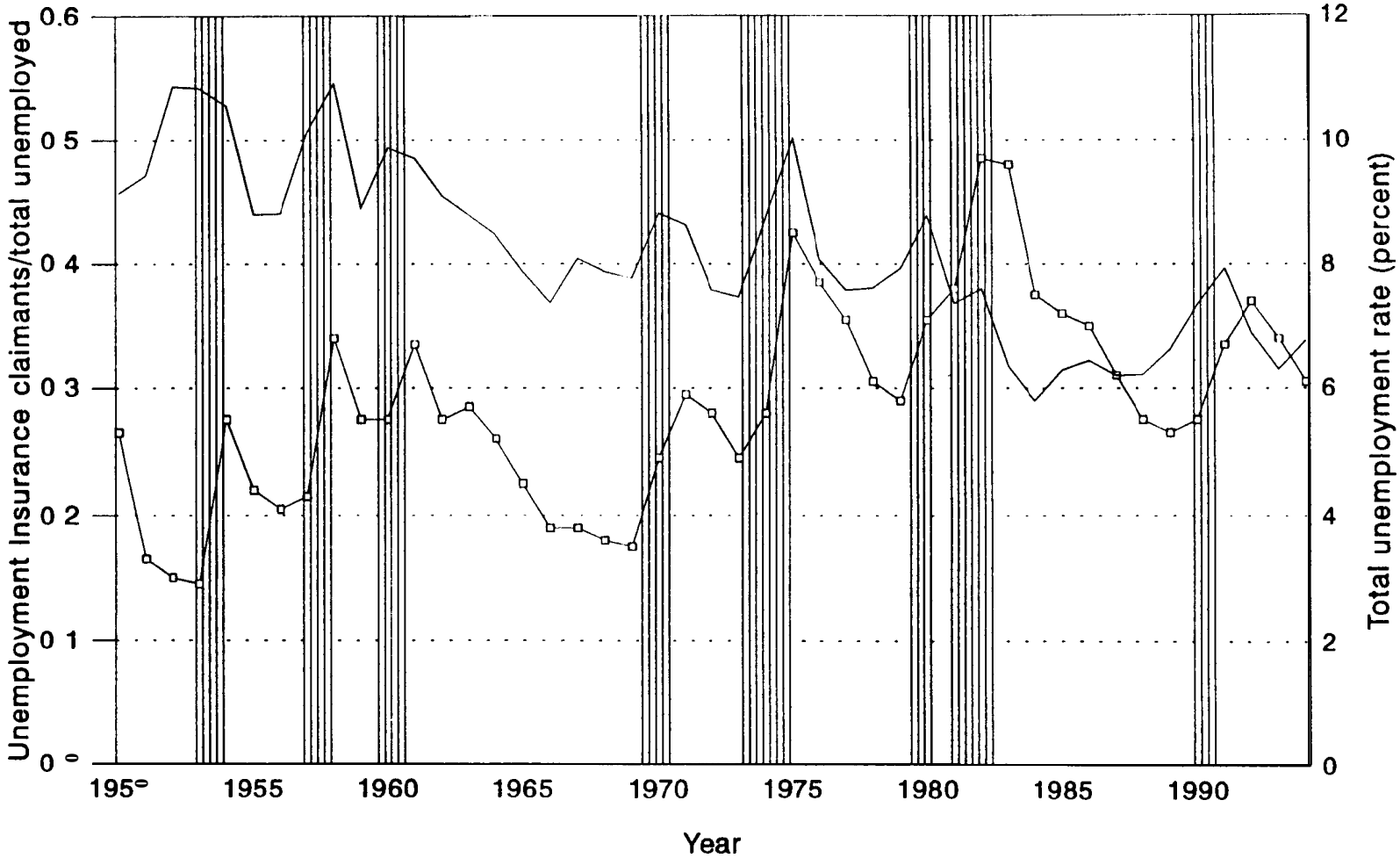
SOURCES: Council of Economic Advisors (1994) and U.S. Department of Labor (1995b)

percentage of the unemployed during recessions have lost (rather than quit) their jobs.[6] In addition to cyclical movements, the level of receipt of UI benefits among the unemployed exhibits two other noteworthy trends: (1) a long-term trend, in which the national recipiency percentage has declined slowly and consistently since the 1940s;[7] and (2) a more recent trend, in which the recipiency percentage dipped dramatically between 1980 and 1984, and has remained low since that time. This latter trend represents a fundamental shift away from the dynamic that had marked the UI program since its inception, as measures of recipiency did *not* increase significantly as the unemployment rate peaked in the early 1980s.

By 1984, the number of UI claimants as a percentage of total unemployment had dropped to 28.5 percent, the lowest recorded percentage since data were first collected in 1947. The ratio increased slightly after 1984, but has remained lower than its historical average. Further, as indicated in Table 1, recipiency measures vary considerably across states, with the ratio of claimants to total unemployed in the second quarter of 1995 (the most recent period for which data were available) ranging from a low of 17.6 percent in Virginia to a high of 65.0 percent in Rhode Island.

Among those individuals who actually receive benefits under the UI program, there are two primary measures of the system's generosity-the potential duration of benefits and the replacement rate. The potential duration of benefits provides a measure of how long UI recipients can expect to be able to rely on the system for partial income replacement, while the

FIGURE 2. Recipiency Rate for Regular State UI Programs and Total Unemployment Rate, 1950-1994



NOTE: Shaded regions represent recession from peak to trough.
SOURCES: Council of Economic Advisors (1995); U.S. Department of Labor (1995d).

TABLE 1. Ratio of Unemployment Insurance Claimants to Total Unemployed, by State, 1995

State	IU/TU	State	IU/TU
Rhode Island	65.0	Nebraska	31.5
Alaska	61.7	Maryland	31.1
Vermont	58.6	West Virginia	29.7
Oregon	54.2	Missouri	28.7
Washington	52.1	Kentucky	28.6
Hawaii	51.0	Ohio	28.6
Connecticut	49.0	Michigan	28.3
Idaho	47.4	South Carolina	28.1
Pennsylvania	46.1	Colorado	27.9
Wisconsin	43.6	Tennessee	27.6
Arkansas	42.1	North Carolina	26.1
Montana	41.6	Arizona	25.7
Massachusetts	41.5	Kansas	25.2
New York	41.3	Mississippi	25.2
Delaware	41.1	New Mexico	24.3
Maine	39.2	Florida	23.8
New Jersey	39.0	New Hampshire	22.5
California	37.5	Alabama	22.0
Illinois	37.2	South Dakota	21.4
Wyoming	35.5	Utah	21.4
District of Columbia	34.9	Texas	21.1
Minnesota	34.6	Oklahoma	21.0
North Dakota	34.5	Georgia	20.6
Nevada	34.4	Louisiana	20.0
Puerto Rico	33.7	Indiana	19.4
Iowa	33.3	Virginia	17.6

NOTES: Data for the Virgin Islands are not available. Data are for the second quarter of calendar year 1995.
SOURCE: U.S. Department of Labor (199%).

replacement rate measures the percentage of an unemployed individual's lost earnings that are replaced by UI benefits.

In most states, potential duration of benefits is determined by a claimant's employment and earnings history. In 1946 (the first year for which data are available), the average potential duration of UI benefits was 19.8 weeks. Average potential duration increased by a modest amount during the 195Os, and has been nearly constant (at approximately 24 weeks) since the 1960s. [8]

Unfortunately, virtually no cross-section data are available on replacement rates, and no data whatsoever are available on changes in replacement rates over time.[9] Data from the Survey of Income and Program Participation (SIPP) indicate that the average replacement rate in 1990 was 63 percent. This is consistent with evidence from microdata available for several individual states, which also suggests that replacement rates are in this general range.[lo] Simulations from the SIPP indicate that, between 1978 and 1990, replacement rates were virtually constant. [1 l]

Taken together, these trends suggest that there does not appear to be a significant deterioration (in terms of replacement rates or duration) of the benefits that are received by the shrinking percentage of the unemployed who actually receive benefits. This suggests that to the extent that states have cut back on the generosity of their UI programs, they have done so primarily by limiting access to the program, rather than by reducing the generosity of the benefits that claimants receive. [121

Empirical Evidence on Interstate Competition in the UI System

The Basic Estimating Equation

A panel data base, consisting of data on the 48 mainland states from 1977 to 1990, was used to test the UI tax competition model. [13] For the purpose of determining the interstate tax variables that form the basis of estimating the model, four interstate tax variables were created for each observed state. These variables were created in two steps. First, in order to test whether an observed state responded differently to tax rates in states that were geographically closer to the observed state, two relative geographic categories of states were created for each observed state. In creating these variables, states that share a border with an observed state were designated "contiguous" states, and those states that do not share a border were designated "balance of country" states.[l4] Separate interstate tax variables were then created for each state using these two geographic categories (for example, the contiguous tax variable for Alabama would be calculated by taking the mean of the tax rates of its contiguous states-Georgia, Florida, Mississippi, and Tennessee). [151 Preliminary analysis indicated that a one-year lag on the interstate tax variables maximized the model's explanatory power.

Second, in order to test whether an observed state responded differently to a given category of other states when the lagged average tax rate of those states was lower, rather than higher, than the lagged tax rate of the observed state (as is predicted by the model described above), both of the geographic categories were split into two categories based upon this criterion. For example, with regard to the contiguous state variables, if the lagged contiguous tax rate was *higher than* or *equal to* the lagged tax rate of the observed state, then the "higher" contiguous tax variable ("H") was set to the lagged mean tax rate of the contiguous states, and the "lower"

contiguous tax variable ("L") was set to zero. Conversely, if the lagged contiguous tax rate was lower than the lagged tax rate of the observed state, then the "H" contiguous variable is zero and the "L" contiguous variable is equal to the lagged mean tax rate of the contiguous states. Similar "H" and "L" calculations were made for the balance of country tax variables. Thus, a total of four interstate tax variables were created and used in the analysis described below.

Six additional independent variables were included in the analysis. The unemployment rate and the change in the unemployment rate were used because, all else being equal, average state tax rates would be expected to be higher if the unemployment rate is at a relatively high level, or if it is decreasing (assuming partial countercyclical funding of the state system). The reserve ratio, a measure of UI trust fund solvency, was included because tax rates are often increased (either automatically, through a movement to a different tax schedule, or legislatively) in response to low UI trust fund reserves.[l6] In order to control for the effect of politics at the state level, the analysis included a measure of the number of state political institutions (i.e., the governorship and the two bodies of the state legislature) controlled by Democrats. A measure of state tax capacity was included to control generally for the level of states' tax bases. State unionization rates were included because empirical research frequently finds that rates of unionization affect UI-related measures. [171

Results

Table 2 presents a series of estimated models for the average UI tax rate in a given state and year. [181 The estimates in Table 2 are obtained by generalized least squares. [191 Once again,

it should be noted that a states response to other states' tax rates could be entirely passive. By simply failing to make adjust their taxable wage base for inflation, a state could lower its average UI tax rate.

The first column of Table 2 presents results of the basic interstate tax competition model. The estimated coefficients of the key explanatory variables-the four interstate tax variables-indicate that, as expected, a state's response to other states' (either contiguous or balance of country) tax rates is greater when those tax rates are lower, rather than higher, than they are in the observed state. For example, the response to contiguous states with lower tax rates is estimated to be 0.33, while the response to contiguous states with higher tax rates is estimated to be 0.19. For balance of country states, the responses are estimated to be 0.44 and 0.35, respectively. [20]

Table 3 is particularly important, as it reports average *per state* effects for each of the interstate tax variables, effects that are derived from the coefficients reported in Table 2. These results indicate that the response to an individual contiguous state's tax rate is, on average, greater than the response to the tax rate in a balance of country state. Consider, for example the two "L" variables. Since there are, on average 4.2 contiguous states per state, a 1 percentage point decline in the lagged tax rate of any *one* of those contiguous states would result in a 0.079 percentage point decline in the tax rate of the observed state. With an average of 44.8 balance of country states, a 1 percentage point decline in the lagged tax rate of any state located in the balance of country would result in a 0.011 percentage point decline in the observed states' tax rate. Thus, in this model, the effect of tax rates in an average contiguous

TABLE 2. Generalized Least Squares Regression Results (Dependent Variable Is State UI Tax Rate as Percent of Total Covered Wages)

Explanatory Variables	(1) All Obs 1977-1990	(2) High ATUR 1977-1990	(3) Low ATUR 1977-1990	(4) All Obs; Incl. Largest State Var. 1977-1990	(5) All Obs; Nat'1 TUR 1948-1962	(6) All Obs; Nat'] TUR 1963-1977	(7) All Obs; Nat'1 TUR 1978-1992	(8) All Obs 1978-1992
Constant	-0.22 (0.15)	0.19 (0.46)	-0.38 (0.10)	-0.26 (0.09)	-0.15 ow	-0.13 (0.W	-0.23 (0.W	-0.24 (O.ofo
State Government	0.063 (0.W	0.061 (0.01)	0.056 (0.02)	0.068 WC9	_	_		
Tax Capacity	-0.0019 (0.15)	-0.0036 (0.08)	-0.0030 (0.18)	-0.0018 (0.17)	-.	_	--	
Unionization Rate	1.50 (0.W	1.55 (0.W	1.53 (0.W	1.40 (0.W	_	--	_	_
Lagged Reserve Ratio (Trust Fund Solvency)	-0.033 (0.02)	-0.058 (0.01)	-0.0089 (0.70)	-0.028 (0.05)	_	_		--
Unemployment Rate (TUR)	6.59 (0.W	6.21 (0.W	5.99 (0.W	6.57 (0.W	6.63 (0.W	8.09 (0.W	8.54 (0.W	7.06 (0.W
A Unemployment Rate (ATUR)	-7.71 ww	-7.01 (0.W	-8.34 (0.W	-7.75 (0.W	-5.89 (0.W	-9.59 (0.W	-10.51 (0.W	-7.05 @.@a
"H" Contiguous Tax-i (contig states' tax avg is higher)	0.19 (0.W	0.022 (0.81)	0.32 (0.W	0.11 (0.02)	0.48 (0.W	0.22 (0.W	0.35 WC9	0.23 (0.W
"L" Contiguous Tax-i (contig states' avg tax is lower)	0.33 (0.W	0.091 (0.40)	0.51 (0.@3	0.23 (0.00)	0.64 (0.W	0.42 (0.W	0.55 (0.W	0.40 (0.W
"H" Balance Tax-l (balance sts' tax avg is higher)	0.35 (0.W	0.37 (0.01)	0.41 (0.W	0.38 (0.W	0.20 (0.01)	0.29 (0.W	0.16 (0.02)	0.41 (0.W
"L" Balance Tax-i (balance sts' avg tax is lower)	0.44 (0.W	0.48 (0.W	0.50 (0.W	0.47 (0.W	0.38 KJ.w	0.45 (0.W	0.29 (0.W	0.51 (0.W
"H" Largest Contiguous Tax-i (largest contig tax is higher)	_	--	--	0.038 (0.26)	--	_		--
"L" Largest Contiguous Tax-i (largest contiguous tax is lower)	--	_.	--	0.14 (0.W	_	--		--
RZ	0.57	0.48	0.61	0.60	0.63	0.69	0.64	0.61
N	672	332	340	658	720	720	720	720

NOTES: Significance levels are in parentheses. Regressions exclude Alaska and Hawaii. Regression (4) excludes Maine (which has only one contiguous state). In column (4), the "H" Contiguous Tax-i and "L" Contiguous Tax-i variables exclude the ***largest*** contiguous state in calculating average contiguous tax rate.

SOURCE: Authors' calculations.

state when the mean of contiguous tax rates is lower than that in the observed state is 7 times greater than the effect of the tax rate of an average balance of country state.

The second columns in Tables 2 and 3 reports the coetlrcrent estimates and associated per state effects that result from estimating the model for the (approximately) one-half of the observations in which a the change in a state's unemployment rate from the previous year was greater than or equal to the median change in unemployment rate (which proved to be cases in which the unemployment rate was increasing, not changing, or decreasing by 0.1 percent or less). The third column reports the results for the remaining observations, in which the change in the unemployment rate was less than the median (i.e., cases in which the unemployment rate declined by more than 0.1 percent).

A comparison of the interstate tax coefficients in these two columns indicates that states' response to contiguous states' tax rates is largely confined to periods in which their unemployment rates are decreasing (in the most extreme difference, the coefficient for the "L" contiguous variable is 0.09 when the change in the unemployment rate is greater than the median, and is 0.5 1 when the change in the unemployment rate is less than the median (i.e. when the unemployment rate declined by more than 0.1 percent from the previous year). This suggests that, as expected, states essentially ignore competitive pressures during periods of increasing unemployment rates (a period when concern over the economic circumstances of state residents is perhaps highest), and that competitive pressures become most pronounced during periods of prolonged economic recovery.

TABLE 3. Average Effect of Lagged State Tax Rate on Another State, by State Category

Explanatory Variables:	(1) All Obs 1977-1990	(2) High ATUR 1977-1990	(3) Low ATUR 1977- 1990	(4) All Obs; Incl. Largest State Var. 1977-1990	(5) All Obs; Nat'1 TUR 1948-1962	(6) All Obs; Nat'1 TUR 1963-1977	(7) All Obs; Nat'1 TUR 1978-1992	(8) All Obs 1978-1992
"H" Largest Contiguous State	-.	--	--	0.038 (0.26)	--	--	--	
"H" Average Other Contiguous State	0.045 (0.W	0.005 (0.81)	0.076 (0.W	0.026 (0.02)	0.114 (0.W	0.052 (0.W	0.083 to.@-%	0.055 co.@3
"H" Average "Balance of Country" State	0.008 (0.W	0.009 (0.01)	0.010 (0.W	0.009 (0.W	0.005 (0.01)	0.007 (0.W	0.004 (0.02)	0.009 (0.W
"L" Largest Contiguous State	--	--	--	0.140 (0.W	--	--	--	-.
"L" Average Other Contiguous State	0.079 ww	0.022 (0.40)	0.121 (0.W	0.054 (0.W	0.152 (0.W	0.100 (0.W	0.131 (0.W	0.095 (0.W
"L" Average "Balance of Country" State	0.011 (0.W	0.011 (0.W	0.011 (0.W	0.011 (0.W	0.009 (0.W	0.011 ww	0.007 (0.W	0.011 (0.W

NOTES: Effects were calculated by dividing regression coefficient by the number of states in each category. Significance levels are in parentheses. Regressions exclude Alaska and Hawaii. Regression (4) excludes Maine (which has only one contiguous state).

SOURCE: Authors' calculations

The fourth columns of Tables 2 and 3 report the results of a regression that included a separate interstate tax variable for the most populous contiguous state of each observed state (in this regression, the average contiguous state tax rate was calculated by taking the mean of the tax rates of the remaining states. As predicted, these results indicate that the response to the most populous contiguous state's tax rate is greater than the response to each individual remaining contiguous state. For example, comparing "L" coefficients for the largest contiguous state and the per state effect of each of the other contiguous states indicates that the largest contiguous state has an effect that is over 2.5 times greater than the other contiguous states (0.140 to 0.054).

In each of the first four columns of Table 2, the effects of unionization are large. This indicates that the decline in unionization has had a substantial effect on UI tax rates. For example, unionization rates drop from 23.6 percent of the work force in 1973 to 15.5 percent in 1994. [21] Using the coefficient estimate on unionization from column 1 suggests that, had unionization remained at its 1973 level, average UI payroll taxes as a percentage of covered wages would have been 0.12 percentage points higher in 1994 (0.97 percent, rather than the actual level of 0.85 percent).

The fifth through seventh columns of Table 2 report the coefficient estimates from a simplified version of the model for three different time periods: 1948-1962, 1963-1977, and 1978-1992. [22] The only variables that were available over this entire time period were the interstate tax variables. Since state unemployment rates were not available prior to 1976, national unemployment rates and changes in national unemployment rates were used instead. The ratio of the difference between comparable "H" and "L" coefficients generally increased

over time. As discussed in detail below, this finding suggests that the overall impact of tax competition in the UI program has increased over the years. Further, the ratio of contiguous and balance of country "L" variables increases slightly over time, suggesting that the relative impact of contiguous states' tax rates may also have increased over time.

Perhaps the most serious criticism that could be made of the estimation summarized here is that the interstate tax variables are simply capturing the effects of omitted variables, rather than the effects of competition. The asymmetry of the results summarized in Tables 2 and 3, however, indicates that this criticism is not valid. First, the results in all columns display asymmetry in the response to states that have higher versus lower tax rates, with states that have lower tax rates eliciting a greater response from observed states. Second, the results in columns 2 and 3 reflect asymmetry in states' behavior across the business cycle, with states more likely to respond to tax rates in other states when their unemployment rates are declining. Third, the results in column 4 indicate asymmetry in the response to contiguous states of various sizes, with the largest contiguous state having the largest effect. If the tax variables were simply measuring omitted variables, none of these three forms of asymmetry would have been expected.

The Dynamics of Competition

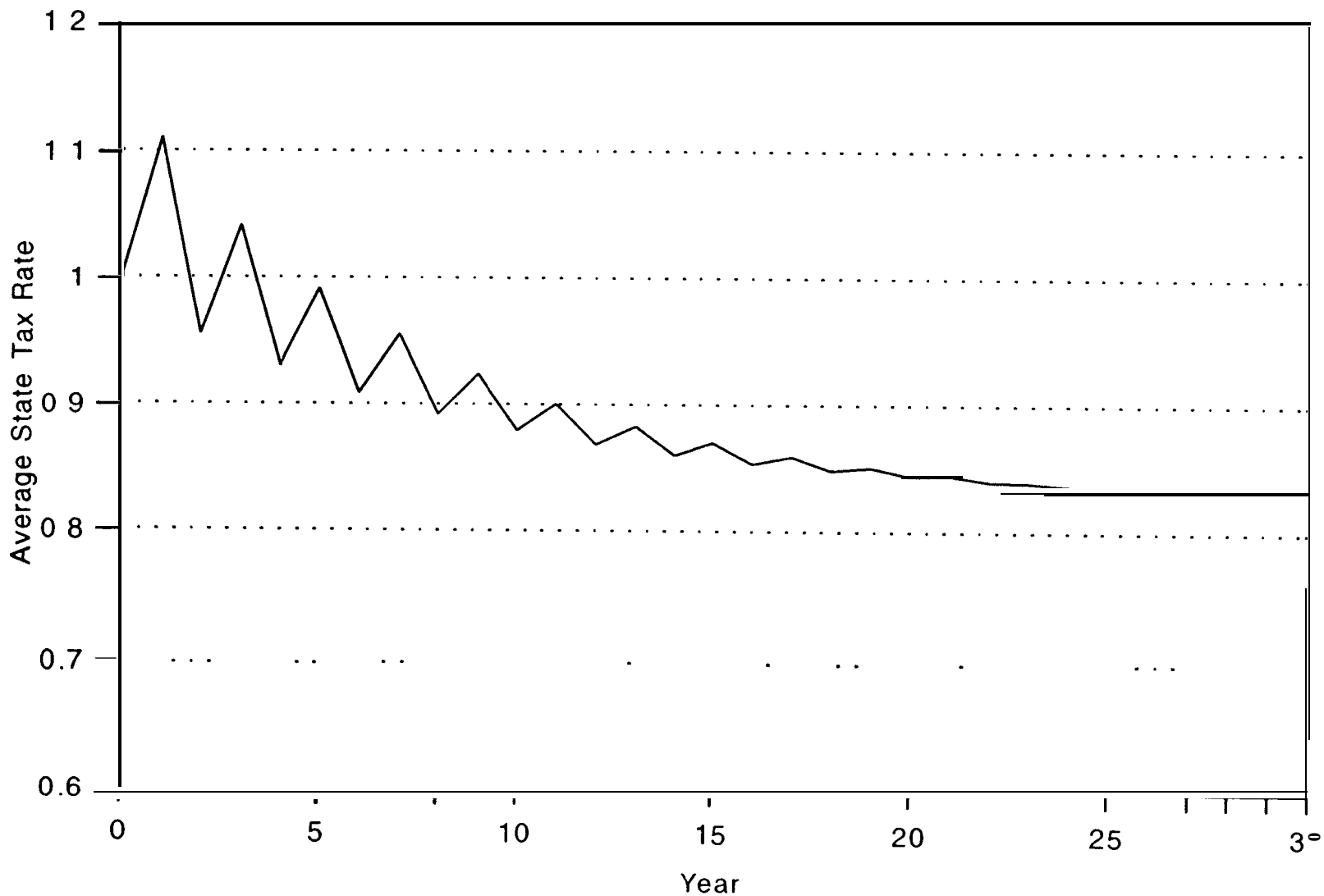
The asymmetry of states' responses (to one another and over the business cycle) generates a dynamic downward pressure in the UI system. This dynamic could work primarily through two mechanisms. First, variation in state tax rates would be expected to generate downward pressure on tax rates, given that: (1) states respond more to states with lower tax rates than

they do. to states with higher tax rates, and (2) by construction, half of the states have lower tax rates and half the states have higher tax rates. Thus, on average, there should be more downward pressure than upward pressure in an average year. Second, variation in state unemployment rates could also generate downward pressure on tax rates. Because a state's tax rate is directly affected by its unemployment rate, which in turn affects other states' tax rates, dispersion in unemployment rates could force tax rates to decline through a similar dynamic.

Both of these sources of downward pressure was explored through Monte Carlo simulations in which tax rates and/or unemployment rates were randomly assigned to each state and the system was than solved recursively over time. That is to say, random starting values were assigned to each state in year 1, with year 1 values then used to solve for the predicted values for each state in year 2. The predicted year 2 values were then used to solve for the predicted year 3 values, and so on. Both simulations were repeated 1,000 times.

The first simulation examined the downward pressure that result from dispersion of states' tax rates, holding unemployment rates constant across states. Initial state UI tax rates were randomly assigned in an interval ranging from 0.5 to 1.5, with the mean fixed at 1 .O. The regression coefficients from column 8 of Table 2 were used to solve the system recursively over time.[23] The average time path that resulted from the 1,000 simulations is shown in Figure 3. The results indicate that, in the absence of changes in unemployment rate, random dispersion in states' tax rates alone can bring about state responses that cause a 12 percent decline in average state tax rates after 10 years, a 15 percent decline after 20 years, and a 17 percent decline after 30 years, at which point the system generally stabilized.

FIGURE 3. Simulated Average State UI Tax Rates, Assuming No Va[illegible] Unemployment and Random Dispersion in Initial State Tax Rates



NOTE: Initial tax rates (year 0) for each state were randomly assigned in an interval ranging from 0.5 to 1.5 percent, with the mean fixed at 1.0 percent. 1,000 random runs were conducted, with state tax rates after year 0 predicted recursively using coefficients from Table 2, Column 8 (1978-1992).

The second simulation explored the additional downward pressure that could result from dispersion in states' unemployment rates. In this case, random starting values were assigned both for states' tax rates and unemployment rates. States' unemployment rates in year 1 were randomly assigned around a mean value of 6.5 percent, and all subsequent year's unemployment rates were allowed to vary up to 0.5 percentage points of its previous rate each year, with annual adjustments to all state rates to keep the national average unemployment rate fixed at 6.5 percent in all years (rates were also not allowed to fall below 0 or to go above 13 percent). The average time path that resulted from the simulations is indistinguishable from the previous simulation, as displayed in Figure 3. The results indicate that, relative to an economy in which unemployment rates are constant across states, an economy with variation in unemployment rates does not generate additional downward pressure on UI tax rates. [24]

The EfSect of Competition

The regression results in Table 2 provide evidence of the existence of interstate tax competition in the UI system, but do not provide a mechanism for isolating the effects of competition over time. It is, in fact, difficult to imagine how this could be done, given that the counterfactual-an absence of competition-has perhaps never existed. [25]

It is, however, possible to assess whether tax competition has changed over time. This can be done by solving for the predicted path of UI tax rates over time, using regression coefficients from different time periods. The coefficient estimates reported in columns 5, 6, and 7 of Table 2-which correspond to the time periods spanning 1948-1962, 1963-1977, and 1978-1992, respectively-have been used for this purpose. [26] Taking states' tax rates and the

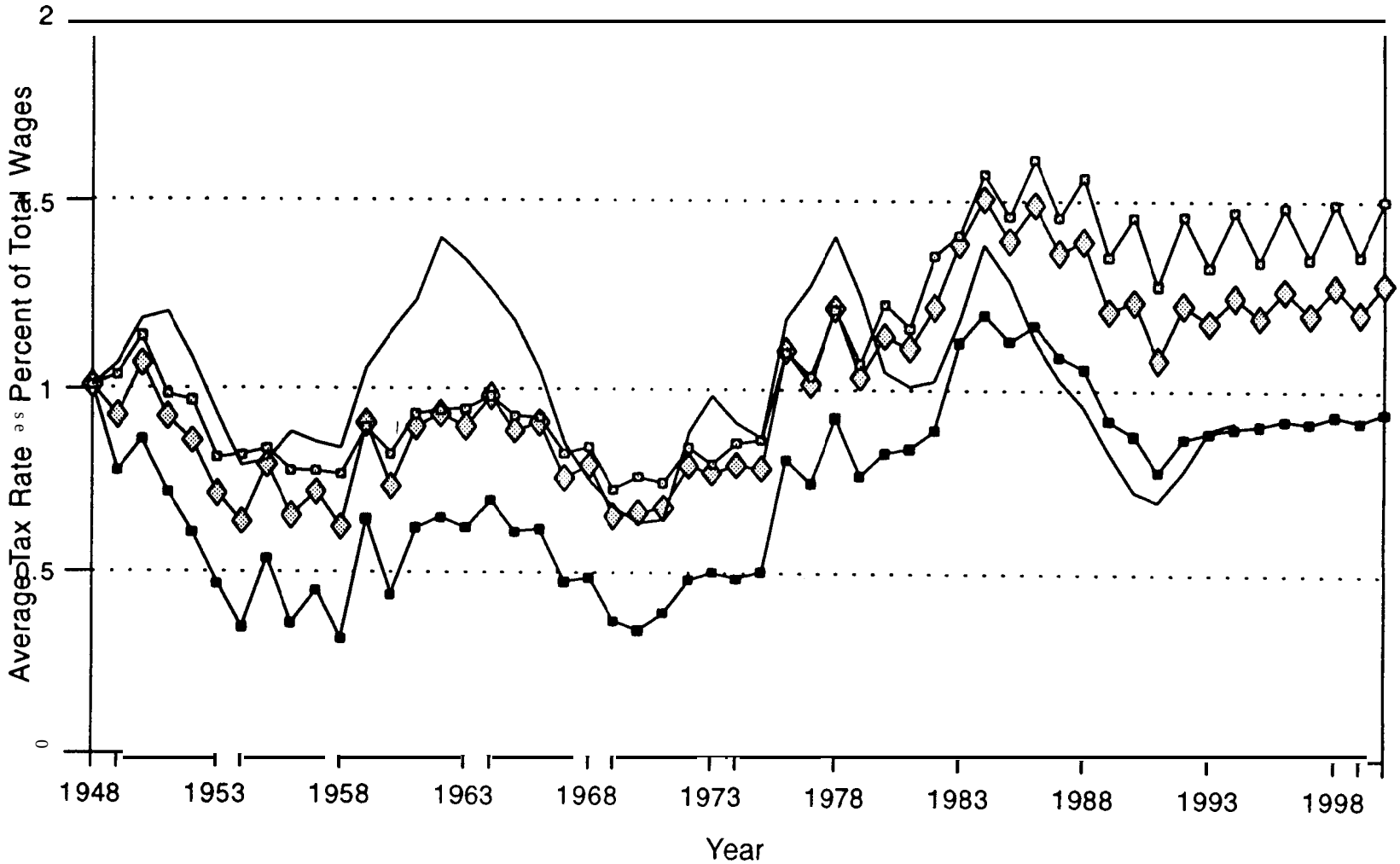
national unemployment rate in 1948 as the starting values, the system was solved for each states' 1949 predicted UI tax rate. [27] The predicted 1949 rates were then used to predict the 1950 rates, and so on. Three separate predicted time paths were derived from 1948 values, using the regression coefficients that correspond to the different time periods. These predicted time paths are shown in Figure 4, along with the actual time path of UI tax rates.

From 1948 until 1984, the coefficient estimates from the first two time periods (1948-1962 and 1963-1977) generate very similar predicted time paths. After 1984, however, the paths diverge more than they had in previous years, with the time path of UI tax rates predicted by the 1963-1977 coefficients being lower than that predicted by the 1948-1962 coefficients.

Most striking, however, is the markedly lower time path predicted by the coefficients from the most recent time period (1978-1993) in comparison both to the actual time path and the time paths predicted by coefficients from each of the two earlier periods. This result suggests strongly that the intensity of interstate competition has increased significantly over time.

Figure 5 shows the difference in the predicted time path of UI taxes based on the coefficient estimates from the earliest period (1948-1962) and the time path predicted based on the latest period (1977-1993). If there were no tax competition between 1948 and 1962, then this difference would represent the cumulative effect of interstate tax competition in the UI system. Stated another way, Figure 5 represents a lower bound estimate of the cumulative effect of interstate tax competition in the UI system. The average lower bound estimate for the first four years of the 1990s is 0.53 percentage points, suggesting that, in the absence of tax

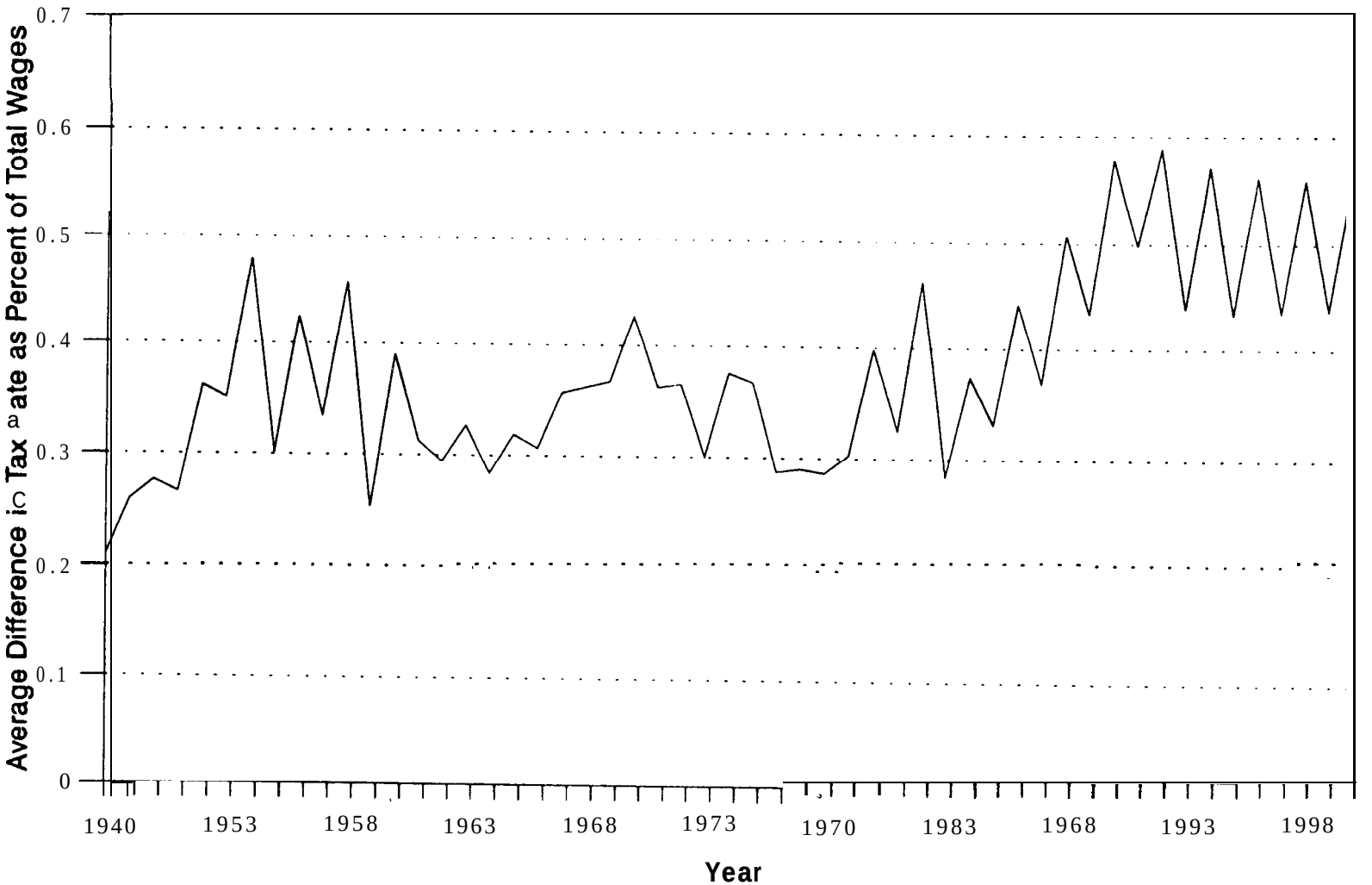
FIGURE 4. Actual and Projected Average Tax Rates Using Different Sets of Tax Coefficients and Actual TURs, 1948-2000



actual 1948-62 coefficients 1963-77 coefficients 1978-92 coefficients

NOTE: Projected lines use 1948 as base year and predict state tax rates for all subsequent years by applying interstate tax coefficients to previous year's tax rates. See text for more details.

FIGURE 5. Difference Between Projected Tax Rates Using Tax Coefficients from 1948-62 and 1978-1992, with actual TURs, 1948-2000



competition, UI tax rates would have been approximately 1.43 percent of covered wages by 1993 (rather than the observed value of 0.90 percent).

Although a state's expenditures from their UI trust fund can exceed UI tax revenues in any given year, such a situation could not prevail over an extended period of time. Consequently, as discussed above, UI tax competition must eventually manifest itself in the form of lower benefits or a smaller percentage of the unemployed receiving benefits. As mentioned earlier, there is no evidence that the generosity of replacement rates or duration of benefits has declined. With regard to the percentage of the unemployed who receive benefits, however, it is quite clear that this measure has declined significantly. [28]

Conclusions

The capacity of the unemployment insurance system to achieve its dual goals-providing insurance to workers who are involuntarily unemployed and serving as an automatic economic stabilizer-is determined, in large part, by the percentage of the unemployed who receive benefits. The time trend in the percentage of the unemployed who receive UI reveals a long history of steady decline, punctuated by occasional sharp decline, indicating that the system's capacity to achieve its fundamental objectives has eroded over time.

The evidence presented in this paper suggests that an important-and heretofore unexamined-force underlying the decline in the system is a force that is inherent in the existing federal-state structure of the program. Although federal law effectively mandates that each state have a UI program, the law does not prevent the states from choosing to have only a

minimal system, nor does the law provide support against competitive pressures that may directly affect the states and, as a result, also affect their UI programs. While other researchers have attributed the decline in the system to the effects of changes in state policy (as well as demographic and industrial shifts), the evidence presented here indicates that these effects are endogenous to the system.

In particular, we find empirical evidence of competitive behavior by states in setting UI tax rates, behavior that is likely driven by the very structure of the system. After controlling for economic conditions and other state-specific factors, we find that states' tax rates are responsive to the previous year's tax rates in other states. More specifically, a state is more likely to change its tax rate when it is higher than rates in other states, and in such situations, the most likely response is that the state's tax rate will be reduced. Further, tax rates are more responsive to rates in contiguous states than to rates in states that are not in geographical proximity, and are more responsive to the largest contiguous state than to any other. Responses to rates in other states, however, are largely confined to periods in which a state's unemployment rate is declining, suggesting that states essentially ignore competitive pressures during periods when there is perhaps greater concern over the economic circumstances of state residents.

Results also indicate that the intensity of tax competition in the UI program has increased significantly over time. At the current levels of competition, the states do, indeed, appear to be locked into a race to the bottom.

In essence, these findings suggest that the failure of the system to respond to changes in the nation's demographic and industrial composition is an outcome, rather than a cause, of the

system's decline. States have responded to the competitive pressures within the system by reducing taxes, which, in turn, has led the states to have to adopt increasingly restrictive policies on the benefit and eligibility side of the program. One result has likely been the decline in the receipt of UI benefits among the unemployed.[29]

These findings also heighten concerns about the effects of upcoming changes in the federal-state structure of the AFDC program. With the shifting of authority for administering and financing a large proportion of expenditures from the federal government to the states, the distribution of powers and responsibilities in this program will begin to resemble the distribution that has prevailed for the past 60 years within the UI system. Based on the evidence presented here, there is reason to believe that such a transfer of authority will result in a significant reduction in the nation's capacity to provide assistance to those in need.

Broad competitive pressures-operating systemically and *within* the nation's federal-state Unemployment Insurance program-alone have greatly hampered the system's capacity to achieve its stated purposes and objectives. Such pressures are likely to have parallel effects in all programs with similar federal-state structures.

Acknowledgments

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Notes

1. These two functions have consistently been identified as the primary purposes of the system since 1936, when the U.S. Social Security Board included them in a suggested statement of purpose for the states.

2. See, e.g., Burgess and Kingston (1987).

3. A number of researchers have analyzed the decline in UI receipt during the 198Os, including Baldwin (1993), Baldwin and McHugh (1992), Blank and Card (1991), Burtless and Saks (1984), Corson and Nicholson (1988), and Vroman (1991). Burtless and Saks (1984) examine the decline in UI receipt over a longer period of time, attributing the decline to changes in the demographic and industrial composition of the labor force.

4. It should be noted that average state tax rates do vary for reasons other than the experience rating of individual employers. Most commonly, the tax rates charged to individual employers in a state all increase or decrease simultaneously when automatic triggers (based on levels of trust fund reserves and/or number of claimants) shift the overall tax schedule for the state. Alternatively, legislative changes to tax rates or taxable wage bases can also have a broad effect on employer tax rates. See, e.g., U.S. Department of Labor (1995a).

5. It should be noted that the percentage of the unemployed who actually receive UI benefits is slightly lower than the rate that is displayed in Figure 2, which includes all UI claimants--even those who ultimately do not receive benefits in a given week.

6. All unemployed individuals who were laid off from their jobs are eligible for UI benefits (assuming that they meet "monetary eligibility" requirements, which are related to the level of their earnings). Those who quit their jobs are only eligible for UI if they quit for "good cause" (the definition of which varies from state to state).

7. This downward trend has occurred despite an increase in the percentage of the workforce that is covered by the unemployment insurance system.

8. See Advisory Council on Unemployment Compensation (1996).

9. Although the U.S. Department of Labor (DOL) does annually report a ratio that is often considered a measure of "replacement rate, " the DOL measure is defined as the ratio of average benefits paid to UI recipients to average wages paid in all of covered employment. Because it compares data for two different populations, this ratio does *not* measure the extent to which UI benefits replace the wages of those individuals who are actually unemployed and receiving benefits. The use of this statistic as a measure of replacement rates would suggest that the replacement rate was 36 percent in 1994, and that it has been virtually constant since 1940, the first year for which data are available (U.S. Department of Labor 1995d). See

Advisory Council on Unemployment Compensation (1995, 126- 127) for additional discussion of this issue.

10. See Advisory Council on Unemployment Compensation (1996).

11. See Advisory Council on Unemployment Compensation (1996).

12. Blank and Card (1991) do not find evidence that states have taken measures to limit access to their UI programs. Corson and Nicholson (1988), however, attribute between 21 and 54 percent of the decline in UI receipt (from 1980-1982) to restrictive state measures. Baldwin and McHugh (1992) find that 54 percent of the decline in UI receipt (between 1979 and 1990) is attributable to state policy changes.

13. Alaska and Hawaii were not included in the analysis because they do not have any contiguous states. Their tax rates were used, however, in calculating balance of country averages (as described below) for all other states. 1977-1990 were the only years for which all variables in the model were available.

14. States have, on average, 4.2 contiguous states, with the number ranging from 0 to 8. States have, on average, 44.8 balance states, with the number ranging from 4 1 to 49.

15. Two versions of the interstate tax variables were created-weighted by the relevant (i.e., contiguous or balance of country) states' populations, and unweighted. Both variables were found to have similar effects in the regressions. Consequently, the unweighted interstate variables were used throughout, since in later analysis (determining the cumulative impact of interstate competition over a longer period of time), the state populations needed for calculating weighted variables were not available for all years.

16. A three-year lag of the reserve ratio was chosen because it had the greatest predictive power.

17. These data were derived from a variety of sources. The unemployment rate variables were drawn from Bureau of Labor Statistics data. The reserve ratio and state tax rates were drawn from Unemployment Insurance Service data. The state political variable was derived from Conference of State Legislatures data. The tax capacity variable is based on data reported by the Advisory Council on Intergovernmental Relations. Unionization rates were drawn from two papers that were based on Current Population Survey data, Kokkelenberg and Sockell (1985) and Curme, ***et. al.*** (1990).

18. The average tax rate is defined as UI tax revenues as a percentage of covered wages. This is arguably the most appropriate dependent variable, since it is what states should be concerned about if they are attempting to maintain a competitive business environment.

Alternatively, it could be argued that maximum tax rates should be used as the dependent variable, since it is a variable that is directly determined by legislation. The model was re-estimated with maximum tax rates as the dependent variable, and the results were very similar to those reported in the text.

19. The model was estimated with state fixed effects, since a Hausman specification tested rejected a random effects estimator (although the results of both estimation techniques were very similar). Generalized least squares was used to correct for the remaining time-specific heterogeneity.

20. The difference between the "H" coefficients and the "L" coefficients is statistically significant for both the contiguous and balance of country variables.

21. Kokkelenberg and Sockell (1985), Bureau of National Affairs (1995).

22. Data from the earliest years of the program (1938 to 1947) were excluded for three reasons. First, since tax rates were initially constrained by federal experience-rating requirements, no interstate competition was possible until at least 1941. Second, during the early years of the program, states had to build up reserves, requiring higher tax rates than after reserves had been accumulated. Third, unemployment rates were at unprecedented (high) levels early in the program, making it unlikely that a model from those years would be comparable to a model estimated for later years.

23. This column contains coefficients from a regression that used data from 1978 to 1992, including state unemployment rates. The data in column 7 were not used because these only made use of national unemployment rates (in order to facilitate comparison with columns 5 and 6). Because all other variables were implicitly held constant in order to isolate the effects of tax rate and unemployment rate dispersion, there was no need to include the effects of the other variables that had been included in the regressions reported in columns 1 to 3.

24. The regression coefficient estimates from columns 3 and 4 of Table 2 cannot be used to solve for the time path of UI tax rates in an economy with constant unemployment (since these coefficients were estimated separately when unemployment was increasing or decreasing).

25. During the early years of the program there was no competition, because UI tax rates were congressionally set. This, however, provides no information about what would happen in the absence of competition since states could not set their tax rates based on the economic circumstances that they faced. Alternatively, one might argue that Alaska and Hawaii's UI systems operate in the absence of competition. These two states, however, differ so dramatically from the mainland states that using them as a counter-factual would be unlikely to be convincing.

26. These time periods were chosen by simply dividing the data base in three approximately equal samples. The latter two time periods (1963-1977 and 19781992) are perhaps the most comparable, since there was a long economic recovery in both, and both periods contain an approximately equal number of months of recessions (27 months during 1963-1977, and 30 months during 19781992; 19481962 included 39 months of recession).

27. Since state unemployment rates were not available prior to 1976, it was necessary to rely on the national rate. This may explain why the predicted time paths underpredict both upturns and downturns.

28. It is possible that some of the decline in receipt of benefits among the unemployed is voluntary. While this possibility cannot be tested directly, evidence from the SIPP suggests that much non-receipt of UI benefits is a function of a constraint on individuals' choice, rather than the result of choice (see Bassi and Chasanov, 1996).

29. In fact, the portion of this decline that some researchers have attributed to population shifts may actually be a result of a broader movement of jobs from states with high employer taxes (of which UI taxes are but one component) to states with low taxes.

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Interstate Competition in Unemployment Insurance and Workers' Compensation

by

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Revised Report
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Introduction

States play a large role in the financing and delivery of benefits in several U.S. social insurance and welfare programs. Deciding upon the appropriate scale of programs involves a balancing of interests: beneficiary preferences for generous payment levels and widely available benefits versus taxpayer interests which generally prefer smaller scale and less expensive programs. Where state taxpayer monies are involved, there are added considerations related to possible interstate competition in providing benefits. A state with a generous program and associated above-average costs to taxpayers may find itself at a competitive disadvantage in attracting and holding households and businesses which can migrate across state boundaries. To the extent that all states have such concerns, the result can be a "race to the bottom" whereby states restrict benefit availability and generosity in order to avoid being at a competitive disadvantage vis-a-vis neighboring states. The net outcome is a smaller scale benefit program for the nation as a whole.

In the last half of the 1990s, concerns about interstate competition are heightened by a likely increase in the role of state (and local) governments in providing social benefits and an attendant reduction in the federal role. This is now occurring in welfare programs that provide cash benefits, food assistance and medical assistance to low income families and individuals. Proposals to change the financing of Unemployment Insurance (UI) program administration are starting to be considered. Devolving responsibilities away from the federal establishment may occur for other programs as well.

This report focuses on questions of interstate competition in providing social benefits. Section I identifies several programs where states provide part or all of the financing of benefits payments. Section II reviews literature that has tried to test for evidence of interstate competition. This literature has focused mainly on cash benefits provided by Aid to Families

With Dependent Children (AFDC). However, a recent paper by Bassi and McMurrer (1996) examined UI tax rates and concluded that interstate competition has been responsible for a substantial reduction in the scale and costs of the UI program. Section III analyzes UI tax rates in more detail for evidence of the effects of interstate competition. Section IV analyzes state-level data on Workers' Compensation (WC) with the same purpose. Section V reviews the findings and discusses some research issues.

Three principal findings of the report can be stated at the outset. 1) An analysis of UI tax rates finds evidence that tax rates declined after 1989 and particularly during 1994-1996 relative to regression-based projections. 2) From an analysis of state-level residuals, the size of the unexpected decline in UI tax rates was roughly 15 percent during 1994-1996. 3) Further research on the determinants of contribution rates in Unemployment Insurance and Workers' Compensation is needed.

I. State-financed Benefit Programs

At the core of the interstate competition hypothesis is the idea that actions in one state provoke imitative responses in other states. The responses move the other states in the same direction, e.g., a major cut in benefits in one sets off a series of benefit reductions in other states. To test this hypothesis, state-level data must be available for a long time period so that the impulse and response patterns can be identified. There is a literature which has conducted such tests using data from the AFDC program. Research using state-level unemployment insurance tax rates has been undertaken by Laurie Bassi and Daniel McMurrer (1996). Other social benefit programs may also be appropriate for testing hypotheses about interstate competition.

Several social welfare and social insurance programs are administered by employees of state and local governments. Many of these programs, however, are fully federally financed. For

example, disability determinations in both the OASDI (Social Security) and SSI (Supplemental Security Income) programs are made by employees of state Disability Determination Units. The associated disability benefits, however, are federally financed.

Most relevant for testing hypotheses about interstate competition are programs where states provide financial support for benefit payments. Chart A summarizes 1996 information on five

Chart A. Benefit Programs with Potential Interstate Competition

Program	Total Spending in 1996 ($ bill)	Number of Programs (including D.C.)	Program Financing	State Share of Program costs
Unemployment Insurance	21.6	51	Payroll tax, Trust fund	100%
Workers' Compensation	41.6"	51b	Payroll tax,c Reserves	100%
General Assistance	3.5	33(42jd	General rev., Annual budget	100%
AFDC-TANF	21.7	51	General rev., Annual budget	20-50%
Medicaid	159.9	50'	General rev., Annual budget	20-50%

a - Private insurance benefits plus state benefits.
b - Voluntary coverage in New Jersey, South Carolina and Texas.
c - Payroll contributions to private insurers in most states.
d - Statewide in 33 states, selected counties in 9 states.
e - No program in Arizona.

programs where states have direct financial responsibility for benefits. Benefit data are from the National Income Accounts.

Expenditures for General Assistance, AFDC-TANF[1] and Medicaid are explicitly included in state budgets. State liability for AFDC-TANF and Medicaid benefits ranges from 20 to 50 percent of total payments while General Assistance benefits are fully state-financed. In Unemployment Insurance and Workers' Compensation, payroll-related contributions made by state employers finance the program while benefit payouts are administered/monitored by state government. Benefits in both programs are fully state-financed.

Chart A shows total benefit payouts in 1996 and the state share of benefit financing. In terms of state costs, Medicaid costs are largest followed by the costs of Workers' Compensation, Unemployment Insurance and AFDC-TANF with General Assistance having the smallest costs.[2] As shown in Chart A the programs are not always offered in each state. However, except for General Assistance, the others can be considered national in scope.[3]

Three programs (AFDC, Medicaid and General Assistance) are welfare-type programs where eligibility for cash benefits and/or services depends upon family income and assets. These are supported by annual budgetary appropriations. The other two (Unemployment Insurance (UI) and Workers' Compensation (WC)) are social insurance arrangements that compensate respectively unemployed individuals and individuals injured on the job. The

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[1] Aid to Families with Dependent Children (AFDC) was the subject of major federal legislation in 1996 which changed many aspects of the program and enhanced the role of the states. Its name also changed to Temporary Aid to Needy Families (TANF).

[2] Note in Chart A that matching rates for AFDC-TANF and Medicaid vary by state. The aggregate matching rate is about 45 percent. Thus Medicaid costs to states in 1996 were about $72 billion, more than half again larger than Workers' Compensation costs, more than three times the costs of Unemployment Insurance and more than six times the costs of AFDC-TANF to the states. Note also that extended unemployment insurance benefits which are partly federally financed are not covered by Chart A.

[3] Very few employers elect to forego Workers' Compensation coverage in New Jersey, South Carolina and Texas. Medicaid is absent only in Arizona.

funding arrangements for the latter two programs involve trust fund or reserve account arrangements where employer contributions for the current year may finance payments in one or more later years. Thus UI and WC depart from pay-as-you-go financing. Contributions from individual employers covered by UI and WC are partially experience rated, i.e., higher benefit payouts to current and former employees lead to higher future contributions.

The five programs identified in Chart A include the largest of the state-financed social benefit programs. Other programs such as state temporary disability insurance might also be considered but they are small, the size of General Assistance or smaller. Evidence of the effects of interstate competition in the provision of social benefits is most likely to be found in analyses of one or more of the programs identified in Chart A.

II. Research Literature

Geographic mobility is hallmark of U.S. society, for both our citizens and businesses. Those who move frequently cross state boundaries. Public policies in the separate states try to influence mobility decisions to their own advantage.

There are two bodies of research which emphasize competition among the states caused by geographic mobility. One stresses the competitive aspects of economic development. States and localities follow different policies in areas such as labor law, business tax rates and other factors which influence "business climate." To some extent, decisions about plant location are influenced by business climate. States compete in trying to attract new businesses and to retain existing firms through a variety of means. Among the costs businesses may consider in making plant location decisions are the costs of Unemployment Insurance taxes and Workers' Compensation contributions. One summary of this literature is provided by Bartik (1991).

AFDC and Welfare Macrnets

The second type of research might be characterized as the "welfare magnets" literature. Do states that pay high welfare benefits attract persons from other states and/or retain current welfare recipients at above-average rates by pursing policies motivated to reduce poverty through high benefit payment levels? If these kinds of recipient behavior exist (or are perceived to exist by elected public officials), individual states may compete to avoid the costs and other undesirable aspects of being welfare magnets. To the extent that generous welfare benefits entail higher costs, the rate of tax-induced out migration (by families and businesses) from such states may also be above-average. Attempts to avoid this situation can motivate states to restrict welfare benefits, and, in the aggregate, lead to a "race to the bottom" in benefit provision. Research by political scientists, e.g., Peterson and Rom (1990), Tweedie (1994), and Scheve, Rom and Peterson (19971, have stressed this aspect of interstate competition. The present report is motivated by this research.

Several researchers have tested for effects of interstate competition in the AFDC program. This report will discuss only a few of these studies. However, interested readers can pursue the references listed in recent articles by Heaney (1997), Scheve, Rom and Peterson (1997) and Tweedie (1994).

A common element in this literature is the variable explained in the regressions and descriptive analysis: the maximum AFDC benefit for a family of four. In individual studies, it is measured in different ways: in nominal terms or relative to state cost of living and either in levels or as changes. The size of the recipient population and/or total AFDC expenditures typically are not the subject of the analysis although the beneficiary caseload does occasionally enter as an explanatory variable. Use of the maximum AFDC benefit is deliberate in that it reflects something under the control of state policy, unlike caseloads or total expenditures where recipient behavior also influences the observed outcomes.

The time unit of the observations is either annual or two year periods. Use of two year intervals is supported by arguments that decision making follows two year electoral and/or budget cycles in many states. Data periods are typically the 1970s and the 1980s. Thus the sample sizes fall into the 400-700 range.[4]

Two broad classes of explanatory variables are utilized. 1) Within-state variables are used to capture political factors (party control of state government, state political ideology) and economic factors (per capita income, the poverty rate, unemployment, inflation). When levels (as opposed to changes) of AFDC benefits are being explained, the lagged dependent variable is also frequently entered. 2) Variables purporting to reflect interstate competition are also entered, typically an average of AFDC benefits in adjacent states. The exact measurement of the dependent variable (some version of the maximum AFDC benefit for a family of four) and the various independent variables differs from one study to the next.

Finding an effect of AFDC benefits in adjacent states could reflect the effects of interstate competition or it could reflect other factors, e.g., a common social ideology and/or similarity of income levels for states of a given region. Thus even if positive coefficients on adjacent-state variables are found, questions of interpretation would still remain.

On this point, the line of argument of the Scheve, Rom Peterson (1997, pages 8-10) paper is interesting. Identification problems abound and perfect correlation of changes in AFDC payment levels across the states would make identification impossible. Additional information about the cause for changes in benefit levels is needed. They argue that such additional information is provided by two sources: economic and political

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[4] Heaney (1997) uses 48 states and two year intervals from 1970 to 1990 (528 observations). Tweedie (1994) uses 50 states and two year intervals from 1971 to 1989 (400 observations). Scheve, Rom and Peterson (1997) use 48 states and annual data from 1976 to 1989 (672 observations).

incentives facing the states and statements from a wide variety of state politicians that they want their states to avoid becoming welfare magnets. The authors further note:

> "Yet we will only be able to determine empirically whether state welfare policies are influenced by their competitors if the influence is imperfect. Paradoxically, if all states had the same welfare policies, it would be impossible to show that they influenced each other. Influence can only be demonstrated if 'slow' states tended to speed up or 'fast' ones slow down."

Thus, the researcher fits multiple regressions and makes inferences based on the coefficients of the interstate competition variables. The researcher's inferences presume the specification of the relationship is correct (both in the selection of the explanatory variables and in the way they are measured) so that estimated coefficients and associated standard errors are unbiased.

These studies generally find the expected positive and significant coefficients on the interstate competition variable. Benefit levels in adjacent states move benefits for the subject state in the same direction.[5] The estimated coefficients vary across studies but usually fall into the range from 0.25 to 0.40. In one test for symmetry of effects, Heaney (1997) found the coefficients were not statistically different for situations where the adjacent state average was above or below the benefit level of the subject state.

The approach of these studies is to utilize pooled time series and cross section data for states. Statistical-econometric questions can be raised about the findings. The questions of most relevance here regard possible biases in the estimated effect of the interstate competition variable. 1) If the specification is

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[5] The coefficient reported by Heaney (1997) is negative and significant but his interstate competition variable is the state's benefit level relative to the average of adjacent states. Thus the interpretation of the finding is the same as for specifications where the interstate competition variable is measured as the average benefit for the adjacent states.

incorrect, either as to choice of included variables, their lag structure or the functional form, the estimated coefficient for this variable could be biased. 2) Where the lagged dependent variable is included and there is autocorrelation of the time series residuals, it could bias the other coefficients including the interstate competition coefficient. Since the lagged dependent variable is the most important variable in both Scheve, Rom and Peterson (1997) and Heaney (19971, this could be especially problematical in their studies. 3) Collinearity among included variables may also be present. If the collinearity were highest among the within-state variables, this could yield underestimates of their effects relative to the interstate competition variable. It should be noted these estimation problems, endemic to "spatial econometrics," are recognized and addressed in different ways by the studies,6 but there is no way to know how successfully they have been addressed.

To summarize the preceding, five comments seem appropriate. 1) These studies have tried to model the explanation of a variable under the control of policy makers, the maximum AFDC benefit for a family of four. 2) They have included within-state economic and political variables within the equation specifications. 3) They find significant effects of variables intended to measure interstate competition. 4) While critical questions about the estimating equations can be raised, the general finding of support for the interstate competition hypothesis seems robust. 5) These studies do not attempt to estimate the quantitative importance of interstate competition in restraining the growth in maximum welfare benefits during the 1970s and 1980s. There is a significant effect, but its macro importance, expressed as a point estimate or as an estimated range for the reduction in maximum benefits, is not addressed.

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6 A standard text is Anselin (1988).

Interstate Competition in Unemolovment Insurance

Recently Laurie Bassi and Daniel McMurrer (1996) have completed a state-level analysis of tax rates in unemployment insurance (UI). As noted earlier, the costs of UI to states is roughly twice the costs of AFDC. Thus financial developments in this program should be of even greater concern to the states. Consistent with a race-to-the-bottom perspective, there has been a long term decline in UI benefit recipiency relative to the economy's level of unemployment. The decline in UI costs has been concentrated in the share of new unemployment spells that are compensated as opposed to average benefit duration or the level of benefits vis-a-vis average wages.

Bassi and McMurrer fitted regressions in pooled data and found strong evidence that lagged tax rates from adjacent states influence tax rates in given states. Using coefficients from regressions they undertook fifty year simulations of state rates and concluded that interstate competition was responsible for a major reduction in UI benefits and taxes. For the year 1993 when the national average UI tax rate was 0.90 percent, they infer that the rate would have been 0.53 percentage points higher (or 1.43 percent) absent the effects of interstate competition. From their analysis they conclude (p. 27) "the states do, indeed, appear to be locked into a race to the bottom." They further conclude that the intensity of interstate competition has been increasing in the post World War II years.

Since the Bassi-McMurrer (1996) analysis reaches such strong findings, it will be reviewed in some detail. Their regressions explain average state level UI tax rates (taxes as a percent of total covered wages and salaries) for the 48 contiguous states. The regression results are summarized by eight multiple regressions in Table 2 of their paper. Four regressions are conducted for the years 1977 to 1990 and utilize what will be termed here a full specification with six kinds of explanatory variables. Four additional regressions covering 15 year periods (1948-1962, 1963-1977 and 1978-1992) are fitted using a reduced

specification with two kinds of variables (unemployment rates and UI tax rates). The latter specifications are not preferred by the authors, but were necessitated by the absence of data for the other variables prior to 1977.

Six variables were utilized in the 1977-1990 regressions:

1) State government is a step variable with values of 0, 1, 2 or 3 depending upon how many of the executive and legislative branches of state government are controlled by the Democratic party, e.g., it equals two if the governor and senate were Democratic but the house of representatives were Republican.
2) Tax caoacitv is the share of UI covered wages that are taxable. States with high taxable wage bases relative to their average covered wage would have high tax capacity.
3. Unionization rate measures the share of workers covered by collective bargaining agreements as reported in the Current Population Survey (CPS) .
4. Reserve ratio is the level of UI trust fund reserves expressed as a percent of covered wages and lagged three years.
5. Unemolovment rate is based on state level estimates of the total unemployment rate(TUR) for persons 16 and older taken from the CPS. Since these data are published for all states only since the mid 197Os, the national TUR is used in specifications for earlier years. This variable enters the regressions in two ways, as a one year lag and the change from two to one years ago.
6. Tax rates in other states is measured as the average for contiguous states and the average for all other (balance of country) states. It enters with a one year lag. The variable is further split into high (H) and low (L) depending on the size of the average relative to the average for the state of interest.

Note the full specification has ten variables including two measurements of the TUR and four of the tax rates in other states (H and L for both contiguous states and balance-of-country states). Like the AFDC literature noted above, the Bassi-McMurrer regressions incorporate both within state and adjacent state variables. Unlike that literature, however, the variable of interest here includes effects beyond the direct control of policy makers, at least in the short run. In this analysis the average tax rates for the entire balance-of-country are included along with the average tax rate for adjacent states. Further, they test for asymmetry of the response to averages that are higher and lower than the tax rate in the state of interest.

For the full specification nine of ten explanatory variables

are significant at conventional levels with expected signs on all ten.[7] State tax rates respond more when the averages for adjacent states and balance-of-country are below the state's own tax rate than when they are above the state's tax rate. Splitting the sample into periods when the TUR is declining more than average or increasing, the authors find evidence that the response to other tax rates is larger in periods when unemployment is declining (equations (2) and (3) of Table 2). They also find evidence that tax rates are especially responsive to the tax rates of the largest adjacent state (equation (4) of Table 2).

The Bassi-McMurrer reduced specifications utilize just the two unemployment rate variables and the four tax rate variables. The national TUR is used in three of these regressions. For the three sub periods (1948-1962, 1963-1977 and 1978-1992) the coefficients on the national TUR variables become larger as one moves towards the present (equations (5), (6) and (7) of Table 2). However the coefficients for the tax variables display mixed patterns. Coefficients for the adjacent states are largest for the 1948-1962 period but the balance-of-country tax coefficients are largest for the 1963-1977 period. Finally, they also fit a regression for the 1978-1992 period using state TURs. This regression (equation (8)) has smaller coefficients on the contiguous state tax variables but larger coefficients for the rest-of-country tax variables when compared to the reduced specification utilizing the national TUR (equation (7)).

Equations (51, (6) and (7) (the reduced specifications for the three sub periods) are particularly important to the conclusions of the paper since these coefficients were used in the simulation analysis. For each of the three, simulations were conducted from 1948 to 1998. Differences in results from using the 1948-1962 versus the 1978-1992 coefficients were the basis

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[7] Positive coefficients are expected for all variable except tax capacity, the lagged reserve ratio and the lagged change in the TUR.

for conclusions about increased interstate competition. Starting the simulations with actual 1948 tax rates and going forward 50 years yielded projected average tax rates for the early 1990s of 1.43 percent using the 1948-1962 coefficients and of 0.90 percent using the 1978-1992 coefficients. The authors conclude that the cumulative effects of increased competition among the states lowered average UI tax rates by 0.53 percentage points in the early 1990s (1.43 percent versus 0.90 percent). Absent interstate competition (or, with a continuation of the intensity of competition as it existed during 1948-1962) the UI program would have been much larger in the early 1990s. The authors' estimate suggests the UI program in the aggregate would have been more than half again larger than its observed size in the early 1990s.

Before accepting this conclusion some critical comments about the Bassi-McMurrer analysis will be offered. Their work has weaknesses in three broad areas. (1) There is insufficient attention to the institutional framework within which the setting of UI tax rates takes place. (2) There are shortcomings in the econometric estimation. (3) There are shortcomings in the simulation analysis. The net effect of the criticisms is to make one skeptical of the size of effects attributed to race-to-the-bottom behavior by the states. Competition among the states undoubtedly exists, but the Bassi-McMurrer analysis exaggerates, perhaps substantially, the size of its effects on UI programs.

Settina UI Tax Rates

The system for funding UI programs in the U.S. is typically described as forward (or advance) funding. Employer contributions are made into state trust fund accounts held at the U.S. Treasury which are the source for benefit payments to eligible claimants. Employer taxes are experience rated so that higher payouts to current and former employees lead to increased taxes at a future date. The details of experience rating vary widely across states, but most states rate employer experiences and set UI tax rates using either reserve ratios (reserve balances as a percent of

covered wages) or benefit ratios (benefits as a percent of covered wages).* Both major types of experience rating systems rely upon multiple tax rate schedules to set individual employer tax rates. The tax schedule in effect in a given year depends on the state's trust fund balance as of a computation date. Individual employer taxes are set by the schedule based on their reserve ratio or benefit ratio depending upon the type of experience rating that is followed. All of the components of experience rating are determined by UI tax variables from the individual states and their respective UI tax statutes.

One hallmark of experience rating is the lags associated with setting tax rates. 1) Most states use a computation date of June 30th to set the tax schedule which will be in effect on January 1st of the following year. 2) Complete data on annual tax rates typically are not published until more than six months after the end of a calendar year. Thus if a state were closely monitoring the rates of one or more of its neighbors, this information lag would impede such monitoring. 3) Experience rating responds with a lag to cyclical benefit payout patterns. Benefit ratio experience rating typically responds to increased benefit payments over a three year period while reserve ratio systems may exhibit equally long lags.

The UI tax variables in the Bassi-McMurrer analysis do not appropriately reflect the institutional realities of tax rate determinations in the states. There is no direct measure of benefit ratios that would be important determinants of tax rates in benefit ratio programs. Even more serious is the short lag on the tax rates used in the regressions, i.e., one year. No evidence is offered to suggest states modify their tax statutes

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* There are 53 UI programs including the District of Columbia, Puerto Rico and the Virgin Islands. Reserve ratios are used in 33 states and benefit ratios are used in 15. Of the remaining five programs, two use both reserve ratios and benefit ratios (Michigan and Pennsylvania) and three use other flow measures of experience (benefit wage ratios in Delaware and Oklahoma and payroll declines in Alaska).

frequently in response to developments in other states, especially developments in adjacent states. Finding significant effects of one year lagged tax rates (selected because this lag had the largest effect) suggests the tax variables are a proxy for something else. A likely candidate for this something else is regional economic developments that affect unemployment and other economic variables in a similar manner for contiguous states.

Because the setting of UI tax rates involves several institutional and economic considerations, it is the subject of further analysis in Section III. To anticipate some findings of that analysis: state tax rates change frequently, different tax rate schedules frequently apply in adjacent years, but states modify the underlying schedules of tax rates rather infrequently. The Section III analysis suggests that states only occasionally modify the institutional framework within which employer tax rates are set.

The Econometric Estimation

Five problems in the econometric estimation merit comments. 1) There is high collinearity between the state level unemployment rates (TURS) from one year to the next. For the fourteen years 1976 to 1989 the squared correlation between the TUR and the TUR lagged one year was 0.71, higher than the R^2 for equation. Yet the squared correlation between the TUR and the annual change in the TUR for the same period, i.e., the two unemployment variables in their regressions, was only 0.08. Thus apparent collinearity is sharply reduced by the choice of the two unemployment variables that enter the regressions. It is not known how many coefficients are affected by this collinearity.

2) The presentation of significance levels for individual coefficients is nonstandard. Rather than showing t ratios, they present probabilities that the true underlying slope could be from a distribution with a zero mean. This statistic is related to the standard t ratio but less informative, both for high and

low levels of significance.g Thus in Table 2 there are six included coefficients that fail conventional tests of significance. This includes three of the coefficients for tax capacity, both contiguous state tax rate variables in equation (2) l the lagged reserve ratio in equation (3) and the high tax rate variable for the largest contiguous state in equation (4). A standard presentation of significance levels would make these results more readily apparent to the reader.

(3) The lags on the tax rates for other states are implausibly short. Lags of at least two years would be more appropriate. From the text, it is clear that using longer lags would reduce the significance of these tax variables, and (as important) the size of the estimated effects of interstate competition.

(4) The sizes of the tax coefficients are inflated in the equations based on the reduced specifications that include just the TUR and the tax rate variables. For example, the coefficient for low tax rates in contiguous states is 0.33 in the full specification for 1977-1990. This increases to 0.40 in the reduced specification that utilizes state TURs for the 1978-1992 period. It rises further to 0.55 in the reduced specification that utilizes national TURs for this same time peri0d.l' The third coefficient is 67 percent larger than the first one. This finding is hardly surprising since the tax variables are undoubtedly capturing effects captured by the state government and the unionization variables in the full specification. The latter variables both trend downward during 1977-1990, and both

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' The probabilities will be 0.00 for each coefficient with a t ratio of 3.0 or larger. Thus there is no way of judging the importance among variables with probabilities shown as 0.00. Conversely, low significance is indicated by higher probabilities. A probability of 0.30 is equivalent to a t ratio of 1.0 while a probability of . 10 is equivalent to a t ratio of 1.70.

l0 These three equations are numbers (11, (8) and (7) respectively in Table 2.

have positive coefficients. Thus both contribute to the downtrend in tax rates during 1977-1990 in the full specification.

(5) Finally, the procedure that splits contiguous state average tax rates into high and low observations and fits separate coefficients for each seems to have a serious econometric flaw. Appendix A describes an analysis of this situation using two series of random variables. The straightforward estimation of one random variable on the other produces expected results, i.e., no significant relation. However, significant coefficients are found when the explanatory random variable is divided into "high" and ‘low" observations, lagged one year and the two sets of observations are used as regressors. Further, the coefficient for the "low" explanatory variable is much larger than for the "high" variable, as in the Bassi-McMurrer findings. The analysis of Appendix A suggests their findings may not have solid statistical underpinnings.

The Simulation Analysis

As noted, the simulations are conducted over 50 year periods using three sets of coefficients from reduced specifications covering the years 1948-1962, 1963-1977 and 1978-1992. The biggest concern raised by these simulations is the likely bias in the coefficients upon which they are based. Three issues relating to potential biases can be identified.

1) The lag between tax rate changes in adjacent states and effects in states of interest would typically be expected to exceed one year. Shorter lags could occur, but a two year lag would usually be needed to encompass reporting delays, computation date delays and legislative delays. Simulations with two year lags on the tax variables (based on equations fitted with two year lags on these variables) would be expected to produce smaller estimated effects of interstate competition than shown in their paper.

2) Based on comparisons of coefficients in equations (1) and (8) versus equation (7) in Table 2 of their paper, one would

expect fuller specifications of the underlying equations would produce smaller tax rate coefficients than used in the simulations. Again, the estimated effects of interstate competition would be reduced.

3) The systematic differences in coefficients between "high" and "low" tax rates in adjacent states may reflect an econometric problem arising from the technique of splitting the variables into "low" and "high" observations. The difference in the size of these coefficients is what propels average tax rates downward through time in the Bassi-McMurrer simulations. Thus if there is a bias which tends to make the "low" coefficient the larger of the two, this bias will account for much of the simulated long run effect of interstate competition.

Combined, the preceding three considerations suggest that the regression coefficients underlying the simulation analysis may have biases that affect the simulation results. It is likely that if these issues were successfully addressed, the simulation results would change. It is also likely that the simulated effects of interstate competition in restraining the level of UI tax rates over the past 50 years would be substantially smaller than estimated by Bassi and McMurrer. Thus the issue is not the direction of the effect of interstate competition but rather the size of the effect on UI tax rates.

Given the inherent interest in questions of interstate competition, more research on the determination of UI tax rates seems warranted. The next section undertakes additional analyses of UI taxes to see if evidence can be found suggesting increased interstate competition in more recent years.

III. Further Analysis of State UI Tax Rates

Tax rates in state UI programs have several determinants. A unique feature of UI program financing is the presence of state trust funds held at the U.S. Treasury that are the immediate

source for disbursements to eligible claimants. Because of trust fund financing, UI programs can make benefit payments during recessions that substantially exceed the volume of annual UI taxes paid by covered employers.

In the long run, UI taxes and benefits are closely related. The principal long run determinant of employer tax rates is the benefit payout rate. Appendix B examines state level tax rates and benefit payout rates. That analysis focuses on state level tax rate determination in the long run and the important factors that underpin the benefit payout rates of the states.

This section focuses on three topics: 1) the institutional features of tax rate determination, 2) movements of tax rates in adjacent states and 3) a regression analysis of determinants of tax rates in individual states. The analysis is both descriptive and econometric. Thus the presentation emphasizes tabular arrangements of state data as well as econometric estimation. In all areas there is a time series component to the analysis. Annual data are studied.

Institutional Considerations

Research that emphasizes interstate competition and the race to the bottom presumes that individual states can respond to developments in adjacent states with reasonably short time lags.

The setting of UI taxes for individual employers involves a number of institutional features that are instructive to review. A full discussion of all important aspects of tax rate determination is not contemplated here-l1 Three features will be emphasized: the computation lag, the structure of the state's tax rate schedules and the triggers that activate individual

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I1 In particular the discussion will not cover: 1) solvency taxes and other aspects of flexible financing in the states, 2) differences in tax rate determination under different types of experience rating (reserve ratio versus benefit ratio experience rating systems) 3) the setting of the taxable wage base, and 4) new employer tax rates.

schedules. Each will be discussed with attention to possible evidence of effects of interstate competition.

Most states set tax rates using several tax rate schedules that are specified by statute. To know which particular schedule will be operative in the next year, a determination is made in the preceding year. The level of the state trust fund balance (or the balance measured relative to covered wages or relative to taxable wages) is used in these calculations. Typically the trust fund balance in mid-year (June 30th or July 1st) determines which tax schedule will be operative on January 1st of the next year. The time interval between the dates is termed the computation lag. Most states have a six month computation lag. No information from adjacent states enters this state-level determination.

If a state were sensitive to taxes in adjacent states it might be expected to shorten the length of this lag in order to respond more rapidly to adjacent state developments, i.e., tax rate reductions. Nothing would prevent a state from using December 31st as the computation date for next year's taxes.[12] However, when computation dates and computation lags were traced from 1966 to 1996, no major changes were observed. The average computation lag was 4.4 months in 1966 and 4.8 months in 1996. No important change in this institutional aspect of UI tax rate determination occurred over this period.[13]

Under experience rating, tax rate schedules assign higher tax rates to employers with worse experience indicators (lower reserves in reserve ratio states or higher benefit payouts in benefit ratio states). If states were sensitive to tax rate developments in adjacent states, predictable changes in these schedules would be expected. Minimum tax rates would be reduced.

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[12] The taxes due for each quarter are typically paid one month after the quarter ends. For the first quarter of the year the tax rate could be conveyed to each employer even after January 1st and still allow a timely tax payment on April 30th.

[13] A summary of the computation lags for 1966, 1975, 1986 and 1996 appears in Table 2-l of Vroman(1997).

Schedules would be modified so that more employers would qualify for lower tax rates, i.e., the length of the intervals where the minimum rate or very low rates apply would expand relative to other parts of the schedules. While no detailed analysis of the shapes of tax rate schedules was undertaken for this report, the average minimum tax rate in 1994 and 1996 (0.6 percent) was the same as in 1966 and only 0.3 percent lower than in 1986.[14]

Setting employer tax rates is a common subject of UI legislation. In recent years some states have added new tax schedules with tax rates lower than those of the preceding lowest schedule, e.g., Washington in 1994, Kansas in 1995. There also have been instances of states adopting temporary tax schedules substantially below existing schedules, e.g., New Jersey during 1993-1995. Most changes, however, are best described as patches or adjustments to the existing set of tax rate schedules.

Fundamental restructuring of a state's UI tax system is a less common occurrence. While there are examples, e.g., Washington in 1984, Illinois in 1987 and Pennsylvania in 1988, they are not common in a given calendar year.

Recent developments in Kansas and North Carolina may have longer term effects on adjacent states and nonadjacent states. Both states have provided substantial tax reductions to positive balance employers in the form of UI tax holidays, i.e., no UI taxes for an entire year. Both states have historically held large UI trust fund balances. Adjacent states have felt pressure to emulate these changes with their own set of tax reductions. However it is not at all clear how long North Carolina and Kansas can persist in providing UI tax holidays. Relative to the longer historical record, these two examples of tax rate reductions are unusually large. Their longer run effects on adjacent states will be followed with interest.

From information on tax rate schedules covering the period 1978 to 1996, the main impression is one of tax schedule

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[14] See Table 2-2 in Vroman(1997).

stability. Because the shape of UI tax rate schedules has not been seriously studied in recent years, more research on this topic could be instructive.[15]

There is evidence that tax schedule trigger thresholds have been changed in a number of states. In one analysis that spanned the years 1986 to 1996 the triggers that activated the top tax rate schedules were noted for 39 states. For 24 there were no changes while the trigger was raised in four states but lowered in 11 states.[16] Perhaps more relevant is an analysis of tax rates and schedule triggers for the bottom tax rate schedules. When minimum rates were compared for the lowest experience rating schedules in 47 programs in 1986 and 1996, 30 were unchanged, 13 were lower and 4 were higher.[17] Comparisons of triggers for the lowest tax rate schedules could be made for 34 states. Of this total, 15 were unchanged, 14 were lower and five were higher. Thus between 1986 and 1996 the triggers did move downward for a measurable number of states. While a more thorough analysis is needed to judge the size and quantitative importance of these changes, the direction of change is clear. There was movement towards lower triggers and lower minimum rates on the bottom tax schedules over the past decade.

One implication of the preceding is that employers in some states during 1996 would find it easier to qualify for low UI tax rates than they would have ten years previously. The lower 1996 tax rates would arise both because the minimum tax rate on the bottom schedule was lower and because the tax schedule trigger was set at a lower threshold. This would have additional

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15 Two researchers Philip Levine of Wellesley College and Philip Ellis of MIT have gathered the tax schedule information for 35 states for purposes of assigning tax rates to individual employers in research projects. See, for example, Card and Levine (1994).

16 See Chapter 2 in Vroman(1997).

17 Comparisons could not be made for Nebraska, North Dakota, Utah and Wyoming.

implications for the cyclical variability of tax rates since revenues not received before a recession (due to lower tax rates) would need to be raised at a later time. The quantitative importance of this change is probably quite small, but it would be interesting to examine. One useful analysis would be to simulate the change in tax rate variability over the business cycle in states that had made relatively large changes in tax rates and/or the trigger for the bottom tax rate schedule.

The conclusion of the preceding review is that many institutional features of UI tax rate determination were stable in recent years. There was little suggestion of frequent modifications in computation dates, shortening of computation lags or changes in the shape of tax rate schedules. Between 1986 and 1996 there were measurable numbers of reductions in the minimum rates on the lowest tax rate schedules and reductions in the triggers that activate the bottom schedules. However, the actual minimum tax rate averaged 0.6 percent in both 1994 and 1996, the same as in 1966 and only 0.3 percent lower than in 1986. The overall impression is much more of continuity than of change in the institutional features state-level UI tax rate determination.

State Tax Rate Patterns, 1956 to 1995

When average state UI tax rates (accruals as percent of covered payroll) are examined, a wide range of variation is observed both across states and through time. Between 1956 and 1996 the national average tax rate ranged from a low of 0.64 percent in 1970 and 1971 to a high of 1.41 percent in 1978.l* During these 41 years the national average UI tax rate fell below

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I8 The tax rates to be discussed are annual average tax rates expressed as a percent of total wages and salaries of taxable covered employers. All tax rates are taken from column (17) of the U.S. Department of Labor (1995) and updates, the so called Handbook data. These tax rates were used by Bassi and McMurrer.

0.70 percent three times and exceeded 1.38 percent three times. The time series variation in the national tax rate strongly follows business cycle developments in the economy.

Even when the national average tax rate is constant there is a wide range of tax rate variation among the individual states. Table 1 shows state data for five separate years (1956, 1967, 1975, 1989, and 1995) when the national tax rate fell within the narrow range from 0.84 percent to 0.88 percent.l' In addition to individual year data by state, the table shows five year averages and the range of rates for these five years. The states have been sorted into the nine Census divisions starting with New England at the top and ending with the Pacific division at the bottom.

Five features of Table 1 are noteworthy. 1) There are strong regional differences in average employer tax rates. The simple average of the five year averages for the six New England states was 1.17 percent fully one third above the national average. In contrast the simple average for the nine states of the South Atlantic division (Delaware through West Virginia in Table 1) of 0.65 was one quarter below the national average.

2) Tax rates for individual states display a wide range of variation over these five years. Across the 51 jurisdictions the range of rates exceeded 0.50 percent for 35. The median of these ranges was 0.60 percent.

3) Some states consistently exhibit tax rates that fall substantially below the national average. The five lowest averages are observed for Virginia (0.34 percent), South Dakota (0.39 percent), Colorado (0.41 percent), Nebraska (0.47 percent) and Florida (0.47 percent).

4) Changes in regional economic fortunes are apparent in these data. The recessions of the early 1970s and the early 1990s were especially severe for New England and Middle Atlantic

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I9 Although data were available, 1996 was not included in Table 1 because the overall tax rate (0.78 percent) was clearly below the 0.84-0.88 percent range of the other five years.

states. With the exceptions of Vermont and Pennsylvania note how tax rates increased between 1967 and 1975 and again between 1989 and 1995. For the five industrial Midwestern states (Illinois through Wisconsin in Table 1) note how tax rates were higher in 1989 than in 1975 for all but Indiana. Finally, the combined effects of the recessions of the early 1980s and the energy bust of the mid 1980s are also obvious. For the five "oil patch" states (Louisiana, Oklahoma, Texas, Colorado and Wyoming) the simple average tax rate rose from 0.58 percent in 1975 to 1.14 percent in 1989 and then declined to 0.59 percent in 1995.

5) Certain states display consistently lower tax rates than their neighbors. Virginia, South Dakota, Colorado, Nebraska and Florida have already been singled out for having the lowest tax rate averages. Two other states whose tax rates fall far below the rates of their immediate neighbors are Indiana and New Hampshire.

These low tax rate states will be studied later in the next part of this section.

Tax Rate Patterns for Adjacent States

Proponents of the interstate competition hypothesis contemplate strong state reactions to developments in adjacent states. Tax rates were examined for sets of states adjacent to selected states where UI tax rates are known to be consistently low. Based on the findings of Bassi and McMurrer (1996) there is reason to expect that low tax rates have particular strength in influencing tax rates in adjacent states.

A descriptive analysis was undertaken for five sets of states that surround specific low tax states. Tax rates were traced for the years 1956 to 1996, a period of sufficient length for patterns of adjustment to low tax rates to be observed.

The low tax states were selected in a straightforward manner. The five states with the lowest average tax rates from Table 1 were Virginia, South Dakota, Colorado, Nebraska and Florida. The first three were selected for the analysis. Nebraska

is adjacent to both South Dakota and Colorado. To minimize overlaps, Nebraska was treated as an adjacent state in the analysis.[20] Florida was not selected because it has only two adjacent states, Georgia and Alabama. The other states were Indiana and New Hampshire, states with average tax rates much lower than the rates of their neighbors.

Table 2 shows the time series of tax rates for the five selected low tax rate states (Indiana, New Hampshire, South Dakota, Colorado and Virginia) and all surrounding states. For each of the five clusters, the time series were reviewed for evidence of convergence in tax rates towards the rates of the low tax state. To help direct the reader's attention, each annual observation where the adjacent state's tax rate falls below that of the low tax state is identified with an outline. Thus Ohio's tax rate during 1956-1958 was lower than Indiana's. Also shown for each state is its average tax rate for the full period 1956-1996 and the two sub-periods 1956-1976 and 1977-1996.

While a descriptive analysis cannot hope to be fully conclusive, two patterns would be expected if interstate competition is a major phenomenon. 1) Something like a ping-pong pattern of state tax rates should be observed. If one state with lower tax rates induces change in its neighbors there should be alternating patterns as to which of each pair has the higher tax rate. In Table 2 there should be several years when adjacent state rates appear in outline indicating lower rates vis-a-vis the low tax state. 2) A gradual convergence in tax rates towards the rates of the low tax states would be expected. Thus the averages for the 1977-1996 period should be closer to the low tax states' averages than their respective 1956-1976 counterparts.

Two states in the Indiana cluster (Ohio and Illinois in Part 1 of Table 2) did have tax rates lower than Indiana's for several years. However, with a single exception, all of these instances

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[20] Nebraska has six neighboring states. All but one of the six (Missouri) is adjacent to either South Dakota or Colorado.

occurred during the 1956-1976 period. For all four states the average tax rate differential vis-a-vis Indiana during 1977-1996 was larger than during 1956-1976.

Similar qualitative findings emerge for New Hampshire and its three neighbors. The adjacent states had lower tax rates only during the earlier 1956-1976 period. These were concentrated during the late 1950s and (for Vermont) the early 1960s. After 1962 there was only a single observation of a neighbor with a lower tax rate than New Hampshire (Vermont in 1972). The absolute differences in average tax rates were larger during 1977-1996 than during 1956-1976. If anything, these data may suggest that New Hampshire moved to a lower tax situation during 1977-1996 (relative to 1956-1976) but its three neighbors did not follow.

Part 2 of Table 2 displays data for South Dakota and its neighbors. Most instances of lower tax rates in adjacent states involve Nebraska and Iowa. Like South Dakota, Nebraska is a low tax state. Nebraska's rate was lower than South Dakota's in eleven different years which span the period 1956-1985. This pattern would be expected by proponents of the interstate competition hypothesis. The pattern for Iowa is qualitatively different. Its rate was below South Dakota's each year from 1956 to 1970 and then only once more, in 1974. After 1975 Iowa moved to significantly higher tax rates which remained consistently above 1.00 percent through 1989. None of the other state tax rates display evidence of convergence towards South Dakota's when the twenty year averages are compared. For all six the absolute difference in tax rate averages were larger during 1977-1996 than during 1956-1976.

Part 3 of Table 2 reviews the states adjacent to Colorado. Note how Colorado experimented with several years of very low tax rates during 1956-1996. Its annual tax rate was less than 0.50 percent in 18 of the 41 years and the average during 1956-1976 was 0.47 percent. Despite Colorado having very low rates in many years, note that three states (Oklahoma, Kansas and Nebraska) each had at least eleven years when their rates were lower than

Colorado's rate. Typically this occurred in years when Colorado's rate increased measurably, e.g., 1970. This evidence of alternation in low tax rates is not repeated for the three other adjacent states (Wyoming, Utah and New Mexico). When twenty year averages are compared, the differential vis-a-vis Colorado are somewhat smaller during 1977-1996 than they were during 1956-1976 for five of the six neighboring states (all but Wyoming). This also suggests some effects of interstate competition. However the degree of convergence was modest.[21]

Part 4 focuses on tax rates in Virginia and its neighbors. Of the 246 neighboring state observations there were only 14 instances of a tax rate below Virginia's. Half were from the District of Columbia between 1956 and 1964. When the twenty year averages are reviewed there is a suggestion of some convergence towards Virginia's average rate from Maryland, Tennessee and North Carolina. Over the 1987-1996 decade, only during 1994-1996 in North Carolina were any average rates below Virginia's rate.

To summarize, the Table 2 data suggest four conclusions. 1) The low tax rate states previously identified in Table 1 had tax rates lower than their neighbors quite consistently throughout the 1956-1996 period. Of the 25 neighboring states[22]' seven never had a tax rate below that of the low tax state throughout the entire 41 years. Another nine neighbors had lower rates in from one to five years. 2) Most of the instances of lower tax rates occurred during the 1956-1976 period. Altogether in Table 2 there were 131 instances of neighboring state tax rates being less than the rate in low tax state and 81 of these occurred between 1956

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[21] While the increase in the twenty year average was 0.23 percent for Colorado (from 0.47 percent to 0.70 percent), the increase was 0.10 in Utah, 0.15 in New Mexico, 0.07 in Oklahoma, 0.08 in Kansas and a decrease of 0.06 in Nebraska. Nebraska's rate during 1977-1996 was actually lower than Colorado's.

[22] This total of 25 counts Nebraska and Wyoming twice, as neighbors of both South Dakota and Colorado. Kentucky is also double counted, as a neighbor of both Indiana and Virginia.

and 1976. The proportions of observations where the tax rate fell below that of the low tax state fell from 0.154 during 1956-1976 (81 of 525) to 0.100 during 1977-1996 (50 of 500). 3) Differences in average tax rates vis-a-vis the low tax rate states tended to be larger during 1977-1996 than during 1956-1976. Across the 25 neighboring states the average differentials were larger during 1977-1996 in 16 instances. This suggests that convergence in tax rates towards the rates in the low tax states was at best a slow process during 1956-1996. 4) Evidence of tax rate alternations with low tax rate states was most apparent for three states adjacent to Colorado, i.e., Oklahoma, Kansas and Nebraska. For nearly all other pairwise comparisons, these patterns were not observed.

A descriptive analysis of this type cannot be as definitive as desired. But the findings suggest that persistent tax rate differentials were the norm for these states and that little or no tax rate convergence occurred during 1956-1996. Since the total number of UI programs covered by this analysis was 27 (five low tax states plus 25 neighbors including three duplications) this finding may well generalize to the overall UI program.

A Rearession Analysis of UI Tax Rates

In an attempt to be more strictly quantitative, state-level UI tax rates were examined using a regression framework that emphasized traditional determinants of tax rates. The approach used variables from within each state as determinants of its tax rate. To the extent that such variables can successfully explain tax rate variation there is no need to consider factors (influences) from adjacent states.

Table 3 presents descriptive data on important within state variables for the period 1956 to 1996. Note the similarity of the averages for UI tax rates and benefit cost rates, measured as a percent of covered wages in columns (1) and (2). In the long run, a state's average tax rate must reflect its experiences in paying

benefits.[23] The range of average tax rates, however, is substantial. The average tax rate for the five states with the lowest tax rates was 0.53 percent during 1956-1996 while it was 1.70 percent for the top five states.

The states also demonstrated wide variability in average reserve ratios (trust fund reserves as a percent of covered wages) and unemployment rates. The variability in unemployment rates is especially noteworthy since individual states have limited ability to control their own unemployment. Over the 40 years 1957 to 1996 five states had unemployment rates that averaged less than 4.0 percent. Not surprisingly each of these five states (Nebraska, South Dakota, Kansas, Iowa and New Hampshire) is a state with low UI tax rates. Conversely, six states (West Virginia, Alaska, Louisiana, Michigan, Washington and California) had average unemployment rates that exceeded 7.0 percent for the period. Except for Louisiana, these states had benefit cost rates and average tax rates that exceeded the national average by at least 15 percent. Clearly a state's unemployment rate has a major effect on its UI program's costs.

The final two columns in Table 3 display indices of UI benefit availability and the average reserve cushion with which each state's trust fund operated during 1956-1996. The benefit availability index is the ratio of the benefit cost rate to the average unemployment rate. The index was 0.25 or higher for the five states Rhode Island, North Dakota, Vermont, New Jersey and Massachusetts but lower than 0.12 for the four states Texas, Florida, Virginia and Indiana. This index at least partly reflects the ease with which a state makes UI benefits available

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[23] A regression of the average tax rate on the average benefit cost rate in the states as shown in Table 3 yielded an adjusted R^2 of 0.959 and a slope on the benefit cost rate of 0.952. The link between tax rates and benefit payouts and the determinants of benefit payout rates in the long run are examined in Appendix B. Table Bl of Appendix B displays a series of regressions that provide parameters for the long run relations.

to unemployed claimants.[24]

Individual states operate with widely varying levels of trust fund reserves relative to their benefit payout rates. This is partially reflected in the reserve cushion index shown in the final column of Table 3. This index shows the average reserve ratio relative to the average benefit cost rate for the 1956-1996 period. Pennsylvania, Michigan, Illinois and Minnesota operated with the smallest average cushions during 1956-1996 while Georgia, North Carolina, South Dakota and Virginia had the highest average cushions during these years.

Three inferences can be drawn from the descriptive data in Table 3. 1) In the long run UI tax rates are closely linked with state experiences in paying programs benefits, i.e., the close correlation between columns (1) and (2). 2) A state has only limited ability to control its UI benefit costs. The variation in state unemployment rates is largely beyond a state's control, but a state can influence payment levels and benefit availability. 3) A state may follow alternative strategies in funding its program. Reserve ratios (column (3)) show large variability relative to average to average benefit cost rates (column (2)). Some states operated with low reserves vis-a-vis annual benefit payouts.

The UI tax rates whose averages appear in column (1) of Table 3 were examined with time series regressions covering the period 1958 to 1996. The objective of the analysis was to determine if tax rates could be satisfactorily explained using just within state variables. Two regression specifications were

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[24] The determinants of the benefit cost rate for states in the long run , i.e., column (2) in Table 3, are examined in Appendix B. Cross section regressions were fitted that utilized the unemployment rate and the ratio of weekly beneficiaries to total unemployment and the benefit replacement rate (average weekly benefits as a proportion of the average weekly wage) as explanatory variables. All three variables had positive and highly significant coefficients, and combined they explained 84 percent of the interstate variation in average benefit costs. Unemployment, benefit availability and benefit generosity are all important as determinants of interstate UI cost differentials.

tested, and they yielded similar findings. Each specification was then used to project UI tax rates.

The first approach fitted a pooled regression for the years 1958 to 1986 and projected tax rates for the ensuing years 1987 to 1996. The second approach fitted state-level regressions in data spanning the full period 1958 to 1996. In both approaches two explanatory variables were utilized: the reserve ratio (reserves as a percent of covered wages) on the computation date and the benefit ratio (benefits as a percent of covered wages) for the three years ending June 30th of the previous year. It was expected that the reserve ratio would enter with a negative coefficient while the benefit ratio would enter positively.

The pooled regression using 1958-1986 data yielded the following result.

$$\text{(1)}\quad \text{Tax Rate} = \underset{(11.74)}{0.232} - \underset{(5.45)}{0.0176}*\text{ResRatio} + \underset{(60.31)}{0.780}*\text{BenRatio}$$

where Tax Rate is the average percentage UI tax rate,
ResRatio is the reserve ratio on the past year's computation date and
BenRatio is the benefit ratio measured as the three years ending on June 30th of the preceding year.

The regression explained 76 percent of the state UI tax rate variation for the 1958-1986 period. The average error per observation was 0.23 percentage points. Both explanatory variables entered with the expected signs. From the t ratios beneath the coefficients, it is clear that the benefit ratio was by far the more important of the two explanatory variables. Its t ratio was 60.31 compared to 5.45 for the reserve ratio. After benefit payouts increase there is a tax rate response spread over the subsequent three years with the increase in the tax rate representing 78 percent of the increase in benefit payouts.

Equation (1) was then used to project tax rates for the full 1958-1996 period, i.e., for the within-sample years 1958-1986, and the ensuing out-of-sample years 1987-1996. Table 4 shows the

results, displaying averages for 51 UI programs in each year. For the within-sample period, the equation tracked actual tax rates quite accurately. The largest percentage error in the average projections is a 10.11 percent overprediction in 1961. Twelve percentage errors exceed 5.0 percent. While there is serial correlation in the average errors (patterns of negative errors followed by negative errors and positive errors followed by positive errors), the projections captured nearly all of the increases in tax rates that occurred during 1958-1962, 1972-1978 and 1981-1984. Conversely, tax rate reductions during 1963-1971, 1978-1981 and 1984-1989 were also closely approximated.

The most dramatic finding in Table 4 pertains to the out-of-sample projections. Starting in 1989 the equation makes systematic overpredictions. The average errors are not unprecedented for the five years 1989-1993, ranging from 4.44 percent in 1989 to 8.76 percent in 1991. However the 1994-1996 errors are the largest in the table, and the three year average overprediction was 14.80 percent.

The pattern of errors is consistent with the interstate competition hypothesis. Tax rates declined relative to a projection that incorporated the effects of each state's reserve ratio and its benefit ratio. If states were responding to tax rate developments in adjacent states, this pattern of overpredictions would be expected.

Two aspects of these overpredictions are noteworthy in light of the conclusions of Bassi and McMurrer (1996). First, the timing of the large overpredictions is concentrated during 1989-1996 and especially during 1994-1996. These years fall largely outside their estimation period, especially the very largest overpredictions of 1994-1996. Second, even for the last three years of the projection period, the percentage errors in Table 4 averaged 14.80 percent not the much larger 50.0 percent suggested by their findings.

The approach utilized here does not include variables that are proxies for developments in adjacent states. To the extent

that interstate competition was operative during 1958-1986, it might be expected to affect the accuracy of the predictions and cause a pattern of increasing overpredictions in later years even before reaching the out-of-sample years. This was not observed. One interpretation of the in-sample residual pattern is that interstate competition was present during 1958-1986, but its effects did not grow during this period of nearly thirty years.

The approach followed in this exercise did not attempted to duplicate the Bassi-McMurrer methodology by incorporating tax variables from adjacent states into the regression specification. However, the modest size of the overpredictions in Table 4 coupled with an absence of increasing overpredictions during the (1958-1986) estimation period suggests much smaller effects of interstate competition than the Bassi-McMurrer results.[25]

The second projection exercise utilized state-level regressions fitted for the full period 1958 to 1996. For each state the UI tax rate was regressed on the (lagged computation date) reserve ratio and the (three year lagged) benefit ratio. This approach allows the slope and coefficients on these variables and the intercepts to vary by state.

The regression results are displayed in Table 5. Generally these equations fit quite well with the adjusted R^2 exceeding 0.50 in 45 states and exceeding 0.60 in 39 states. Only six

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[25] An alternative interpretation is that effects of interstate competition are somehow subsumed within one of the regression's explanatory variables. Given its generally greater significance, the obvious candidate is the benefit ratio. Of the three long run determinants of state benefit ratios (See Appendix B), the ratio of weeks compensated to total weeks of unemployment (a proxy for benefit availability), did decrease noticeably between 1958 and 1986 (from 0.48 to 0.28 nationwide). However, the decrease was concentrated in two periods, the early 1960s and the early 1980s. For the latter period where reasonably complete state-level data are available, the decreases occurred in many states at the same time (1980-19821, not in a staggered pattern that would suggest reactions to developments in adjacent states. The most likely explanation for decreased benefit availability during 1980-1982 is financing problems within the states (as signaled by trust fund deficits) not interstate competition.

states have standard errors that exceed 0.25 percentage points. However, there is strong evidence of positive serial correlation in the residuals. Durbin-Watson statistics are generally low, and 40 indicate positive serial correlation when tested at the 0.01 level of significance.[26]

Of the two regressors, the benefit ratio has the expected positive coefficient in all 51 regressions, and it is significant at the 0.01 level in 45 states. The reserve ratio is generally the less important than the benefit ratio, but it has the expected negative coefficient in 41 states. The reserve ratio is significant at the 0.01 level in 21 states and at the 0.05 level in 25 states. Only three of its ten positive coefficients are significant. Thus both variables enter with expected effects in most states.

The Table 5 regressions were then used to trace patterns of tax rate residuals for the years 1989 to 1996. The results are summarized in Table 6. The table shows the signs of the residuals for the 408 state-level observations of these eight years. The choice of 1989-1996 was made on the basis of the average residual patterns observed in Table 4. These were the eight consecutive years of overpredictions noted in that table.

To keep the detail in Table 6 manageable, the display emphasizes the signs but not the numerical values of the residuals. Years when the regression overpredicts (actual tax rate less than the projected tax rate) are identified with negative signs. If the residuals were normally distributed one would expect half of the residuals to be negative. Further, under a normal distribution about 34 percent of the observations would be expected to fall within one standard error in both positive and negative directions. Of the remaining errors 16 percent would

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[26] The lower and upper bounds for a test at the 0.01 level are 1.187 and 1.393 respectively with an indeterminate range falling between these bounds. Forty of the Durbin-Watson test statistics fall below the lower bound while another five fall into the indeterminate range.

be expected to be one standard deviation or more in each direction. The table identifies both the positive and negative errors which are "large" (one standard error or larger in size) with the indicators of +l and -1 respectively.

While the regression residuals may not be normally distributed, the use of the normality assumption is convenient for setting expectations about sign and size of the residuals. Suppose that the reserve ratio and the benefit ratio were the only important determinant of each state's tax rate during 1958-1996. Half of the errors from 1989-1996 would be expected to be negative (204 of 408 observations) while 16 percent would be expected to be negative and at least one standard error below the regression line (65 observations). If taxes have been reduced by interstate competition, however, the number of negative errors and the number of "large" negative errors would respectively be expected to exceed 204 and 65. The states have been arranged by Census division in Table 6 to allow the reader to observe geographic patterns in the residuals.

Table 6 clearly shows a larger number of negative residuals than would be expected under the no change hypothesis, e.g., 204 negative residuals if interstate competition were no more intense during 1989-1996 than it had been during 1958-1986. The number of positive errors totals only 104 (0.255 of the total) compared to 304 negative errors. There are also more "large" negative than might be expected, 92 versus an expectation of 65 under a no change hypothesis. Negative errors predominate in each of the eight years with the numbers ranging from a low of 35 in both 1992 and 1993 to a high of 42 in 1996. Also, observe that the negative errors are relatively more numerous during 1994-1996 (averaging 40) than during 1989-1993 (averaging 37). Finally, note that large negative errors are much more numerous during 1994-1996 than during 1989-1993 (averaging 16.3 and 8.6 respectively).

The time series patterns of regression equation errors in Table 6 suggest that interstate competition and associated tax

rate reductions increased in intensity during 1994-1996. The predominance of negative errors during 1989-1993 also suggests that interstate competition may have been more intensive during these years than during the earlier 1958-1988 period.

The geographic pattern of the residuals in Table 6 is also noteworthy. While five or more negative errors occurred in all but nine states, states in the East North Central division (Iowa to South Dakota), the three southern divisions and the Mountain division (Arizona to Wyoming) had especially high proportions of both negative errors and large negative errors. The most extreme situation is found in the East South Central division (Alabama to Tennessee) where all 32 errors were negative and 16 were large negative errors. Ten of the 16 large negative errors occurred during 1994-1996.

The geographic patterns of residuals in Table 6 plus the time series patterns noted in both Tables 4 and 6 suggest that factors besides within-state reserve ratios and benefit ratios have affected UI tax rates during 1989-1996. Part of the explanation for the presence of so many negative residuals could be the effects of interstate competition and increased sensitivity to tax rates in adjacent states.

Summary of the UI Tax Rate Analyses

This section has undertaken three analyses of UI tax rates. Concluding comments will be organized according to each area of analysis. 1) Most of the institutional features of state UI tax rate determination were quite stable during the past forty years. This qualitative finding applies, for example, to the length of the lag between the computation date and the date new tax schedules become effective. However, when tax rate schedules in 1986 and 1996 were compared, there was evidence that a measurable minority of states did modify features of their lowest tax rate schedule. In instances where comparisons could be made, the minimum tax rate on the bottom schedule was lower for 13 of 47 programs in 1996, and the trigger for the bottom schedule was

lower in 1996 in 14 of 34 states. The net effect of these changes was to make it easier for employers to pay lower taxes on the bottom tax rate schedule in 1996 than in 1986.[27]

2) When the tax rates for states surrounding five low tax rate states were examined, most evidence suggested a persistence of wide disparities and no tendency for tax rate differentials to decline during more recent years. The strongest evidence of ping-pong effects among adjacent states was found in the states adjacent to Colorado. In many of the comparisons of Table 2, the adjacent states had higher tax rates in all but a handful of years during the 1956-1996 period. When adjacent state average tax rate differentials (vis-a-vis the low tax state) were compared for the two periods 1956-1976 and 1977-1996, the differentials were more often larger during 1977-1996.

3) A regression analysis explained time series variation in state tax rates from 1958 to 1986 using only within-state financing variables (reserve ratios and benefit ratios). During these years there was no observed tendency for a regression based on pooled data to make larger overpredictions in the later years (as would be expected under the interstate competition hypothesis). However, consistent overpredictions for the years 1989-1996 did emerge from two separate regression-based analyses. The percentage overprediction during 1994-1996 averaged 14.80 percent (a projected average tax rate of 0.948 percent compared to an actual average of 0.826 percent in Table 4). This pattern is consistent with the expectations of the interstate competition hypothesis. While overpredictions were especially widespread and large during 1994-1996, their estimated size was much smaller than suggested in research by Bassi and McMurrer (1996). The overpredictions were less than 20 percent rather than the 50

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[27] While these changes imply lower UI taxes in 1996 for some fraction of employers, the changes also would be expected to increase business cycle variability in tax rates. Lower pre-recession taxes imply lower trust fund balances and greater need to raise taxes after the onset of a recession.

percent suggested by their analysis.

4) Further quantitative and qualitative analysis of UI tax rates should be undertaken. The work completed to date has not been definitive. The effects of changing political party control of state government is one topic that merits added attention.

IV. Workers' Compensation Costs

Of the five social protection programs introduced in Section I, Workers' Compensation (WC) is the second most expensive in both total expenditures and state-level financing costs. Only Medicaid is more expensive. Like Unemployment Insurance, WC is supported by payroll levies on employers. In most states, contributions are paid to private, for-profit insurance carriers. The carriers also are heavily involved in WC benefits administration and the rehabilitation of injured workers. Thus WC is a mandatory social insurance program whose benefits and financing are determined by state statutes, but a program with substantial private sector involvement. Because the majority of employer payroll contributions are made to private carriers, most of WC's state-level costs of financing are not reflected in state government budgets.

Table 7 displays national time series data on WC and UI costs from 1956 to 1995. Estimates of WC costs are based both on data published by the National Council on Compensation Insurance (NCCI) and the Social Security Administration (SSA). The NCCI estimates show annual percentage increases in WC benefit costs and an index of benefit costs arbitrarily based at 1.00 in 1959. The latter is a cumulative total based on annual percentage changes in benefits as estimated by NCCI. Recently, SSA revised its methodology for estimating WC costs as a percentage of payroll. Starting in 1989 there are two estimates, labeled SSAl

and SSA2 respectively.[28] For comparative purposes Table 7 also displays annual data on UI costs as a percent of payroll.

Since the mid 1960s Workers' Compensation costs, expressed as a percent of employer payroll, have more than doubled. Program costs represented 0.9-1.0 percent of payroll during the last half of the 1950s and the first half 1960s. Costs started to increase measurably in the early 1970s. Increases are noticeable in NCCI data starting in 1972 and in SSA data starting in 1974. By 1989 the SSAl estimate had reached 2.27 percent of payroll. These data further suggest that WC costs peaked in 1992-1993 and have declined in the most recent years. However, during the 1990s WC costs have continued to average about two and one half times the costs of UI. Note in Table 7 that WC cost increases were most rapid during the 1970s, especially during 1972-1978. Unlike UI costs, WC costs do not exhibit an obvious cyclical pattern.

Workers' Compensation is especially relevant to discussions and analyses of interstate competition. Unlike UI, there is no important federal involvement in WC. Individual states set benefit levels through their own legislation. Program financing is similar to UI financing in that WC is supported by employer payroll contributions, and contribution rates are experience rated. Thus higher benefit payouts for wage loss benefits and/or medical expenses cause contribution rates to increase.[2g]

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[28] Another source for data on WC costs to employers is the Employment Cost Index (ECI) prepared by the U.S. Bureau of Labor Statistics. These data are available for private sector employers from 1987 and state and local governments from 1991. One analysis of these data has been undertaken by Barkume and Ruser(1997). The geographic detail of published EC1 data is national and for the four major Census regions but not for individual states.

[2g] Details of experience rating in WC differ from details in UI. Of most importance: 1) individual employers can elect to self insure in WC, i.e., post a bond and directly finance the costs of work injuries and illnesses, 2) rates are set using a credibility factor which means small employer rates are largely determined by industry costs as opposed to the firm's own experiences and 3) the interest that accrues between the time of contributions and payouts is the property of the private insurance carrier and not

This program is a good candidate for testing hypotheses about interstate competition. The regulations covering the carriers are set by state insurance commissions. There is no federal oversight in setting taxes and/or benefits. If a state felt itself at a competitive disadvantage vis-a-vis one or more neighboring states, it could modify (restrict) benefits, and this would cause employer premium rates to decline. Since these costs average more than twice the costs of UI, evidence of interstate competition involving WC costs could potentially be stronger than evidence based on UI costs. Actions to lower employer costs in both programs could signal that business climate was better in one state than in higher-cost adjacent states.

Limitations on available WC cost data, however, hamper empirical testing. There is no requirement for uniform data reporting. Much of the information on program costs is derived from the National Council on Compensation Insurance (1996) (NCCI) which assists state rating agencies and insurance carriers in setting premium rates. For most states, NCCI publishes advisory rates across a full array of industry-occupation classifications of employment. In most states with competitive rate making, these advisory rates must be adjusted upward by an average loading factor to capture estimated costs of sales and administrative expenses to yield an estimate of manual rates. The resulting manual rates are paid by new employers and small employers who do not qualify for experience rating. When state legislation alters payment levels (cash benefits and medical benefits), NCCI advisory rates are modified to reflect the changes.

One recent development in WC rate making has been the gradual introduction of competitive rate making into the states. Starting with Arkansas in 1981, most states have enacted competitive rating laws which allow individual insurance carriers

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automatically available for benefit payments. In the long run, contribution rates are heavily influenced by experiences in paying benefits (as shown in Appendix B for the UI program).

broad leeway in setting contribution rates for their customers. While this development allows price shopping by employers, it increases the variation in the premium rates actually charged.

The premium rates paid by covered employers are typically less than the manual rates proscribed by state rating agencies. Factors causing these downward deviations include reductions related to good accident experiences, premium discounts for large purchases, reductions associated with deductibles and dividends to employers. However, the size of the downward deviations (discounts) from manual rates has not been extensively studied.

Three brief investigations of WC costs were undertaken with the objective of finding evidence of interstate competition. 1) Average manual rates for the years 1986-1996 were studied in data assembled by the Oregon Department of Consumer and Business Services (1996). 2) The costs of benefit changes were traced for 45 individual WC programs from 1965 to 1995 in data assembled by NCCI. 3) State adoptions of competitive rating laws were studied for period 1981 to 1996. The first topic examined average premium rates. The second and third topics focused on changes instituted during specific years. In all three areas, state-level data were examined with particular attention to developments in adjacent states that could reflect the effects of interstate competition.

Average Manual Rates, 1986 to 1996

The manual contribution rates published by NCCI and other state-level WC rating organizations show rates for detailed risk categories of employment. Individual employers make contributions that reflect the distribution of workers across these detailed categories. Additionally, the average rate paid an employer is influenced by the employer's own experiences and by the pricing policies of insurance carriers, e.g., premium discounts for large employers. Also, with the increased prevalence of competitive rating laws in the states, insurance carriers have increased flexibility to set rates in light of their own financial circumstances and other considerations. Thus even if one knew the

distribution of workers across rating categories, the actual average rate paid by an employer could deviate substantially from the average rate suggested by the manual rates for its workers.

Since the mid 1980s, the Oregon Department of Consumer and Business Services (1996) has developed information on contribution rates which is used to rank WC costs in Oregon against costs in other states. While there are more than 500 detailed rating categories, the Oregon procedure utilizes manual rates from 50 categories. These are large categories that represent about 60 percent of loss experiences in Oregon. For each state, the Oregon analysts have assembled premium rates for these fifty categories. These rates were then weighted by the distribution of payrolls in Oregon to derive an estimate of the average manual rate. Differences in statewide averages reflect differences in contribution rates with no effect of differing distributions of employment across the 50 categories.

Weighted averages of manual rates, adjusted for average overhead loadings in competitive rating states, are available for the even numbered years starting in 1986. Table 8 displays the averages from 1986 to 1996 for all 50 states plus the District of Columbia. The states have been arranged by geographic area, i.e., the nine Census divisions. Also shown are average yearly premium rates for the nine Census divisions and the U.S. along with six year averages for each state, Census division and the U.S..[30] All of these latter averages were developed from data as published by Oregon. The Oregon analysts do not attempt to estimate national or regional averages.

Four features stand out in Table 8. 1) There is wide variation in state-level averages. The six year averages range from a low of 1.81 percent in Indiana to 6.44 percent in Hawaii. 2) The Census divisions also exhibit noticeable variation with

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[30] The averages for Census divisions and for the U.S. weight each state's premium rate by average UI taxable covered wages for the years 1986 and 1995.

six year averages between 3.41 percent and 3.56 percent in four divisions while the averages exceed 4.50 percent in three divisions. 3) The average premium rates shown in Table 8 are much higher than rates shown previously in Table 7. This suggests that the combined effects of factors such as experience rating, self insurance and quantity discounts are substantial, making actual WC costs to employers perhaps only half of the costs shown in Table 8. To the extent that self insurers have lower costs than firms that purchase WC policies, this too would tend to inflate the costs measured in the Oregon rates relative to the Table 7 cost estimates. 4) The national average of state-level rates also shows considerable variation, increasing by roughly 50 percent between 1986 and 1992 and declining by about 20 percent between 1992 and 1996. The aggregate data from the earlier Table 7 suggest a much smaller increase between 1986 and 1992 and a somewhat smaller decrease after 1992.[31]

The Table 8 premium rates were examined using multiple regressions. Some specifications similar in spirit to those utilized by Bassi-McMurrer (1996) in their analysis of UI tax rates. Pooled data for five years (1988, 1990, 1992, 1994 and 1996) were studied in equations that tested for effects of adjacent state WC premium rates and rest-of-country premium rates. These contribution rate variables were entered with two year lags (hence the loss of 1986 in the pooled data). Tests were conducted for possible differing effects of high and low averages for these variables.[32] Thus the analysis tested for possible differences in estimated coefficients when these rates were above and below the premium rate for the state of interest. However,

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[31] The 1986-1992 percentage increase in the SSAl data of Table 7 was about 20 percent. The two estimates for the 1992-1995 period (SSAl and SSA2) indicated reductions of about 15 percent.

[32] High and low were identified from comparisons of adjacent state averages with the given state and rest of U.S. averages with the given state.

because of questions about the accuracy of coefficients estimated using separate "High" and "Low" variants of contribution rate variables (from adjacent states and from rest-of-U.S.), some regressions also fitted that used simply the contribution rates from adjacent states and rest-of-U.S.."

Three additional variables were included in the regressions. The first was a O-l dummy variable to indicate the presence of a competitive rating law in the state. The sign on this variable's coefficient was not obvious. High premium rates may have been a factor leading to the adoption of such laws (hence a positive coefficient) or they may have caused reductions in premium rates (hence a negative coefficient). The second variable, also a O-l dummy variable, identified the six states that operate with exclusive state funds as opposed to private carriers. Such funds would be expected to charge lower premium rates on average as there are no sales commissions and no profits associated with providing WC insurance. The third variable was the unionization rate in the state. It has been shown that union workers claim and receive WC benefits at higher rates than nonunion workers (Hirsch, Macpherson and DuMond(1997) 1. This would lead one to expect higher benefit cost rates, hence higher contribution rates, in states where unionization was higher.

Table 9 presents four regression results, two using the original data as shown in Table 8 and two using data weighted by the state size (as proxied by average UI covered wages for 1986-1995). Both measurements test for equality of coefficients for "High" and "Low" contribution variables. In equation (1) the lagged contribution rate from adjacent states enters with the expected positive coefficient and a highly significant t ratio. The lagged rest of U.S contribution rate variable has a negative coefficient, contrary to expectations, which is not significant. The exclusive state fund dummy has the expected negative effect

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33 See Appendix A for an analysis of potential econometric problems that arise when this type of specification is used.

which also is significant. Unionization enters positively as expected and has the highest t ratio of all included variables.

Splitting the two contribution variables into "High" and "Low" in equation (2) yields findings like Bassi-McMurrer. For each pair the "Low" coefficient in (2) is the larger of the two and both "Low" coefficients are significant. The Exclusive State Fund dummy and the unionization rate both enter significantly.

The results using weighted data again seem to support the hypothesis that WC contribution rates respond more when the average for adjacent states is lower than for the given state. In equations (3) and (41, however, the signs for the lagged rest of U.S. variables are negative, not positive as expected. The dummy for presence of an exclusive state fund continues to enter with a negative coefficient which is significant in (4). Note in both (3) and (4) that the competitive rating law dummy enters with a negative coefficient which is significant in equation (4) whereas the unionization rate is significant in neither regression.

To summarize, these regressions findings generally support the hypothesis of interstate competition in determining WC premium rates. The (two year) lagged average contribution rate from adjacent states enters all four regressions with a positive and significant coefficient. Further, this coefficient was larger when the adjacent state average was below the average for the state of interest.

Finally, the reader is reminded of some caveats. First, the analysis was based on data constructed from WC manual rates which on average appear to be about twice the levels of average WC contribution rates. Second, the specifications tested did not attempt to include all variables shown to be important in these kinds of analysis, e.g., political control of state government. Third, there probably are biases in the coefficients on "High" and "Low" variables in formulations where the tax rate variables for adjacent states and rest of U.S. are divided into these two categories.

Large Changes in WC Benefit Costs

As noted in Appendix C, NCCI publishes information on the factors that lead to changes in WC premium rates. Of the three sources of change (experience, benefit change and miscellaneous) benefit changes are most directly controllable through state legislation. A state that wanted to reduce costs to employers could accomplish this by enacting restrictions on payments for cash benefits and/or medical benefits.

Table Cl in Appendix C displays annual time series on the costs of WB benefit changes as estimated by NCCI from 1965 through 1995. These data were reviewed to note instances of large changes that were matched by large changes in adjacent states. A large benefit increase was (arbitrarily) defined as an increase of more than 14.9 percent while a large benefit decrease was defined as a decrease of larger than 9.9 percent. Each instance of a large increase and a large decrease under these definitions is highlighted in Table Cl. Between 1965 and 1995 there were 61 large increases and 19 large decreases.

Table Cl has the individual states arranged according to the nine major Census divisions. For each instance of a large increase (or decrease), the changes in adjacent states were examined for the same year and in each of the next two years. If an adjacent state also had a large increase (decrease) this was recorded. This could be done for the 45 jurisdictions where NCCI routinely makes estimates of the costs of WC benefit changes. Comparable data were not available for the six exclusive state fund jurisdictions.34

As noted there were 61 instances of "large" benefit increases and 19 of "large" benefit decreases between 1965 and 1994. The time series patterns of the changes are worth noting. When the changes were summarized according to five year periods, the large increases were concentrated in the early years while

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34 The six are Ohio, West Virginia, North Dakota, Nevada, Wyoming and Washington.

the large benefit reductions were concentrated the late years of this thirty year interval. Fifty four of 61 large increases occurred prior to 1980 and only two occurred after 1984. Eleven of the 19 large decreases took place between 1990 and 1994 while six occurred between 1980 and 1989.

Many large increases took place between 1972 and 1978, 37 altogether. The frequency of these changes during the early 1970s may be related to activities of a national commission that studied the Workers' Compensation program, and made several recommendations regarding benefit levels in the states.[35] Following that Commission's report, a number of states made liberalizing changes in their WC benefit statutes. The Commission's activities were followed by legislative proposals to institute federal benefit standards in WC. Although the proposals were never enacted, the possibility of federal legislation may have been the largest single factor leading to WC benefit changes in the states during the 1970s.

Table 10 summarizes the results of this tracking. The 45 states are divided into the four main geographic regions of the U.S.. Large increases and decreases occurred in all parts of the country. The table is organized to show large increases and large decreases separately. Fourteen of the large increases occurred in states located in the North East. There were 55 adjacent states and seven instances if increases in adjacent states of at least 15 percent that occurred within two years of the initiating changes. When the threshold for a "large" adjacent state increase was lowered from 15 percent to 10 percent, the number of large increases in adjacent states rose from 7 to 10. For states in the North East the proportion of states making large adjustments in the same direction was 0.13 and 0.18 under the two definitions of "large" adjacent state adjustments.

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[35] See National Commission on State Workmen's Compensation Laws (1972). This "Report" includes a series of recommendations for target benefit levels for different types of WC benefits.

adjacent to the 61 states that made large WC benefit increases. Among these 220 states there were 52 instances of large increases of 15.0 percent or larger and 80 instances of increases of 10.0 percent or larger during the same year or the next two years. The associated proportions were 0.24 and 0.36 respectively. Thus while there were measurable numbers of large increases in WC benefits in the same direction, the increases occurred in fewer than half of the states even under the lower threshold for measuring a large increase, i.e., 10.0 percent or larger.

When large adjustments are observed in adjacent states, there remain questions of interpretation. Especially in the early to mid 197Os, many of the state-level changes may have had more to do with the recommendations of a WC national commission than to activities in adjacent states. The proportions in the top half of Table 10 undoubtedly exaggerate the effects of adjacent state activities in causing benefit increases among neighboring states.

Under certain formulations of the interstate competition hypothesis, including the work of Bassi and McMurrer, states are hypothesized to be especially sensitive to benefit reductions in adjacent states. Perhaps the most surprising aspect of the data in the bottom half of Table 10 is the small number of WC benefit reductions that exceeded 10.0 percent in the NCCI data. The total over the full thirty years was only 19, and as previously noted, the majority (11) occurred in the 1990s. Of the 56 adjacent states, there were nine with decreases of 10.0 percent or more in the same year or the next two years. This increases to 14 states when the threshold for a l'largel' adjacent state reduction is reduced to 5.0 percent. These numbers represent 0.16 and 0.25 of the states adjacent to the states making large WC benefit reductions, proportions even lower than the proportions for states making large benefit increases.36

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36 Because of the small numbers of states making the indicated changes (increases as well as decreases) the present analysis did not conduct statistical tests for significant differences between the proportions of states with large

To summarize, four final observations can be offered. 1) The states have exclusive control over benefit levels in their workers' compensation programs. 2) For the first half of the 1965-1995 period, the predominant direction of change in WC benefits was for benefits to increase. Despite the possibility of losing competitive advantage to adjacent states, many states were willing to institute large benefit increases and the overall cost of the program (as a percent of payroll) more than doubled. 3) Even in the 1990s when most large changes in WC benefits have been benefit reductions, the number of states making large reductions has been low. Eleven decreases exceeded 10.0 percent during the five years 1990-1994. 4) The proportion of adjacent states making benefit reductions has been low in the 1990s. Even using reductions of 5.0 percent or more as a threshold, only one quarter of adjacent states made large benefit reductions within two years of the reductions occurring in these eleven states. To date, the states do not seem to be especially sensitive to WC benefit reductions in adjacent states, at least when the measure of response is legislated WC benefit reductions.

AdoDtions of Competitive Rating Laws

Starting with Arkansas in 1981, the states have moved to deregulate rate making in Workers' Compensation (WC). As of 1996 32 jurisdictions of the 45 jurisdictions where private insurance carriers operate have enacted competitive rating laws. These give individual carriers wide leeway in setting rates for each customer and downplay the importance of rate making done by state rating agencies (bureaus) and advisory rates made by NCCI.

If interstate competition is important in the WC programs, evidence would be expected in the patterns of deregulation in rate making. For the 32 states that have enacted competitive

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analysis did not conduct statistical tests for significant differences between the proportions of states with large increases versus states making large decreases in WC benefits.

rating laws, Table Cl of Appendix C shows the year of adoption. Following the lead of Arkansas in 1981, eight other states adopted such laws during 1982-1984. A high rate of adoptions also occurred during 1991-1994 with 14 states enacting these laws.[37] From 1981 through 1996 state adoptions averaged two per year with faster rates of adoption observed during 1982-1984 and 1991-1994.

The timing of state adoptions of competitive rating laws was examined for evidence of interstate competition. The procedure noted how many adjacent states adopted such laws in the same year or within two years after a given state enacted such a law. The 32 adoptions generated 79 observations for eligible adjacent states. Adjacent states were not eligible if they had an exclusive state fund or if they already had a competitive rating law. The number of adoptions by adjacent states totaled 13 or 0.16 of the eligible number. Note that the number of adoptions includes double counting if two adjacent states adopted a competitive rating law in the same year.

When the patterns were reviewed, it seemed there were several adoptions in the early 1990s that may have been influenced by adoptions of a competitive rating law in an adjacent state. In particular, the six states Missouri, Nebraska, South Dakota, Utah, Oklahoma and Texas all adopted competitive rating laws between 1992 and 1994. One other suggestive pattern is provided by Illinois, Michigan and Minnesota, three states which adopted competitive rating laws between 1982 and 1984.

Summarv

Since Workers' Compensation is a state controlled social benefits program it is logical to examine for evidence of

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[37] This count places Maine's adoption in 1993 even though it briefly had a competitive rating law during 1986-1987. As NCCI publications point out, Maine's earlier law was not important as most employers and covered wages were placed in an assigned risk pool during 1986-1987, hence not eligible for lower rates througl competitive rating.

interstate competition. Despite limitations of available data, the preceding analyses found some evidence of interstate competition. However, the program underwent substantial growth in overall scale between the early 1970s and the late 1980s. The analysis did not yield consistent findings that states reacted more strongly to benefit reductions as opposed to benefit increases in adjacent states. The Table 9 regressions suggested this was the case, but the Table 10 information on large benefit reductions did not find high sensitivity to large reductions in adjacent states. Clearly this program should be examined more thoroughly for evidence of interstate competition.[38]

V. Final Observations

This report has reviewed selected literature and undertaken new analysis of interstate competition in the provision of social welfare benefits and social insurance benefits. Five programs were identified where there is a direct state financial stake in providing benefits. The literature review emphasized mainly the AFDC program (now TANF) and provided a rather detailed critique of work by Bassi and McMurrer (1996) which focused on Unemployment Insurance (UI) tax rates. The selection of the AFDC "welfare magnet" literature was deliberate because the Bassi-McMurrer analysis draws direct inspiration from this work.

Some criticisms of the Bassi-McMurrer analysis were offered. Since interstate competition in UI programs is likely to be studied more intensely in the near future, it is important to critically discuss this paper which may influence later research.

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[38] An ongoing project to measure state-level WC premium rates accurately for the period 1975 to 1997 is being conducted by John Burton at Rutgers University along with Terry Thomason and Timothy Schmidle. While their data are not presently available, they expect to have a completed data file by mid-1998. These data would be appropriate for testing hypotheses about interstate competition in WC.

The most important conclusion is that it probably exaggerates the size of the effect of interstate competition in reducing the scope of UI over the past 50 years. Their estimate that the UI program nationwide in the 1990s would be roughly half again larger absent the effects of interstate competition seems implausibly high to this author. Others would want to undertake their own analysis before accepting or rejecting this conclusion.

New analyses of the UI and WC programs were undertaken in Sections III and IV respectively. Summaries of findings in these sections have already been offered and will not be repeated here. A principal finding of the analysis of UI tax rates was that there seemed to be evidence of increased interstate competition during 1989-1996 and especially over the final three years of this period. UI tax rates were estimated to be about 15 percent below their expected levels based on historic regression relationships with state-level reserve ratios and benefit ratios. Interstate competition seems to have contributed to recent reductions in UI tax rates.

More research would help to solidify the estimated effect of interstate competition. At present there is a need to make estimates of the effects of other potentially important factors such as political control of state government and the declining unionization rate.

Given the apparent trend in federal-state intergovernmental relations, research on interstate competition is likely to attract increased interest over the next few years. Some observations about this research may be useful. 1) The configuration of political forces that affect social welfare and social insurance programs may differ measurably across programs. For example, attempts to reduce the scale of UI and WC may provoke more active opposition from trade unions than similar initiatives directed at social welfare programs. 2) The effects of interstate competition may not follow a liner time line or may not be the same across regions. The change of political party control in Southern states during the past decade may be worthy

residuals observed in Table 6 of this report. 3) There may be tradeoffs in the pace of program restrictions (or attempted restrictions) within a given state. If UI is reduced, for example, this could make opposition to reductions in WC more pronounced and effective. 4) Given the scale of state-financed spending on Medicaid, this program would be a logical object for research on interstate competition. 5) Finally, this report made only a modest attempt to examine interstate competitive effects in Workers' Compensation (WC). It is a large program, but research is hampered by absence of data, particularly data that are comparable across states. Efforts to assemble better data should be made. In this area, the current efforts being coordinated by the National Academy of Social Insurance and the work on WC contribution rates being conducted by Burton, Thomasor and Schmidle will be followed with interest.

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Table 1. State Unemployment Insurance Tax Rates, 1956 to 1995

STATE	Percentage Tax Rate 1956	1967	1975	1989	1995	Avg. Rate	Range of Rates
CONNECTICUT	0.77	0.86	1.40	0.49	1.26	0.96	0.91
MAINE	1.24	0.73	1.50	0.96	1.27	1.14	0.77
MASSACHUSETTS	1 .18	1.18	1.68	0.74	1.43	1.24	0.94
NEW HAMPSHIRE	1.25	0.61	0.91	0.26	0.48	0.70	0.99
RHODE ISLAND	2.15	1.38	2.08	1.35	2.07	1.81	0.80
VERMONT	0.97	1.55	1.14	1.20	0.95	1.16	0.60
NEW JERSEY	1.06	1.05	1.48	0.91	0.87	1.07	0.61
NEW YORK	0.94	0.91	1.16	0.53	1.02	0.91	0.63
PENNSYLVANIA	1.49	1.40	1.15	1.34	1.57	1.39	0.42
ILLINIOS	0.69	0.19	0.41	1.07	1 .Ol	0.67	0.88
INDIANA	0.72	0.57	0.49	0.49	0.41	0.54	0.31
MICHIGAN	0.77	0.80	0.99	1.37	1.34	1.05	0.60
OHIO	0.47	0.63	0.52	0.98	0.91	0.70	0.51
/WISCONSIN	0.70	0.84	0.85	1.43	0.84	0.93	0.73
IOWA	0.42	0.32	0.51	1.02	0.51	0.56	0.70
KANSAS	0.80	0.67	1.Ol	0.89	0.16	0.71	0.85
MINNESOTA	0.63	0.81	0.81	1.Ol	0.79	0.81	0.38
MISSOURI	0.67	0.34	0.70	0.51	0.70	0.58	0.36
NEBRASKA	0.54	0.54	0.52	0.48	0.27	0.47	0.27
NORTH DAKOTA	1.09	1.18	1.10	1.24	0.61	1.04	0.63
SOUTH DAKOTA	0.67	0.46	0.38	0.23	0.21	0.39	0.46
DELAWARE	0.51	0.48	0.83	0.83	0.86	0.70	0.38
DIST. OF COLUMBIA	0.46	0.42	0.55	0.44	0.92	0.56	0.50
FLORIDA	0.55	0.40	0.49	0.34	0.58	0.47	0.24
GEORGIA	0.97	0.66	0.42	0.52	0.48	0.61	0.55
MARYLAND	0.69	0.63	0.63	0.40	1.08	0.69	0.68
NORTH CAROLINA	1.04	0.81	0.57	0.51	0.28	0.64	0.76
SOUTH CAROLINA	0.92	0.83	0.53	0.76	0.63	0.73	0.39
VIRGINIA	0.47	0.34	0.13	0.30	0.45	0.34	0.34
IWEST VIRGINIA	0.82	0.83	0.52	0.87	1.08	0.82	0.56
ALABAMA	0.84	0.61	0.56	0.61	0.37	0.60	0.47
KENTUCKY	1.37	0.83	0.77	0.88	0.75	0.92	0.62
MISSISSIPPI	0.91	0.59	0.43	0.55	0.77	0.65	0.48
TENNESSEE	1.29	0.91	0.78	0.63	0.55	0.83	0.74
ARKANSAS	0.92	0.81	0.86	0.95	0.88	0.88	0.14
LOUISIANA	0.88	0.71	1.21	1.24	0.64	0.94	0.60
OKLAHOMA	0.67	0.40	0.55	0.97	0.49	0.62	0.57
TEXAS	0.44	0.35	0.17	1.12	0.60	0.54	0.95
ARIZONA	0.92	0.93	0.52	0.43	0.61	0.68	0.50
COLORADO	0.39	0.25	0.19	0.77	0.47	0.41	0.58
IDAHO	0.99	1.21	1.14	1.44	0.92	1.14	0.52
MONTANA	0.90	0.89	0.97	1.03	0.95	0.95	0.14
NEVADA	1.50	1.26	1.56	0.85	0.89	1.21	0.71
NEW MEXICO	0.85	0.69	0.95	0.98	0.73	0.84	0.29
UTAH	0.79	0.99	0.83	0.90	0.55	0.81	0.44
WYOMING	0.77	0.99	0.80	1.61	0.73	0.98	0.88
IALASKA	1.88	2.16	2.34	3.31	1.71	2.28	1.601
CALIFORNIA	0.98	1.58	1.27	0.72	0.96	1.10	0.86
HAWAII	0.79	1.13	1.26	0.76	1.60	1.11	0.84
OREGON	1.09	1.16	1.02	1.89	0.85	1.20	1.04
WASHINGTON	1.51	1.18	1.74	1.64	1.16	1.45	0.58
]U.S. Total	0.88	0.86	0.88	0.84	0.86	0.86	0.041

Source: U.S. Department of Labor, 'ET Handbook 394, Unemployment Insurance Financial Data.'

Table 2, Part 1. Unemployment insurance Tax Rates for Selected Adjacent States. 1956-1996

Year	States Adjacent to Indiana					States Adjacent to New Hampshire			
	Ohio	Michigan	Illinois	Kentucky	Indiana	Maine	Massa-chusetts	Vermont	New Hampshire
1956	0.47	0.77	0.69	1.37	0.72	1.24	1.18	0.97	1.25
1957	0.44	1.20	0.61	1.43	0.65	1.19	1.04	0.98	1.18
1958	0.45	1.24	0.46	1.34	0.67	1.13	0.99	0.83	1.09
1959	0.80	1.43	0.61	1.58	0.80	1.13	1.14	0.87	1.14
1960	0.84	1.55	1.15	1.44	0.73	1.15	1.16	0.89	1.15
1961	0.77	1.55	1.14	1.36	0.65	1.23	1.29	1.03	1.09
1962	1.14	1.52	1.18	1.36	0.75	1.34	1.72	1.06	1.07
1963	1.10	1.66	1.07	1.25	0.69	1.41	1.61	1.13	1.05
1964	1.45	1.44	0.98	1.14	0.65	1.29	1.68	1.33	1.04
1965	1.22	1.22	0.68	1.11	0.59	1.09	1.59	1.54	1.02
1966	1.02	1.12	0.39	0.81	0.63	0.91	1.49	1.89	0.73
1967	0.63	0.80	0.19	0.83	0.57	0.73	1.18	1.55	0.61
1968	0.45	0.63	0.12	0.67	0.51	0.78	1.16	1.20	0.60
1969	0.37	0.65	0.18	0.68	0.49	0.77	1.02	1.00	0.57
1970	0.39	0.59	0.21	0.66	0.42	0.73	0.99	0.80	0.45
1971	0.39	0.63	0.34	0.70	0.42	0.71	0.91	0.57	0.43
1972	0.56	1.38	0.69	0.78	0.53	1.59	1.66	0.62	0.68
1973	0.75	1.25	1.02	0.92	0.48	1.55	1.73	1.10	0.70
1974	0.61	1.02	0.78	1.06	0.49	1.48	1.68	1.16	0.72
1975	0.52	0.99	0.41	0.77	0.49	1.50	1.68	1.14	0.91
1976	0.88	1.53	0.74	1.17	0.76	1.64	1.74	1.12	1.23
1977	1.06	1.63	1.06	1.23	0.74	1.73	1.74	1.80	0.91
1978	1.26	1.68	1.41	1.22	0.82	1.87	1.72	1.82	1.16
1979	1.03	1.56	1.27	1.06	0.70	1.74	1.70	1.72	0.92
1980	0.88	1.37	1.37	1.19	0.56	1.61	1.51	1.53	0.63
1981	1.01	1.31	1.23	1.40	0.67	1.52	1.46	1.44	0.62
1982	1.02	1.30	1.47	1.76	1.05	1.42	1.35	1.33	0.58
1983	1.35	1.82	1.59	1.78	1.27	1.80	1.34	1.61	0.76
1984	1.72	2.12	1.81	1.79	1.03	1.74	1.23	1.73	0.70
1985	1.55	2.22	1.68	1.57	0.93	1.45	1.04	1.98	0.55
1986	1.41	2.14	1.51	1.43	0.53	1.20	0.80	1.87	0.33
1987	1.32	1.80	1.35	1.21	0.52	1.15	0.76	1.78	0.30
1988	1.09	1.49	1.21	1.03	0.51	1.05	0.72	1.41	0.29
1989	0.98	1.37	1.07	0.88	0.49	0.96	0.74	1.20	0.26
1990	0.86	1.31	0.88	0.78	0.45	0.87	0.80	1.14	0.25
1991	0.82	1.33	0.79	0.78	0.40	0.87	1.05	0.96	0.27
1992	0.95	1.37	0.81	0.82	0.42	1.12	1.28	0.94	0.60
1993	0.96	1.40	0.98	0.80	0.43	1.42	1.61	1.00	0.70
1994	0.95	1.46	1.10	0.78	0.42	1.45	1.53	1.10	0.72
1995	0.91	1.34	1.01	0.75	0.41	1.27	1.43	0.95	0.48
1996	0.76	1.09	0.78	0.72	0.38	1.23	1.31	0.91	0.31
Average									
1956-96	0.91	1.35	0.93	1.11	0.62	1.27	1.31	1.24	0.73
1956-76	0.73	1.15	0.65	1.07	0.60	1.17	1.36	1.08	0.89
1977-96	1.09	1.56	1.22	1.15	0.64	1.37	1.26	1.41	0.57

Source: U.S. Department of Labor, "ET Handbook 394, Unemployment Insurance Financial Data" Outlines identify instances where the adjacentstate'stax rate is lower than Indiana's or New Hampshires's tax rate.

Table 2. Part2. Unemployment Insurance Tax Rates for Selected Adjacent States. 1956-1996

Year	North Dakota	Montana	Wyoming	Nebraska	Iowa	Minnesota	South Dakota
	States Adjacent to South Dakota						
1956	1.09	0.90	0.77	0.54	0.42	0.63	0.67
1957	1.08	0.87	0.79	0.66	0.48	0.55	0.69
1958	0.89	0.85	0.74	0.56	0.50	0.49	0.69
1959	1.00	0.88	0.84	0.75	0.53	0.74	0.71
1960	1.34	1.48	0.86	0.68	0.38	0.67	0.54
1961	1.45	1.56	0.89	0.73	0.40	0.63	0.65
1962	1.58	1.03	1.05	0.77	0.47	0.86	0.85
1963	1.55	0.97	1.78	0.78	0.46	0.78	0.71
1964	1.51	0.95	1.92	0.74	0.44	0.72	0.62
1965	1.41	0.95	1.33	0.59	0.39	0.73	0.58
1966	1.29	0.89	1.22	0.54	0.31	0.88	0.51
1967	1.18	0.89	0.99	0.54	0.32	0.81	0.46
1968	1.15	0.88	0.80	0.41	0.34	0.74	0.44
1969	1.12	0.86	0.64	0.39	0.38	0.70	0.39
1970	1.12	0.86	0.57	0.34	0.32	0.66	0.37
1971	1.15	0.83	0.48	0.39	0.38	0.56	0.38
1972	1.32	0.94	0.65	0.59	0.52	0.75	0.48
1973	1.37	0.95	0.63	0.59	0.56	0.85	0.52
1974	1.16	0.83	0.58	0.60	0.46	8 8	0.51
1975	1.10	0.97	0.80	0.52	0.51	0.81	0.38
1976	0.94	1.22	0.94	1.26	1.21	1.04	0.46
1977	1.37	1.54	1.08	0.89	1.21	1.32	0.51
1978	1.17	1.68	1.02	0.75	1.49	1.37	0.66
1979	1.41	1.67	0.62	0.66	1.44	1.23	0.69
1980	1.35	1.46	0.50	0.61	1.18	1.01	0.54
1981	1.43	1.45	0.47	0.69	1.15	0.93	0.60
1982	1.49	1.29	0.86	0.52	1.17	0.99	0.60
1983	2.08	1.42	1.97	0.75	1.57	1.16	1.04
1984	2.03	1.37	1.92	0.77	1.90	1.31	0.83
1985	1.76	1.65	1.77	0.65	1.87	1.29	0.69
1986	1.62	1.64	1.73	0.80	1.86	1.27	0.67
1987	2.30	1.33	1.43	0.57	1.69	1.25	0.44
1988	1.51	1.22	1.59	0.57	1.45	1.13	0.38
1989	1.24	1.03	1.61	0.48	1.02	1.01	0.23
1990	0.87	0.92	1.53	0.38	0.84	0.96	0.28
1991	0.65	0.72	1.05	0.33	0.81	0.72	0.22
1992	0.78	0.81	1.04	0.46	0.81	0.68	0.24
1993	0.80	0.92	1.04	0.39	0.81	0.86	0.20
1994	0.65	0.95	0.74	0.31	0.69	0.94	0.21
1995	0.61	0.95	0.73	0.27	0.51	0.79	0.21
1996	0.45	0.87	0.72	0.30	0.51	0.66	0.20
Average							
1956-96	1.25	1.11	1.04	0.59	0.82	0.89	0.51
1956-76	1.23	0.98	0.92	0.62	0.47	0.74	0.55
1977-96	1.28	1.24	1.17	0.56	1.20	1.04	0.47

Source: U.S. Department of Labor, "ET Handbook 394, Unemployment Insurance Financial Data"
Outlines show instances where the adjacent state's tax rate is lower than South Dakota's tax rate.

Table 2, Part 3. Unemployment Insurance Tax Rates for Selected Adjacent States, 1956-1996

Year	States Adjacent to Colorado						Colorado
	Wyoming	Utah	New Mexico	Oklahoma	Kansas	Nebraska	
1956	0.77	0.79	0.85	0.67	0.80	0.54	0.39
1957	0.79	0.88	0.81	0.65	0.73	0.66	0.45
1958	0.74	0.90	0.83	0.54	0.70	0.56	0.46
1959	0.84	0.82	0.84	0.63	0.68	0.75	0.28
1960	0.86	0.90	0.81	0.76	0.67	0.68	0.33
1961	0.89	0.86	0.78	0.83	0.66	0.73	0.67
1962	1.05	0.85	0.81	1.14	0.75	0.77	0.79
1963	1.78	1.13	0.81	1.11	0.74	0.78	0.76
1964	1.92	0.96	0.78	0.87	0.82	0.74	0.89
1965	1.33	1.01	0.77	0.80	0.82	0.59	0.70
1966	1.22	0.99	0.75	0.63	0.79	0.54	0.64
1967	0.99	0.99	0.69	0.40	0.67	0.54	0.25
1968	0.80	0.94	0.66	0.36	0.66	0.41	0.24
1969	0.64	0.91	0.64	0.37	0.63	0.39	0.23
1970	0.57	0.86	0.59	0.33	0.53	0.34	0.54
1971	0.48	0.84	0.72	0.33	0.56	0.39	0.42
1972	0.65	0.83	0.91	0.68	1.07	0.59	0.45
1973	0.63	0.93	0.92	0.79	1.17	0.59	0.21
1974	0.58	0.88	0.89	0.60	1.04	0.60	0.17
1975	0.80	0.83	0.95	0.55	1.01	0.52	0.19
1976	0.94	1.00	0.91	0.79	0.97	1.26	0.78
1977	r-1.08	1.28	1.08	1.06	1.00	0.89	1.10
1978	1.02	1.17	1.03	1.17	1.08	0.75	0.78
1979	0.62	1.15	1.13	0.72	0.87	0.66	0.64
1980	0.50	1.02	0.93	0.46	0.85	0.61	0.44
1981	0.47	1.14	0.93	0.33	0.81	0.69	0.35
1982	0.86	1.10	0.91	0.32	0.94	0.52	0.46
1983	1.97	1.88	0.93	0.79	1.42	0.75	0.66
1984	1.92	1.97	1.16	0.93	1.16	0.77	1.27
1985	1.77	1.46	1.14	0.98	1.05	0.65	1.17
1986	1.73	1.04	1.09	1.08	0.97	0.80	0.86
1987	1.43	0.96	1.04	1.08	0.94	0.57	0.92
1988	1.59	0.87	1.01	1.08	0.91	0.57	0.93
1989	1.61	0.90	0.98	0.97	0.89	0.48	0.77
1990	1.53	0.83	0.81	0.78	0.87	0.38	0.63
1991	1.05	0.69	0.79	0.54	0.82	0.33	0.52
1992	1.04	0.56	0.81	0.46	0.81	0.46	0.55
1993	1.04	0.55	0.84	0.50	0.81	0.39	0.55
1994	0.74	0.59	0.86	0.53	0.76	0.31	0.53
1995	0.73	0.55	0.73	0.49	0.16	0.27	0.47
1996	0.72	0.50	0.72	0.40	0.12	0.30	0.40
Average							
1956-96	1.04	0.96	0.87	0.70	0.82	0.59	0.58
1956-76	0.92	0.91	0.80	0.66	0.78	0.62	0.47
1977-96	1.17	1.01	0.95	0.73	0.86	0.56	0.70

Source: U.S. Department of Labor, "ET Handbook 394, Unemployment Insurance Financial Data"
Outlines identify instances where the adjacent state's tax rate is lower than Colorado's tax rate.

Table 2, Part 4. Unemployment Insurance Tax Rates for Selected Adjacent States, 1956-1996

Year	States Adjacent to Virginia						
	District of Columbia	Maryland	West Virginia	Kentucky	Tennessee	North Carolina	Virginia
1956	0.46	0.69	0.82	1.37	1.29	1.04	0.47
1957	0.46	0.68	0.73	1.43	1.24	1.13	0.38
1958	0.39	0.69	0.75	1.34	1.22	1.12	0.30
1959	0.50	1.39	1.24	1.58	1.18	1.20	0.90
1960	0.51	1.67	1.63	1.44	1.15	1.16	0.59
1961	0.50	1.89	1.60	1.36	1.15	1.07	0.73
1962	0.62	1.92	1.77	1.36	1.15	1.04	0.85
1963	0.49	1.85	1.74	1.25	1.18	1.12	0.79
1964	0.48	1.63	0.72	1.14	1.17	1.02	0.56
1965	0.52	1.28	0.77	1.11	1.15	0.96	0.47
1966	0.50	0.95	0.81	0.81	1.08	0.82	0.41
1967	0.42	0.63	0.83	0.83	0.91	0.81	0.34
1968	0.35	0.43	0.83	0.67	0.86	0.78	0.28
1969	0.33	0.36	0.81	0.68	0.80	0.68	0.23
1970	0.34	0.34	0.62	0.66	0.76	0.56	0.18
1971	0.34	0.37	0.62	0.70	0.75	0.53	0.17
1972	0.47	0.56	0.56	0.78	0.84	0.48	0.23
1973	0.52	0.75	0.71	0.92	0.87	0.55	0.24
1974	0.60	0.82	0.55	1.06	0.86	0.62	0.16
1975	0.55	0.63	0.52	0.77	0.78	0.57	0.13
1976	1.03	0.91	0.84	1.17	0.77	0.67	0.51
1977	0.98	1.31	0.82	1.23	0.86	0.95	0.67
1978	1.14	1.64	1.06	1.22	1.13	1.21	0.57
1979	1.38	1.74	1.16	1.06	0.94	1.14	0.53
1980	1.19	1.61	1.08	1.19	0.86	0.95	0.61
1981	0.90	0.99	1.85	1.40	0.81	0.78	0.75
1982	0.86	0.53	2.10	1.76	1.05	0.74	0.75
1983	1.08	0.82	1.97	1.78	1.41	0.83	0.94
1984	1.17	1.32	1.97	1.79	1.43	1.31	1.05
1985	1.17	1.27	1.94	1.57	0.90	1.24	0.75
1986	1.04	1.03	1.91	1.43	0.71	0.96	0.51
1987	0.70	0.54	1.79	1.21	0.68	0.55	0.39
1988	0.50	0.46	1.65	1.03	0.66	0.48	0.31
1989	0.44	0.40	0.87	0.88	0.63	0.51	0.30
1990	0.55	0.36	0.83	0.78	0.59	0.52	0.28
1991	0.49	0.45	1.12	0.78	0.56	0.52	0.27
1992	0.75	0.95	1.12	0.82	0.56	0.50	0.33
1993	1.07	1.05	1.16	0.80	0.59	0.48	0.43
1994	1.03	1.18	1.12	0.78	0.59	0.34	0.48
1995	0.92	1.08	1.08	0.75	0.55	0.28	0.45
1996	0.79	0.77	1.06	0.72	0.50	0.10	0.36
Average							
1956-96	0.70	0.97	1.15	1.11	0.91	0.79	0.48
1956-76	0.49	0.97	0.93	1.07	1.01	0.85	0.42
1977-96	0.91	0.98	1.38	1.15	0.80	0.72	0.54

Source: U.S. Department of Labor, "ET Handbook394, Unemployment Insurance Financial Data."
Outlines identify instances where the adjacent state's tax rate is lower than Virginia's tax rate.

Table 3. State UI Taxes, Benefits and Reserves and State Unemployment Rates, Averages 1956-l 996.

STATE	UI Tax Rate (1)	Benefit Cost Rate (2)	Reserve Ratio (3)	Unemploy. Rate (4)	Benefit Availability (2)/(4)	Reserve Cushion (3)/(2)
CONNECTICUT	0.97	1.21	1.95	5.27	0.23	1.61
MAINE	1.27	1.38	2.08	5.89	0.23	1.51
MASSACHUSETTS	1.31	1.35	1.76	5.49	0.25	1.31
NEW HAMPSHIRE	0.73	0.73	2.91	3.93	0.19	3.98
RHODE ISLAND	1.80	1.84	1.88	6.16	0.30	1.02
VERMONT	1.24	1.34	2.34	5.06	0.27	1.74
NEW JERSEY	1.22	1.52	1.96	6.19	0.25	1.28
NEW YORK	1.18	1.18	3.62	6.28	0.19	3.06
PENNSYLVANIA	1.46	1.55	0.57	6.58	0.24	0.36
ILLINIOS	0.93	1.02	0.86	5.88	0.17	0.85
INDIANA	0.62	0.65	2.15	5.75	0.11	3.34
MICHIGAN	1.35	1.38	0.60	7.80	0.18	0.43
OHIO	0.91	1.00	1.28	6.23	0.16	1.29
WISCONSIN	1.08	1.14	2.81	5.00	0.23	2.46
IOWA	0.82	0.86	2.95	3.92	0.22	3.43
KANSAS	0.82	0.87	3.10	3.90	0.22	3.56
MINNESOTA	0.89	0.98	0.86	4.66	0.21	0.87
MISSOURI	0.73	0.80	2.09	5.18	0.15	2.62
NEBRASKA	0.59	0.64	2.30	3.33	0.19	3.60
NORTH DAKOTA	1.25	1.28	1.81	4.36	0.29	1.41
SOUTH DAKOTA	0.51	0.58	2.64	3.44	0.17	4.57
DELAWARE	0.94	0.95	1.59	5.72	0.17	1.68
DIST OF COL	0.70	0.83	1.86	6.72	0.12	2.23
FLORIDA	0.61	0.56	2.22	5.94	0.09	3.98
GEORGIA	0.69	0.67	3.25	5.64	0.12	4.86
MARYLAND	0.97	0.98	2.08	5.21	0.19	2.13
NORTH CAROLINA	0.79	0.78	3.78	5.38	0.15	4.83
SOUTH CAROLINA	0.83	0.82	2.96	6.15	0.13	3.63
VIRGINIA	0.48	0.47	2.09	4.62	0.10	4.47
WEST VIRGINIA	1.15	1.28	1.63	10.00	0.13	1.27
ALABAMA	0.85	0.92	2.09	6.85	0.13	2.26
KENTUCKY	1.11	1.16	2.85	6.49	0.18	2.45
MISSISSIPPI	0.94	0.91	3.46	6.88	0.13	3.80
TENNESSEE	0.91	0.90	2.29	6.09	0.15	2.53
ARKANSAS	1.04	1.11	1.70	6.94	0.16	1.54
LOUISIANA	0.98	1.10	2.28	7.87	0.14	2.08
OKLAHOMA	0.70	0.72	1.70	5.52	0.13	2.36
TEXAS	0.48	0.53	1.34	5.77	0.09	2.52
ARIZONA	0.73	0.70	3.10	5.88	0.12	4.40
COLORADO	0.58	0.63	1.90	4.95	0.13	3.00
IDAHO	1.35	1.35	4.19	6.11	0.22	3.11
MONTANA	1.11	1.30	2.67	6.17	0.21	2.06
NEVADA	1.30	1.26	2.83	6.55	0.19	2.24
NEW MEXICO	0.87	0.88	3.30	6.64	0.13	3.74
UTAH	0.96	0.94	2.86	5.37	0.17	3.05
WYOMING	1.04	1.02	3.28	5.16	0.20	3.22
ALASKA	2.18	2.20	2.73	9.14	0.24	1.24
CALIFORNIA	1.23	1.26	2.30	7.05	0.18	1.82
HAWAII	1.15	1.16	2.88	5.21	0.22	2.48
OREGON	1.52	1.44	2.91	6.83	0.21	2.02
WASHINGTON	1.55	1.57	3.27	7.29	0.22	2.08
U.S.Total	1.01	1.07	1.98	5.97	0.18	1.85

Source: U.S. Department of Labor, UI Service and Bureau of Labor Statistics. Unemployment rate averages for the years 1957-l 996. Unemployment rate estimates prepared by the author for the years 1957 to 1975.

Table 4. Estimates of UI Tax Rates from the Pooled Regression, 1958to 1996

Year	Average Tax Rate	Average Estimate	Average Error	Percent Error
1958	0.8849	0.9495	-0.0646	-7.30
1959	1.0224	1.0184	0.0040	0.39
1960	1.0906	1.1757	-0.0851	-7.80
1961	1.1386	1.2537	-0.1151	-10.11
1962	1.2084	1.2640	-0.0556	-4.60
1963	1.2147	1.2340	-0.0193	-1.59
1964	1.1488	1.2161	-0.0673	-5.86
1965	1.0604	1.1181	-0.0577	-5.44
1966	0.9551	0.9838	-0.0287	-3.00
1967	0.8245	0.8576	-0.0331	-4.01
1968	0.7449	0.7440	0.0009	0.12
1969	0.6996	0.6805	0.0191	2.73
1970	0.6520	0.6531	-0.0011	-0.17
1971	0.6543	0.6857	-0.0314	-4.80
1972	0.8557	0.7970	0.0587	6.86
1973	0.9353	0.9220	0.0133	1.42
1974	0.8927	0.9561	-0.0634	-7.10
1975	0.8898	0.9275	-0.0377	-4.24
1976	1.1659	1.0519	0.1140	9.78
1977	1.2925	1.2506	0.0419	3.24
1978	1.3741	1.3363	0.0378	2.75
1979	1.2700	1.2292	0.0408	3.21
1980	1.1041	1.0462	0.0579	5.24
1981	1.0751	1.0146	0.0605	5.63
1982	1.1018	1.0696	0.0322	2.92
1983	1.3280	1.2294	0.0986	7.42
1984	1.4751	1.3786	0.0965	6.54
1985	1.3655	1.3720	-0.0065	-0.48
1986	1.2331	1.2426	-0.0095	-0.77
1987	1.1331	1.0882	0.0449	3.96
1988	1.0361	1.0162	0.0199	1.92
1989	0.9167	0.9574	-0.0407	-4.44
1990	0.8149	0.8633	-0.0484	-5.94
1991	0.7367	0.8012	-0.0645	-8.76
1992	0.8078	0.8490	-0.0412	-5.10
1993	0.8931	0.9447	-0.0516	-5.78
1994	0.8820	0.9936	-0.1116	-12.65
1995	0.8278	0.9628	-0.1350	-16.31
1996	0.7690	0.8878	-0.1188	-15.45

Source: Estimates of state tax rates based on a pooled regression for the years 1958-1986. All estimates shown are averages across 51 UI programs.

Table 5. Regressions Explaining UI Tax Rates by State, 1958-I 996.

STATE	Constant	Reserve Ratio	Benefit Ratio	Adj. R2	Std. Error	Durbin Watson	Avg. Tax Rate -%
CONNECTICUT	0.391 (5.97)	0.006 (0.97)	0.473 (9.96)	0.720	0.14	0.88	0.980
MAINE	0.691 (6.45)	-0.086 (6.20)	0.544 (8.32)	0.810	0.14	1.23	1.273
MASSACHUSETTS	0.341 (2.55)	-0.020 (0.99)	0.741 (9.06)	0.745	0.17	0.87	1.322
NEW HAMPSHIRE	0.022 (0.36)	0.050 (3.01)	0.707 (13.32)	0.841	0.12	1.43	0.708
RHODE ISLAND	1.253 (4.53)	-0.046 (1.80)	0.340 (2.61)	0.446	0.28	0.74	1.787
VERMONT	1.200 (4.59)	-0.081 (3.76)	0.173 (1.06)	0.503	0.26	0.44	1.258
NEW JERSEY	0.638 (4.81)	-0.052 (4.03)	0.450 (5.92)	0.708	0.16	0.75	1.232
NEW YORK	-0.052 (0.58)	0.000 (0.02)	0.971 (13.97)	0.836	0.13	1.08	1.114
PENNSYLVANIA	0.539 (2.58)	-0.023 (0.73)	0.602 (4.92)	0.748	0.22	0.58	1.474
ILLINIOS	0.087 (0.62)	-0.031 (1.17)	0.857 (7.26)	0.846	0.17	0.75	0.942
INDIANA	0.375 (5.09)	-0.054 (2.59)	0.538 (7.66)	0.668	0.12	0.89	0.617
MICHIGAN	0.928 (6.62)	-0.098 (4.20)	0.350 (3.84)	0.787	0.18	0.97	1.367
OHIO	0.599 (8.09)	-0.080 (5.66)	0.421 (7.31)	0.878	0.12	1.34	0.929
WISCONSIN	1.174 (4.63)	-0.149 (5.04)	0.287 (1.84)	0.786	0.22	0.71	1.098
IOWA	0.292 (1.89)	-0.075 (3.39)	0.884 (7.92)	0.893	0.17	0.78	0.843
KANSAS	0.719 (3.71)	-0.096 (3.14)	0.448 (2.81)	0.374	0.19	0.61	0.825
MINNESOTA	0.693 (7.55)	-0.132 (7.14)	0.315 (3.87)	0.765	0.11	0.77	0.902
MISSOURI	-0.131 (1.28)	-0.012 (1.08)	1.092 (9.99)	0.763	0.12	1.99	0.731
NEBRASKA	0.080 (0.88)	-0.011 (0.58)	0.809 (6.51)	0.515	0.14	1.48	0.588
NORTH DAKOTA	0.324 (1.46)	-0.083 (1.80)	0.817 (6.19)	0.597	0.25	0.93	1.262
SOUTH DAKOTA	-0.044 (0.60)	0.003 (0.28)	0.905 (7.75)	0.615	0.12	0.83	0.505
DELAWARE	0.592 (2.46)	-0.045 (1.08)	0.466 (2.39)	0.411	0.23	0.59	0.963
DIST OF COL	0.034 (0.30)	-0.002 (0.17)	0.810 (7.70)	0.850	0.12	1.10	0.708
FLORIDA	0.110 (0.86)	-0.059 (1.64)	1.139 (8.90)	0.740	0.16	0.79	0.618
GEORGIA	0.179 (4.14)	0.029 (3.55)	0.589 (12.85)	0.822	0.08	0.68	0.680
MARYLAND	-0.216 (1.53)	-0.040 (1.43)	1.296 (11.60)	0.799	0.22	0.80	0.989
NORTH CAROLINA	0.031 (0.36)	0.023 (1.50)	0.810 (10.96)	0.763	0.15	0.56	0.773
SOUTH CAROLINA	0.453 (6.52)	-0.001 (0.06)	0.442 (7.02)	0.579	0.10	1.04	0.820
VIRGINIA	-0.098 (1.14)	0.014 (0.78)	1.150 (9.48)	0.743	0.12	1.68	0.482
WEST VIRGINIA	0.509 (2.10)	-0.043 (1.12)	0.562 (3.98)	0.723	0.26	1.15	1.169
ALABAMA	0.185 (1.24)	-0.136 (4.84)	1.005 (8.64)	0.817	0.18	1.01	0.855
KENTUCKY	0.428 (6.84)	-0.047 (4.76)	0.662 (14.96)	0.864	0.12	0.95	1.093
MISSISSIPPI	0.701 (2.99)	-0.169 (2.80)	0.874 (8.05)	0.648	0.25	0.49	0.936
TENNESSEE	0.289 (3.33)	0.018 (0.78)	0.596 (8.85)	0.668	0.14	0.61	0.888
ARKANSAS	0.384 (3.41)	-0.063 (4.69)	0.678 (7.35)	0.714	0.13	1.15	1.042
LOUISIANA	0.498 (4.46)	-0.020 (1.29)	0.467 (6.30)	0.695	0.17	1.58	0.985
OKLAHOMA	0.208 (3.56)	-0.148 (8.76)	0.988 (15.43)	0.899	0.08	1.48	0.697
TEXAS	0.003 (0.06)	-0.059 (3.63)	1.056 (10.32)	0.775	0.13	0.94	0.485
ARIZONA	-0.048 (0.75)	0.039 (4.13)	0.898 (12.60)	0.813	0.10	1.01	0.720
COLORADO	0.157 (1.53)	-0.050 (2.71)	0.823 (6.40)	0.626	0.17	1.19	0.590
IDAHO	0.769 (5.62)	-0.098 (6.85)	0.737 (9.51)	0.827	0.15	1.10	1.367
MONTANA	0.704 (6.91)	-0.070 (5.19)	0.454 (6.10)	0.576	0.19	0.64	1.120
NEVADA	0.204 (1.17)	-0.042 (1.39)	0.935 (7.96)	0.623	0.24	0.86	1.292
NEW MEXICO	0.813 (8.10)	-0.048 (4.21)	0.239 (2.60)	0.447	0.11	0.48	0.871
UTAH	0.147 (0.98)	-0.051 (2.62)	0.987 (8.12)	0.735	0.16	0.95	0.965
WYOMING	1.008 (6.20)	-0.140 (4.61)	0.477 (5.97)	0.768	0.22	1.33	1.055
ALASKA	1.956 (4.13)	-0.040 (1.01)	0.152 (0.90)	0.148	0.33	0.50	2.187
CALIFORNIA	-0.241 (1.80)	0.040 (1.58)	1.091 (12.55)	0.804	0.18	1.18	1.246
HAWAII	1.001 (3.59)	-0.163 (4.20)	0.559 (3.45)	0.780	0.21	1.28	1.173
OREGON	1.063 (3.23)	-0.123 (2.53)	0.577 (3.80)	0.560	0.28	0.71	1.547
WASHINGTON	1.253 (5.86)	-0.062 (3.31)	0.319 (2.85)	0.461	0.26	0.36	1.554

Source: Regressions utilize data on tax rates, reserve ratios and benefit ratios derived from U.S. Department of Labor, "ET Handbook 394, Unemployment Insurance Financial Handbook." Adjacent to each coefficient is the absolute value of its t ratio. T ratios of 2.03 and 2.73 needed for significance at .05 and .01 levels respectively.

Table 6. Residuals from State-Level UI Tax Rate Regressions, 1989 to 1996.

STATE	1989	1990	1991	1992	1993	1994	1995	1996	State Totals 1989-1996 + Resid.	- Resid.	-1 S.Err.
CONNECTICUT	-1	-1	-1	-1	-1	+	+1	+1	3	5	5
MAINE							-1	-	0	8	1
MASSACHUSETTS	-1	-	-	-	-	-	+	+	2	6	1
NEW HAMPSHIRE	-	-	-	+	+	+	-	-1	3	5	1
RHODE ISLAND				+	+	+	+	+	5	3	0
VERMONT	+	+	+	-	-	-	-	-	3	5	0
NEW JERSEY	+	-	-	-	-1	-1	-1	+	2	6	3
NEW YORK	-1	-	-	-	+	-	-	-	1	7	1
PENNSYLVANIA	+	+	+	+	+1	+1	+	-	7	1	0
ILLINIOS	+1	+	+	+	+	+	+	-	7	1	0
INDIANA									0	8	0
MICHIGAN	+	-	-	-	-	+	+	-	3	5	0
OHIO	+	-	-	+	+	+	+	-	5	3	0
WISCONSIN	+	+	-	-	-	-	-	-	2	6	0
IOWA		+	+	+	+	-	-1	-1	4	4	2
KANSAS							-1	-1	0	8	2
MINNESOTA	+	+	-1	-1	-	+	-	-1	3	5	3
MISSOURI						+	-	+	2	6	0
NEBRASKA	-1	-	-	+	-	-	-	-	1	7	1
NORTH DAKOTA	-1	-1	-1	-	-	-	-	-1	0	8	4
SOUTH DAKOTA	-1	-	-	-	-	-	-	-	0	8	1
DELAWARE	+	-	-	-	-	-	-	-	1	7	0
DIST OF COL	-1	-	-	+	+1	+1	+1	+	5	3	1
MARYLAND			+	+1	+	+			4	4	0
FLORIDA					-1	-1	-1	-1	0	8	4
GEORGIA					-1	-	-1	-	0	8	2
NORTH CAROLINA		+	+	-	-	-1	-1	-1	2	6	3
SOUTH CAROLINA	+	+	+	-	-1	-1	-1	-1	3	5	4
VIRGINIA									0	8	0
WEST VIRGINIA	-1	-1	+	+	+	-	-	-	3	5	2
ALABAMA						-1	-1	-1	0	8	3
KENTUCKY					-1	-1	-1	-1	0	8	4
MISSISSIPPI	-1	-1	-1	-	-	-	-	-1	0	8	4
TENNESSEE				-1	-1	-1	-1	-1	0	8	5
ARKANSAS	-1	-1	-1	-	+	-1	-1	-1	1	7	6
LOUISIANA		-1	-	-	-	-	-	-	0	8	1
OKLAHOMA		+	+	+	+	+	+	+	7	1	0
TEXAS	+	-1	-	-	-	-	-1	-1	1	7	3
ARIZONA			-1	-1	-	-	+	+	2	6	2
COLORADO				+	+	-	-	-	2	6	0
IDAHO	-1	-1	-1	+	-	-1	-1	-	1	7	5
MONTANA			-1	-	-	-	-	-	0	8	1
NEVADA				-1	-	-1	-1	-	0	8	3
NEW MEXICO	+	-1	-	-	-	+	-1	-	2	6	2
UTAH	-1	-	-	-	-	-	-	+	1	7	1
WYOMING				+	+	-	-	-	2	6	0
ALASKA	+1	+1	-	-1	-1	-1	-1	-1	2	6	5
CALIFORNIA			+	+	+	-	-	-	3	5	0
HAWAII		+	-	-	-	-1	+1	-	2	6	1
OREGON	+1	+1	+1	+1	+1	-1	-1	-	5	3	2
WASHINGTON	+	-	+	-	-	-1	-1	-1	2	6	3
U.S. Total, + Resid.	15	15	12	12	16	16	13	11	9	104	
U.S.Total, - Residuals	36	39	39	35	35	38	40	42		304	
U.S.Total, -1 Std. Error	12	9	8	6	8	14	19	16			92

Source: Residuals (actuals - estimates) from state-level regressions fitted for the years 1958 to 1996

Table 7. Costs of Workers' Compensation and Unemployment Insurance

Year	SSA1, WC costs Pct. of Payroll	SSA2, WC costs Pct. of Payroll	NCCI, Increase in WC Ben. costs, Pct.	NCCI, index of WC Ben. (1959 = 1 .0)	USDOL, UI Taxes, Pct. of Payroll
1956	0.92	NA	NA	NA	0.88
1957	0.91	NA	NA	NA	0.85
1958	0.91	NA	NA	NA	0.84
1959	0.89	NA	NA	1 .00	1.06
1960	0.93	NA	1.4	1.01	1.15
1961	0.95	NA	1.7	1.03	1.24
1962	0.96	NA	1.4	1.05	1.39
1963	0.99	NA	1.2	1.06	1.34
1964	1 .00	NA	0.4	1.06	1.26
1965	1 .00	NA	4.2	1.11	1.18
1966	1.02	NA	3.3	1.14	1.05
1967	1.07	NA	4.1	1.19	0.86
1968	1.07	NA	2.2	1.22	0.76
1969	1.08	NA	4.2	1.27	0.69
1970	1.11	NA	2.8	1.30	0.64
1971	1.11	NA	2.9	1.34	0.64
1972	1.14	NA	5.9	1.42	0.88
1973	1.17	NA	6.3	1.51	0.99
1974	1.24	NA	5.9	1.60	0.92
1975	1.32	NA	7.7	1.72	0.88
1976	1.49	NA	6.7	1.84	1.20
1977	1.71	NA	1.8	1.87	1.28
1978	1.86	NA	3.8	1.94	1.41
1979	1.95	NA	2.1	1.98	1.26
1980	1.96	NA	2.7	2.04	1.06
1981	1.85	NA	3.1	2.10	1.02
1982	1.75	NA	4.3	2.19	1.03
1983	1.67	NA	5.0	2.30	1.20
1984	1.66	NA	2.7	2.36	1.39
1985	1.82	NA	1.7	2.40	1.30
1986	1.99	NA	1.3	2.43	1.14
1987	2.06	NA	0.7	2.45	1.04
1988	2.16	NA	1.4	2.48	0.96
1989	2.27	2.04	0.5	2.50	0.84
1990	2.36	2.13	1.3	2.53	0.73
1991	2.40	2.16	-0.3	2.52	0.71
1992	2.39	2.13	0.9	2.54	0.79
1993	2.44	2.17	-2.0	2.49	0.90
1994	2.30	2.05	-1.9	2.44	0.92
1995	2.05	1.82	NA	NA	0.86

Source: Social Security Administration (SSA), "Social Security Bulletin, Annual Statistical Supplement," National Council on Compensation Insurance (NCCI), "Annual Statistical Bulletin," and U.S. Department of Labor (USDOL), "ET Handbook 394, Unemployment Insurance Financial Data." NA - Information not available.

Table 8. Workers' Compensation Premium Rates by State, 1986 to 1996.

STATE	1986	1988	1990	1992	1994	1996	Avg.
CONNECTICUT	3.62	4.25	5.50	6.21	5.34	4.64	4.93
MAINE	3.26	4.28	5.45	5.05	5.87	3.91	4.64
MASSACHUSETTS	3.03	3.67	5.14	5.40	4.98	3.71	4.32
NEW HAMPSHIRE	3.48	3.57	4.18	4.40	4.73	4.13	4.08
RHODE ISLAND	4.91	5.08	5.77	6.19	5.75	4.81	5.42
VERMONT	2.32	2.26	2.88	3.11	4.21	3.60	3.06
NEW JERSEY	2.18	2.66	2.48	3.13	3.58	3.20	2.87
NEW YORK	2.74	2.98	3.46	5.36	5.38	4.90	4.14
PENNSYLVANIA	3.62	3.79	3.98	4.60	5.02	4.37	4.23
ILLINOIS	3.21	3.58	4.30	5.03	5.48	3.77	4.23
INDIANA	0.99	1.57	2.03	2.29	2.26	1.71	1.81
MICHIGAN	3.21	4.04	4.00	4.75	4.54	3.05	3.93
OHIO	2.01	3.25	3.81	3.83	4.42	4.12	3.57
WISCONSIN	1.86	2.59	2.99	3.02	3.17	2.34	2.66
IOWA	2.30	2.79	3.06	3.37	3.47	2.17	2.86
KANSAS	2.06	2.21	2.43	3.10	3.49	2.64	2.66
MINNESOTA	4.01	4.33	6.72	6.18	5.29	4.03	5.09
MISSOURI	2.08	2.60	2.65	3.63	4.35	3.45	3.13
NEBRASKA	1.77	1.93	2.31	2.92	3.31	2.04	2.38
NORTH DAKOTA	2.11	2.39	3.94	1.97	2.53	2.34	2.55
SOUTH DAKOTA	2.01	2.63	3.06	3.42	3.88	3.20	3.03
DELAWARE	3.50	3.57	3.26	3.35	3.18	3.54	3.40
DIST OF COL	5.02	5.07	5.46	4.99	4.83	3.90	4.88
FLORIDA	3.47	3.94	6.39	6.22	5.72	5.26	5.17
GEORGIA	3.35	3.87	3.57	4.77	4.52	4.04	4.02
MARYLAND	3.75	3.42	2.61	2.86	3.08	2.23	2.99
NORTH CAROLINA	1.37	1.57	1.53	2.56	3.41	3.05	2.25
SOUTH CAROLINA	2.49	3.09	3.22	2.71	2.91	2.38	2.80
VIRGINIA	2.08	1.91	2.19	2.28	2.76	1.91	2.19
WEST VIRGINIA	1.73	1.74	2.30	2.99	2.93	2.91	2.43
ALABAMA	2.58	3.18	3.41	5.04	4.78	3.64	3.77
KENTUCKY	3.18	2.71	3.24	4.04	5.46	3.77	3.73
MISSISSIPPI	2.10	2.85	2.94	3.41	3.70	3.30	3.05
TENNESSEE	2.07	2.63	3.34	3.33	3.60	3.59	3.09
ARKANSAS	2.53	3.18	3.48	4.04	3.69	3.04	3.33
LOUISIANA	3.27	3.77	4.50	4.96	6.98	5.47	4.83
OKLAHOMA	3.86	3.56	3.55	4.11	4.86	4.65	4.10
TEXAS	3.31	4.41	6.46	6.51	5.91	4.19	5.13
ARIZONA	3.42	3.42	3.93	4.34	4.18	3.38	3.78
COLORADO	3.51	4.97	5.94	6.60	5.28	3.34	4.94
IDAHO	2.88	3.38	3.80	3.90	3.88	3.00	3.47
MONTANA	4.38	5.11	6.43	6.34	6.91	4.71	5.65
NEVADA	3.07	3.28	3.88	4.61	4.55	3.96	3.89
NEW MEXICO	3.88	4.76	4.82	4.63	5.75	3.55	4.57
UTAH	1.89	1.96	2.34	3.00	3.62	2.64	2.58
WYOMING	1.79	1.04	2.47	2.12	2.84	2.85	2.19
ALASKA	3.78	4.99	4.78	4.35	3.92	3.41	4.21
CALIFORNIA	4.51	5.32	5.61	5.96	5.04	4.11	5.09
HAWAII	8.91	6.50	5.87	5.52	6.06	5.75	6.44
OREGON	4.36	4.86	5.65	4.41	3.70	3.15	4.36
WASHINGTON	3.60	3.81	3.92	3.54	3.33	2.55	3.46
U.S.	3.12	3.63	4.24	4.72	4.66	3.78	4.03
New England	3.33	3.90	5.16	5.52	5.14	4.08	4.52
Mid Atlantic	2.84	3.12	3.37	4.64	4.86	4.36	3.87
East North Central	2.50	3.26	3.70	4.13	4.37	3.29	3.54
West North Central	2.63	3.01	3.85	4.14	4.24	3.18	3.51
South Atlantic	2.88	3.11	3.70	4.03	4.08	3.55	3.56
East South Central	2.46	2.82	3.28	3.95	4.35	3.60	3.41
West South Central	3.30	4.15	5.70	5.89	5.79	4.33	4.86
Mountain	3.24	3.81	4.48	4.91	4.68	3.39	4.08
Pacfic	4.50	5.15	5.42	5.56	4.77	3.91	4.88

Source: Oregon Department of Consumer and Business Services, "Oregon Workers' Compensation Premium Rate Ranking," various issues. Rates measured as a percent wages. Estimates for Michigan and Wyoming in 1986 developed by the author.

Table 9. Regressions Explaining Workers' Compensation Premium Rates, 1988-l 996.

Explanatory Variable	Unweighted Data (1)	Unweighted Data (2)	Weighted Data (3)	Weighted Data (4)
Constant	2.144	1.958	3.540	4.018
	(4.12)	(5.03)	(7.60)	(10.97)
Lagged Contiguous State Contrib. Rate (LCSCR)	0.394		0.720	
	(3.84)		(6.51)	
LCSCR "High"		0.110		0.073
		(1.37)		(0.69)
LCSCR "Low"		0.333		0.446
		(3.61)		(4.03)
Lagged Rest of U.S. Contrib. Rate (LRUSCR)	-0.125		-0.341	
	(0.90)		(2.56)	
LRUSCR "High"		0.138		-0.148
		(1.29)		(1.39)
LRUSCR "Low"		0.372		-0.100
		(3.05)		(0.82)
State Competitive Rating Law (Yes = 1)	0.300	-0.112	-0.250	-0.651
	(1.90)	(0.92)	(1.50)	(4.87)
Exclusive State Fund (Yes = 1)	-0.933	-0.434	-0.507	-0.619
	(4.02)	(2.45)	(1.69)	(2.54)
Unionizatiion Rate, (Percent)	0.055	0.023	-0.010	-0.004
	(4.61)	(2.48)	(1.05)	(0.53)
Sample Size	255	255	255	255
Adjusted R2	0.173	0.539	0.939	0.962
Standard Error	1.113	0.831	1.518	1.184

Source: Regressions explain premium rate data in Table 8. Variables are defined in the text. In parentheses beneath each coefficient is the absolute value of its t ratio. T ratios of 1.96 and 2.58 indicate significance at the .05 and .01 levels respectively.

Table 10. Patterns of Adjacent State Responses to Large Changes in Workers' Compensation Benefit Costs

Major Region	Large Changes in Given States-a	Number of Adjacent States	Large Changes in Adjacent States-a	Large Changes in Adjacent States-b	Proportion of States Making Adjustments-a	Proportion of States Making Adjustments-b
Large Increases in Workers' Compensation Benefit Costs, 1965 to 1994						
North East, 9 states	14	55	7	10	0.13	0.18
Midwest, 10 states	10	43	12	19	0.28	0.44
South, 16 states	24	96	25	40	0.26	0.42
West, 10 states	13	26	8	11	0.31	0.42
U.S.. 45 states-c	61	220	52	80	0.24	0.36
Large Decreases in Workers' Compensation Benefit Costs, 1965 to 1994						
North East, 9 states	5	13	4	4	0.31	0.31
Midwest, 10 states	2	7	0	1	0.00	0.14
South, 16 states	8	24	1	3	0.04	0.13
West, 10 states	4	12	4	6	0.33	0.50
U.S., 45 states-c	19	56	9	14	0.16	0.25

Source: All data taken from NCCI calculations of benefit changes as summarized in Table Al of Appendix A.

a - Large increases for states inititiating benefit changes defined to be larger than 14.9 percent. Large decreases defined to be larger than -9.9 percent.

b - Large increases defined to be larger than 9.9 percent and large decreases defined to be larger than -4.9 percent.

c - Excluded states are Ohio, West Virginia, North Dakota, Nevada, Wyoming and Washington. The District of Columbia included in the South.

Appendix A. Statistical Properties of Estimators

Central to the empirical results presented by Bassi and McMurrer are regression coefficients on the average UI tax rates of adjacent states. These coefficients are interpreted as showing the effects of tax rates in adjacent states. The authors display several equations where the lagged average tax rate from adjacent states enters with a highly significant effect in determining a given state's tax rate.

Bassi and McMurrer also find that distinguishing between higher and lower tax rates in adjacent states enhances the fits of the regressions. Several specifications split the adjacent state tax rate into two variables: observations where the adjacent state average rate exceeds the state's rate (High Adjacent State Tax, hereafter TADJ"H") and observations where the adjacent state average rate falls below the given state's rate (Low Adjacent State Tax, hereafter TADJ"L").[39] For both variables generally significant effects are found, but the size and significance levels of the coefficients are uniformly larger when the adjacent state tax rate is below the given state's tax rate. The authors interpret this as evidence that state tax rates are more responsive to situations where the adjacent state average is lower than when it is higher. Differential sensitivity to low tax rates, in turn, provides the mechanism that causes the long run downtrend in their simulations of average tax rates.

The measurement of the adjacent state tax variables TADJ"H" and TADJ"L" utilizes information about the dependent variable in the regressions. Namely, all the TADJ"H" variable observations were situations where the adjacent state average exceeded the state's tax rate in the preceding year while all the TADJ"L" variable observations were situations where the adjacent state

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[39] These variables are utilized in Tables 2 and 3 of Bassi and McMurrer(1996).

average fell below the state's tax rate in the preceding year. To provide a full complement of observations for the TADJ"H" and TADJ"L" variables, both have numerous observations equal to zero. When an observation for TADJ"H" is nonzero, the same observation for TADJ"L" is zero and vice versa.

A procedure that selects explanatory variables conditioned on the dependent variable raises questions about statistical reliability. There could be a linkage between such explanatory variables, i.e., TADJ"H" and TADJ"L," and the disturbance term of the regression leading to biased coefficient estimates.

A simulation exercise was undertaken to test for possible problems in the Bassi-McMurrer specification. The analysis was based on constructed tax rate data that display time series properties similar to those of annual UI tax rates in the states.

State level UI tax rates were studied for the forty year period 1957 to 1996. Two aspects of state tax rates were of particular interest: long run averages and the degree of autocorrelation in annual observations. Time series regressions were fitted for each state where the current year tax rate was explained by its lagged value. For 51 programs (the states plus the District of Columbia) the coefficients on the lagged tax rate were concentrated in the range from 0.75 to 0.89. The average tax rate over this period was nearly 1.0 percent nationwide with state averages ranging from about 0.50 percent to 2.00 percent.

Two series were then created that had statistical properties similar to UI tax rates. Respectively these approximated the state tax rate (T) and the average tax rate for adjacent states (TADJ). Both had means of 1.0 and autocorrelation coefficients of 0.80.

The first year values were based on the following equation:

(Al) $T = 1.0 + 0.4*Z1$

where T is the UI tax rate and

Z1 is a standard normal deviate.

One modification was made in T to limit its lower values to 0.35 to more closely approximate historic levels of tax rates in low

tax rate states. In the first year T was essentially a random variable with a mean of 1.0 and a standard deviation of 0.4.

For the second and later years the variables were then determined as follows:

(A2) T = 0.2 + 0.8*TLag + 0.15*Z2

where Z2 is also a standard normal deviate and

TLag is the one year lagged value of T.

The second variable, TADJ (a proxy for the adjacent state average tax rate) was constructed in the identical manner. Thus both series were centered at 1.0 and both had autocorrelation of 0.8 with their remaining variation due to random factors.

The variables T and TADJ were then compared, and the TADJ‘H" and TADJ"L" variables were derived. Finally TADJ, TADJ"H" and TADJ"L" were all lagged one year. The full data set had 306 observations, six years times 51 "states." To have appropriate lagged variables the regressions utilized the final five years of data or 255 observations.

Three regressions were then fitted each of which related T to TADJ. The results were the following.[40]

(A3) T = 0.963 + 0.009*TADJ Adj.R^2 = -0.004
(13.4) (0.14) Std.Err. = 0.295

(A4) T = 0.924 + 0.048*TADJLag Adj.R^2 = -0.002
(13.6) (0.75) Std.Err. = 0.295

(A5) T = 0.593 + 0.223*TADJ"H"Lag + 0.619*TADJ"L"Lag
(9.6) (4.14) (8.66)
Adj.R^2 = 0.344
Srd.Err. = 0.238

Four aspects of the regressions need to be emphasized. First, the underlying series T and TADJ are both random variables with properties determined by construction. Second, the first two regressions, (A3) and (A4),correctly show that there is no statistical relationship between the two series, The t ratios are

[40] The numbers in parentheses beneath the coefficients are t ratios. Generally a t ratio of 2.0 or larger indicates statistical significance at the .05 level.

close to zero as are the adjusted R^2s. Third, the third regression conveys a much different impression. The adjusted R^2 is 0.344 and both tax variables are highly significant as indicated by their t ratios. Fourth, the coefficient for a low tax rate in adjacent states is roughly three times the size of the coefficient for a high tax rate in adjacent states. A simulation analysis based on coefficients from (A5) would produce a long term downtrend in average tax rates due to the larger estimated sensitivity to low tax rates compared to high tax rates in adjacent states. However, all these findings are based on random variables. The misleading inferences are the direct result of splitting the tax variable in the manner followed by Bassi and McMurrer.

The point of this appendix is to raise a question about the reliability of coefficients estimated by Bassi and McMurrer. Their regressions contain other explanatory variables. However the key critical question is the differential effect ascribed to having lower tax rates in adjacent states. The results presented in (A3), (A4) and (A5) may mean that all the effect is due to splitting the adjacent state tax rates into TADJ"H" and TADJ"L" variables. Their findings may be totally a consequence of following this procedure.

Appendix B. UI Costs in the Long Run

As noted at the start of Section III, benefit payouts are the ultimate long run determinant of UI costs. This appendix undertakes an empirical analysis of UI tax rates and benefit cost rates by state. Regressions are fitted to explain average employer tax rates and average benefit cost rates (each measured as a percent of covered payrolls) for the fifty states plus the District of Columbia.

Tax rates and benefit cost rates are measured as averages of annual observations for two periods: 1956 to 1996 and 1967 to 1996. Since annual data for the years 1956-1996 are examined in Section III, it seemed appropriate to use the same period for an analysis of long run costs.

One variable used in the analysis, the total unemployment rate by state (or TUR), is available from BLS for every state only since 1977. However, BLS estimates are available for 29 states from 1970 and for 10 states from 1967. There are also BLS estimates from 1967 of TURs for the nine Census divisions. The other state-year estimates of TURs were developed at the Urban Institute. Because the estimates include BLS divisional controls from 1967, these observations are probably more reliable than TUR estimates from 1956 to 1966. Thus the present analysis displays results for the period 1967-1996 as well as the longer period.

The analysis fitted two equations, one for the average employer tax rate and one for the average benefit cost rate. The tax rate (T) is determined by the benefit cost rate (BCR). The benefit cost rate is determined by three factors: 1) the unemployment rate (TUR), 2) the ratio of weeks compensated to weeks of unemployment (WKTU) and 3) the benefit replacement rate (RRATE). All explanatory variables are expected to display positive slope coefficients. The replacement rate is measured from the ratio of average weekly UI benefits to the average weekly wage in covered employment. The weeks compensated ratio is

measured as weeks compensated by taxable employers divided by 52 times the estimate of total unemployment for that year. The Urban Institute file that has state-level TURs also has the underlying estimates of total unemployment and the civilian labor force, respectively the numerator and denominator of the TUR.

Of the three factors specified to determine the benefit cost rate, the TUR is largely beyond state control. It reflects, among other things, developments in national economy, the regional economy and in industries important to individual states. In contrast, the weeks compensated ratio and the replacement rate are influenced by UI statutes in the states. They are affected by factors such as monetary eligibility requirements, nonmonetary disqualification provisions and the maximum weekly benefit amount, all of which can be altered through UI legislation.

Table B1 presents regression results. For each regression the table shows t ratios for individual explanatory variables directly beneath the estimated coefficient. The benefit cost rate regressions are fitted in logs as well as natural units of the variables. In the log formulation each of the three explanatory variables would be expected to have a coefficient of unity if the benefit cost rate was exactly the product of the three included factors (the TUR, the WKTU ratio and the replacement rate).

The tax rate regressions have very high explanatory power (R^2s of 0.959 and 0.954) and the benefit cost rate's coefficient is close to unity. The intercept does not differ significantly from zero. The benefit cost rate provides all that is needed to explain the long run level of employer tax rates in the states.

The three identified factors provide a good explanation of the benefit cost rate. Each of the TUR, the WKTU ratio and the replacement rate enters with the expected positive coefficient and each coefficient is highly significant. The fit is somewhat better for the shorter 1967-1996 period, possibly because the TUR is measured with greater accuracy starting in 1997.

The log regressions display coefficients that are close to unity, especially for the 1967-1996 period. Using formal

statistical tests, the TUR and RRATE coefficients do not differ significantly from unity, but the WKTU coefficient is significantly smaller than unity.

Overall, the regressions summarized in Table B1 conform closely to expectations. The long run determinant of the tax rate is the benefit cost rate. The benefit cost rate is significantly linked to each of the TUR, the WKTU ratio and the replacement rate. The latter two variables both can be influenced by states through UI statutes and administrative practices. Considering the two equations together, the states can exercise considerable long run control over their average UI tax rate through actions that affect the WKTU ratio and the replacement rate.

Table B1. Long Run Determinants of UI Tax Rates and Benefit Cost Rates by State

Dependent Variable and Time Period	Explanatory Variables					Summary Statistics		
	Inter-cept	Ben. cost Rate	TUR	WKTU	RRATE	Adj. R2	Std. Error	Mean Dep. Var.
UI Tax Rate, 1956-I 996	0.006 (0.2)	0.952 (34.3)				0.959	0.069	1.008
UI Tax Rate, 1967-I 996	0.014 (0.4)	0.959 (32.1)				0.954	0.075	0.992
Ben. Cost Rate, 1956-I 996	-1.782 (5.8)		0.166 (8.7)	2.405 (11.6)	3.033 (4.6)	0.838	0.141	1.053
Ben. Cost Rate, 1967-I 996	-1.756 (7.7)		0.151 (9.8)	2.668 (15.0)	2.813 (6.0)	0.904	0.110	1.020
Log Ben. Cost Rate, 1956-I 996	0.374 (1.8)		0.916 (8.9)	0.737 (11.7)	1.075 (5.0)	0.840	0.134	-0.003
Log Ben. Cost Rate, 1967-I 996	0.386 (2.2)		0.897 (10.2)	0.817 (15.7)	1.020 (6.5)	0.910	0.106	-0.039

Source: All regressions based on 51 observations of long run averages for the indicated periods. Variables are defined in the text of Appendix B. In the log regressions all variables are measured in logs. Beneath each coefficient is the absolute value of its t ratio.

Appendix C. Workers' Compensation Benefit Changes by State

Table Cl displays time series estimates of WC benefit changes by state for the period 1965 to 1995. These data were taken from issues of the NCCI "Annual Statistical Bulletin." The most recent of these publications utilized was for the year 1995 but many state entries for 1995 were not available. Also shown are the year when competitive rate making was instituted in the 32 states that have adopted competitive rating laws. Estimates of benefit increases do not appear for the six states that have exclusive state funds, i.e., private WC insurance is not available. These states are identified by the initials SF. The states are arranged by Census division.

Large WC benefit increases of more than 14.9 percent are identified with shading. Large benefit reductions of more than 9.9 percent or more are identified with box outlines. The benefit changes combine cash benefits and medical benefits.

Table Cl. Changes in Workers' Compensation Benefit Costs, 1965 to 1995.

State	Maine	N.H.	Vt.	Mass.	R.I.	Conn.	N.Y.	N.J.	Penn.
Division	N.Eng.	N.Eng.	N.Eng.	N.Eng.	N.Eng.	N.Eng.	M.Atl.	M.Atl.	M.Atl.
Dereg-ulation	1993	1994	1984		1982	1989			1993
1965	35.6	3.7	2.1	1.0		2.0	5.1		
1966	1.1			2.1	4.7	2.9	6.3		8.1
1967	1.1	5.5	20.3	2.2		15.5	1.0	23.1	
1968				2.0		0.8	8.1	-0.2	18.4
1969	1.1	5.1	1.5	0.7	32.3	-0.4	1.2	0.6	
1970	3.9		5.2	1.8		2.0	12.3	1.0	
1971	1.6		2.7	3.8	1.0	3.8	2.7	0.8	
1972	27.7	12.3	4.2		1.1	2.2	1.2	1.3	46.0
1973	1.3	7.2	16.3	4.2	0.9	2.8	2.5	1.3	5.5
1974	30.2		2.6		13.0	1.5	10.5	0.7	5.5
1975	11.3	4.5	2.0	2.2	6.0	1.5	4.1	1.4	22.1
1976			14.2		0.5	3.5	3.6	1.7	10.0
1977	7.1	0.6	12.2	6.8		13.8	1.0	2.0	2.1
1978	0.8			9.3	0.3		23.2	1.5	2.5
1979	0.2		-0.3			13.8	8.9	1.8	2.3
1980		2.2		0.4		2,2	2.9	22.5	
1981	0.7		6.0			2 0	5.1	2.9	5.9
1982		1.2	7.4	2.6	0.7	0.9	2.9	9.6	2.6
1983		8.7	1.9	6.4		1.0	13.0	6.5	1.6
1984			1.5			1.5	7.8	5.9	1.2
1985	-8.0		1.6		-3.9	0.6	8.3	3.6	0.8
1986		0.2	3.0			0.4	2.5	3.7	0.6
1987		0.4	0.8			6.1	2.2	3.7	1.0
1988	-41.1		0.8	0.8	-0.7		7.2	3.6	1.0
1989	0.5	2.1	0.8	3.3		0.4	2.0	4.0	
1990	0.6	-2.1	1.2	6.7		0.3	21.4	3.7	1.4
1991	-14.4			0.8		0.3	5.8	2.3	1.1
1992	0.9	1.0	0.7			-4.9	5.4	3.2	1.0
1993			0.5	-18.0	NA	-19.2	1.0	3.2	
1994		-13.6	-2.7	1.1	NA	0.3	-1.1	3.9	NA
1995	1.7	-0.1	NA	1.0	NA	NA	NA	1.2	NA

Source: National Council on Compensation Insurance (NCCI), "Annual Statistical Bulletin," Exhibit II, various issues. Changes in percent. Increases of more than 14.9 percent and decreases of more than 9.9 percent are highlighted.
NA - Information not available.

Table CI (cont.) Changes in Workers' Compensation Benefit Costs, 1965 to 1995.

State	Ill.	Ind.	Mich.	Ohio	Wisc.	Minn.	Misso.	Iowa	Kan.	Neb.	S.D.	N.D.
Division	ENC	ENC	ENC	ENC	ENC	WNC	WNC	WNC	WNC	WNC	WNC	WNC
Dereg-ulation	1982	1989	1983	SF		1984	1994			1993	1993	SF
1965	10.1	4.1	45.0	SF	1.8	0.1	4.8	9.5			2.0	SF
1966			0.9	SF	-0.2					7.2	4.0	SF
1967		5.9	2.2	SF		15.5	5.1		6.8		3.7	SF
1968			1.3	SF	1.9				0.1	3.5	1.5	SF
1969	7.7	4.8	2.6	SF	0.2	6.0					0.7	SF
1970			1.2	SF	1.8	0.5	6.0	12.6	8.1	9.1	5.7	SF
1971	11.1	4.8		SF	0.1	9.5	6.1	1.4		20.6	12.5	SF
1972			6.3	SF	2.9			3.5			3.0	SF
1973	7.8		1.7	SF		10.4		34.6		14.9	6.5	SF
1974		9.5	2.7	SF	3.4	0.3	19.1		22.0	11.8	4.6	SF
1975	47.4		2.7	SF	0.6	19.6	1.2	12.3	2.3	11.5	18.3	SF
1976	4.9	3.8	2.8	SF	9.0			4.7	3.8		8.8	SF
1977		8.2	3.8	SF	0.4	23.2	0.2	3.3	9.3	9.2	6.4	SF
1978				SF	2.2		0.8	0.3	2.3	4.6	4.8	SF
1979	0.7	2.4	3.5	SF	0.5			1.4	5.5	3.0	3.0	SF
1980		1.4	4.9	SF	2.7		6.3	0.1	1.8			SF
1981				SF		-12.9	6.8		1.5		3.7	SF
1982			4.6	SF	9.7			0.2	0.7		2.0	SF
1983		2.3	-6.5	SF	0.6		12.5	3.5		1.7	2.4	SF
1984	0.5	1.1	0.3	SF	4.3	2.7	1.5	0.0		2.4	0.6	SF
1985	-2.6	1.3	0.2	SF	2.9	0.9			0.5		0.2	SF
1986	0.2	1.1	0.3	SF	1.6	0.5	1.9	0.0	0.6	2.2	0.6	SF
1987	0.2		0.6	SF	1.5	0.5	2.3		-3.1		0.7	SF
1988	0.6	9.7	0.2	SF	1.3	0.4	1.1	0.6	0.7	0.8	3.3	SF
1989	0.3		0.3	SF	1.2	0.6				0.8		SF
1990	0.6	2.5	-3.2	SF	1.7	0.8		0.1	0.3		0.8	SF
1991	0.4	2.2	0.4	SF	1.5	0.5	4.8	0.0	0.3	1.4	0.6	SF
1992	0.5	0.6	0.0	SF	2.0	0.4	2.1	0.0	0.4		-4.3	SF
1993	0.7	2.6	1.6	SF	1.4	-4.8		0.0	-11.0		0.9	SF
1994	0.8	2.8	0.3	SF	1.3	NA			-1.9	0.3	-5.3	SF
1995	0.5	0.5	0.4	SF	0.8	NA		0.1	NA	NA	NA	SF

Source: NCCI, "Annual Statistical Bulletin," Exhibit II. Changes in percent.
SF - Exclusive State Fund NA - Information not available

Table Cl. (cont.) Changes in Workers' Compensation Benefit Costs, 1965 to 1995.

State	Del.	D.C.	Md.	Va.	W.Va.	N.C.	SC.	Geo.	Fla.
Division	S.Atl.	S.Atl.	S.Atl.	S.Atl.	S.Atl.	S.Atl.	S.Atl.	S.Atl.	S.Atl.
Dereg-ulation	1994	1991	1988	1994	SF	1995	1990	1984	
1965			9.4		SF				
1966				7.1	SF		13.4		
1967			3.2		SF	16.1			
1968			4.7	4.2	SF		5.9	19.6	5·6
1969			0.3		SF	11.5		0.4	3 6
1970	17.2		15.5	6.6	SF		2.5		7.7
1971	3.0		7.1		SF			2.9	
1972			5.6	8.2	SF	12.5			7.6
1973		50.0	11.9	5.6	SF			5.4	11.1
1974		1.2	2.4	4.2	SF			7.3	
1975	30.8	0.3	17.6	11.7	SF		19.1	10.3	9.1
1976	1.9	0.8	5.5	2.6	SF				11.0
1977	3.2	3.7	1.7	1.3	SF				1.1
1978	23.7.	0.6		0.6	SF	4.7	14.3	7.2	1.0
1979	5.6	1.6	3.2	0.6	SF	0.5	4.3		-15.0
1980			17.3	0.6	SF	5.9	0.9		
1981	7.0	0.7	1.3	0.9	SF	4.9	5.2		
1982	3.8	-28.7	9.8		SF	1.5	1.1		12.6
1983	5.0		2.2	1.6	SF	6.4	4.6		
1984	2.3		3.4	0.5	SF	5.0	1.1	6.6	0.3
1985	0.9		2.2	0.6	SF	4.6	0.7	3.9	3.7
1986	1.9	0.2	2.5	0.5	SF	0.6	3.8	4.8	0.7
1987		0.1	2.2	0.5	SF	5.8	0.5		-3.6
1988	1.4	0.4	3.9	0.4	SF	2.1	0.2		0.2
1989		0.1	1.2		SF				1.0
1990		0.1	1.4	0.2	SF	0.7	0.9	9.4	-24.8
1991		6.3	1.3		SF	3.6	1.9		0.5
1992		0.3	2.7	0.6	SF	0.5	0.3	NA	0.2
1993		0.2	2.7		SF	4.9	NA	NA	
1994	0.5	NA	0.2	0.4	SF	0.3	NA	N A	-15.7
1995	NA	NA	1.0	0.3	SF	NA	NA	NA	NA

Source: NCCI, "Annual Statistical Bulletin," Exhibit II. Changes in percent.
SF - Exclusive State Fund NA - Information not available

Table CI. (cont.) Changes in Workers' Comp. Benefit Costs, 1965 to 1995.

State	Alab.	Miss.	Tenn.	Ky.	Ark.	La.	Okla.	Tex.
Division	ESC	ESC	ESC	ESC	WSC	WSC	WSC	WSC
Dereg-ulation	1991			1982	1981	1988	1994	1992
1965			2.4		4.5		3.3	
1966				3.7				
1967	8.5		7.4					
1968		5.2		3.6	24.3		4.0	
1969	7.2		6.3	0.8		16.3		17.7
1970	1.7			10.0		4.7	2.6	
1971			10.6	3.7		0.2	13.4	
1972	8.6	15.1		3.4				
1973	9.3		6.6	39.8	6.7	15.8		22.8
1974	3.0	4.0	5.5	1.2	1.8			5.8
1975	17.7		7.6	1.5		17.9		
1976	2.2	16.4		23.0	7.6	6.0		5.5
1977	1.7	2.4	12.4	-8.8	3.5	12.7		7.2
1978	1.8		0.1	1.9	1.5	-1.0	28.3	6.7
1979	1.3	2.3	2.8		10.1			5.0
1980	1.8		4.4	-24.21	3.7	4.5	15.0	4.2
1981	1.7	4.4	2.2	1.5	5.3		6.9	5.2
1982	1.3		2.9			2.6		5.3
1983	1.3		0.1			-20.0		1.2
1984		3.8		6.0	2.4	0.7	3.6	2.0
1985	4.9	1.7	6.6	1.5			0.7	2.0
1986	0.2	1.3	4.2	0.6	2.0	5.9		
1987	0.3		2.9	0.3		0.5		0.9
1988	0.4	8.0	2.3	0.4	0.8		2.7	0.8
1989			1.8	0.6		0.5		-2.4
1990	0.1		1.6		1.0	-1.0	2.8	
1991	0.3	0.8	1.4	0.8	0.6			-15.7
1992		0.5		0.8	0.6	0.5	0.3	
1993		NA	1.8	-4.4		0.5	-5.2	
1994	-9.0	NA	1.8	-11.1		0.5		
1995	NA	NA		NA	-1.2	NA	-1.9	NA

Source: NCCI, "Annual Statistical Bulletin," Exhibit II. Changes in percent.
SF - Exclusive State Fund NA - Information not available

Table Cl. (cont.) Changes in Workers' Compensation Benefit Costs, 1965 to 1995.

State	Ariz.	N.M.	Col.	Id.	Mont.	Utah	Nev.	Wyo.	Alas.	Haw.	Cal.	Ore.	Wa.
Division	Mt.	Mt.	Mt.	Mt.	Mt.	Mt.	Mt.	Mt.	Pac.	Pac.	Pac.	Pac.	Pac.
Dereg-ulation		1987	1991			1992	SF	SF		1990		1982	SF
1965		2.4	6.4	6.2	8.3	14.3	SF	SF		2.8			SF
1966							SF	SF	1.4	1.1	7.2	4.1	SF
1967		5.9	5.9	11.2	5.1		SF	SF		5.3		11.4	SF
1968		0.3	2.5	6.2			SF	SF		0.5			SF
1969		3.3	6.5	9.1	3.0	15.5	SF	SF	2.2		5.5	6.7	SF
1970			1.5	0.8		4.1	SF	SF	6.7			5.0	SF
1971	3.3	5.2	7.3	1.1	8.9	7.4	SF	SF				18.3	SF
1972	0.1	3.3	2.6	43.9			SF	SF	18.6		16.2		SF
1973	2.2	9.7	6.2	7.0	28.7	25.7	SF	SF			0.6	15.8	SF
1974		6.7	10.5	4.1		1.5	SF	SF	11.2	1.4	10.8	7.6	SF
1975	1.8	11.3	13.7	7.6	6.1	11.6	SF	SF	35.2	22.2	2.7	6.6	SF
1976	1.2	9.0	5.5	3.8	3.3	3.1	SF	SF	11.0	3.2	7.3	1.5	SF
1977	3.8	8.2	1.3	4.6	1.8	8.4	SF	SF	-12.7	2.4	4.9	-0.8	SF
1978		4.3	3.3	4.3	1.6	4.0	SF	SF	1.0	3.5			SF
1979	1.1	1.3	2.2	2.2	1.4		SF	SF	3.5	2.9	2.3		SF
1980	4.1	1.4	4.7	2.7		17.1	SF	SF		4.3		3.0	SF
1981	3.2	1.9	11.9	5.8	3.0	7.7	SF	SF	0.6	5.1	2.5	4.3	SF
1982	1.7	2.0	0.7	7.8	1.8	4.1	SF	SF	0.1	4.3	2.8	1.1	SF
1983	0.4	1.6	1.4	5.2	1.7					2.8			SF
1984		0.8	3.6	2.3	0.5	5.2	SF	SF	8.2		6.4	0.4	SF
1985	4.6	0.5	0.6	2.2	0.4	3.2	SF	SF	7.3	4.3	0.8	2.9	SF
1986	0.8		3.7	1.6	2.2	0.4	SF	SF	-0.6	1.1		12.6	SF
1987	6.7	6.1	1.3	1.5	-25.0	0.2	SF	SF		2.2		0.3	SF
1988	4.8			0.7		-0.1	SF	SF	-5.7	2.4	0.8		SF
1989	2.2		2.8	1.3	2.3	0.3	SF	SF		3.4		0.3	SF
1990			-1.1	1.5	-4.5	3.1	SF	SF			2.5	0.4	SF
1991	3.4	-19.8	.8	1.4	3.3	0.2	SF	SF			3.9	-4.2	SF
1992		-1.1				2.2	SF	SF		3.7	0.2	0.4	SF
1993		1.0			0.9	0.5	SF	SF				0.7	SF
1994		1.7	0.5	0.1	-0.5	4.4	SF	SF		18.0	-9.7	0.5	SF
1995	NA	NA	1.1		NA	0.1	SF	SF		NA		1.5	SF

Source: NCCI, "Annual Statistical Bulletin," Exhibit II. Changes in percent.
SF - Exclusive State Fund NA - Information not available

A Few Closing Comments on the Issue of Interstate Competition in the UI System

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Summary

We are pleased to have the opportunity to add some final comments to this collection of recent research (comprised of our 1996 analysis and the 1998 Vroman analysis) on whether there is evidence of interstate competition in the Unemployment Insurance (UI) system. This is an issue of vital significance to the future of UI, and we note here the important result that both papers come to the same conclusion: there is empirical evidence that competition among the states exists in the UI program, and this competition has caused a decline in UI tax rates.

That both papers should reach the same conclusion is all the more notable when one considers our differences in many areas of methodology. Indeed, given the nature of the variables included in Vroman's models (discussed in additional detail below), we find it remarkable that his estimates of the effect of interstate competition are as high as they are.

We agree with Vroman that our collective findings point to a clear need for further research on this subject. Tax rate declines necessarily cause reductions on the benefit side of the UI ledger (these reductions could take the form of fewer unemployed individuals receiving UI benefits, lower benefit payments, or reduced average duration of benefits), and these benefit-side effects have not yet been examined. To cite one example: the research has not directly probed the possible link between interstate competition and the long-term decline in recipiency.

The remainder of our comments first address some of Vroman's more specific comments about our analysis. We then include a few of our thoughts on his methodology.

Comments on Vroman Critique of ***Bassi-McMurrer Analysis***

In discussing our econometric analysis of interstate competition in UI, Vroman focuses much of his attention on what he perceives to be three potential problems:

1. In his view, we have not paid sufficient attention to institutional considerations, which he argues would result in longer time lags in states' responses to one another than our "implausibly short" one year lags.
2. He suggests that our simulated estimates of the cumulative effect of interstate competition would have been smaller if we had used coefficients from some of our alternative regressions.
3. He argues that a potential bias in our "higher" and "lower" regression coefficients causes an overestimation of the cumulative effects of interstate competition.

In response to the first point, we appeal to a well-developed literature in game theory. One widely-accepted result in this literature is that, within the context of a "repeated game" (e.g., one that is played by policy makers year after year), response time lags are expected to be very short (or possibly even non-existent, if the game has been incorporated into the very fabric of the decision-making apparatus). This is a result of players' capacity to anticipate one anothers' moves when a game is played repeatedly. In other words, we would suggest short time lags are to be expected.

Vroman's second concern relies on an incorrect assumption. Because the interactions of the regression coefficients in our simulation (which models the cumulative effect of competition) are so complex, it does not necessarily follow that smaller regression coefficients in a different regression would produce a smaller estimate of competition's cumulative effect. In fact, in our experience working with our simulation model, we found that the system was sufficiently complex that the actual relationships among

the coefficients were as important as their magnitudes (although we, too, were initially tempted to estimate the extent of competition simply by looking at the magnitudes of the coefficients). Indeed, we would point out, for example, that it would have been almost impossible to predict the relative heights of the projected average tax rate lines in Figure 4 of our paper by simply looking at the magnitude of the interstate coefficients in Table 2.

Regarding Vroman's third concern, we commend him on the clever exercise that he uses to illustrate his point-that some of the significant coefficients that we observed may be a result of an econometric flaw related to the separation of the sample into "higher" and "lower" categories for each state. Still, we would note that he demonstrates only *apotential* bias. While it is true that the pattern of "higher" and "lower" effects that we observe could represent a statistical artifact, this pattern would also have been produced by the underlying phenomenon of competition that we are attempting to model.

There is ample other evidence in our analysis (evidence which does not depend on the higher/lower separation) that supports the hypothesis that interstate competition exists. Importantly, additional asymmetric results in our regression coefficients-results that support the conclusion that there is interstate competition in U&cannot be explained by the potential bias cited by Vroman. For example, our regression results suggest that states exhibit a greater response to the tax rates of their largest neighbor, in comparison with smaller neighbors. In addition, we find that states are more responsive to other states when unemployment rates are falling.

Overall, we are disappointed that Vroman's discussion of our work and its implications is so one-sided. The only issues which he raises are those which, in his view, could result in an over-estimate of the cumulative effect of interstate competition. He is silent on one major point (which we discuss in our paper) that would result in an under-estimation of the effect of competition: to the extent that the system has always contained an element of competition, our simulations will underestimate its effect, since the baseline for comparison itself includes some competition.

And we would note our surprise that-despite his rather harsh criticism of our UI model-Vroman later uses an estimation procedure in his workers' compensation analysis that is, in his own words, consistent with the spirit of our model.

Comments on Vroman Analysis** of **Interstate Competition

In regard to Vroman's own attempt to evaluate the possibility and potential magnitude of interstate competition, we offer the following comments.

StabiIity and competition are not inconsistent. We find Vroman's conclusion that "most of the substantial features of state UI tax rate determination were quite stable during the past forty years" to be largely irrelevant to the question of whether interstate competition exists. Indeed, such competition may well manifest itself in a *Zack* of change (in which case, the program would be expected to appear "quite stable"). For example, if states compete with one another by keeping their average tax rate constant and refusing to increase the taxable wage base, then the system would appear stable, even as it slowly spiraled into irrelevance due to wage inflation.

Interstate competition is a complexphenomenon. Thus, we find the first Vroman analysis of "responses" to five states with historically low UI tax rates to be unconvincing. Within the context of a model of interstate competition, a state responds to all of its neighbors (not just one), as well as economic and numerous other factors within a given state. Vroman's univariate analysis is simply unable to capture this complexity.

The Vroman model is unable to capture all effects of possible interstate competition. Vroman's second analysis of UI tax rates (using a regression model) is also, in our view, far too simplistic to address the issues at hand. First, it should be noted that he uses a reduced form (rather than a structural) equation. Since his "explanatory" variables are themselves also the result of choices made by policy makers (rather than exclusively the determinants of those choices), it is not at all clear how to interpret his results in the context of the interstate competition question. There is a clear endogeneity problem in this model.

This points to an important characteristic of Vroman's analysis: his model is designed to capture only a subset of the effects that are possible from interstate competition. That is, his analysis looks only for changes in the relationship between a variety of *within-state* variables. It is altogether possible that (a) intense interstate competition could have existed without causing fundamental changes in the relationship between the tax rate and the lagged reserve and benefit ratios in a given state, or (b) only a portion of the competition among states would have been reflected in the interactions among those within-state variables.

Thus, the high degree of explanatory power (high R-squared) that he cites in these equations in no way rules out the possibility of additional interstate competition, and his estimate that interstate competition resulted in a I5 percent reduction in UI tax rates seems to be, at best, a *lower-bound* estimate which captures some, but not necessarily all, interstate competition. [We believe that this points to one of the relative strengths of the Bassi-McMurrer model: it looks for interstate competition by actually examining *interstate* relationships.]

Time@ame of Vroman cumulative effects is not strictly comparable to that of Bassi-McMurrer effects. Since the Vroman analysis is based on average regression coefficients over the entire period from 1958 to 1986, the appropriate baseline comparison for the effects that he observes is not 1958 (the earliest date), but is better estimated by the mid-point of that period, which is 1972. Thus, his analysis estimates not the cumulative effect of competition over much of the program's history, but instead, is a point-in-time estimate compared to a much more recent time period (since 1972). It is thus not comparable to our *cumulative* estimate of a 50 percent reduction by 1993 based on the dynamics that prevailed earlier in the program (1948- 1962, with mid-point in 1955).

Overall, that Vroman still finds significant evidence of a large effect of competition over the much shorter time period-while also using a model that would be expected to produce a lower-bound estimate-is powerful evidence, in our view, that the effect of competition is large and growing.