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IZA DP No. 10893

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ABSTRACT

The Unemployment Insurance Taxable Wage Base Mystery*

Unemployment insurance experts lament the low Federal taxable wage base (TWB), last increased to $7000 per worker in 1982. The Federal TWB sets only a system minimum and by 2014 all but two states had TWBs that exceeded the minimum, opening up state TWB choice for study. States do align TWB with state payroll earnings. Indeed TWB/WAGE ratios within states have been remarkably stable for decades, though the ratio varies dramatically across states. Critics seem especially concerned about the tax regressivity of low TWBs, but the hypothesis that more progressive states choose less regressive (higher) TWBs is flatly rejected by the data. Earlier UI analysts focused on employer insurance equity, and the resistance of low cost, high-wage (stable) employers to subsidizing high cost, low-wage (un-stable) employers. These analysts provided convincing evidence that (i) employers believed this to be the key issue, and (ii) the TWB did redistribute the insurance premium burden in the hypothesized direction. Across states – wage levels constant – economies characterized by greater income inequality and a preponderance of large (low turnover) firms are associated with lower TWBs. Apparently critics were right to imagine a link between wages and the TWB, but ignored the fact that this matching could be done better across location.

JEL Classification: J65, J41, J33

Keywords: unemployment insurance, taxable wage base, experience rating

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* The paper is dedicated to George J. Stigler, teacher and inspiration, whose acerbic wit delighted and entertained even as it intimidated. How else might one explain studying both industrial organization and the history of economic thought under him only to emerge a labor economist? The luxury of a sabbatical year at GW is gratefully acknowledged as are the comments of participants in the GW microeconomics seminar.

The determination of the tax base is the most difficult and least satisfactory task in the financing of unemployment insurance.

Joseph Becker (1981, p.112)

I. Introduction

For decades, UI experts have expressed frustration with the stubbornly low Federal taxable wage base (TWB), the (minimum) upper-bound on worker earnings subject to the UI payroll tax that states can impose, Haber and Murray (1966, p.378), Topel (1990, p.132), Levine (1997, p.352), Vroman (2011), and Vroman and Woodbury (2014, p.261), among others.[1] This was last increased in 1982, to $7000 per year. The forces that determine the TWB are not well established, but a wage base independent of wage levels would seem an unlikely design feature. The Federal TWB is however a system minimum, and by 2014 all but two states, Arizona and California, imposed a TWB above the Federal minimum, Figure 1A. (Figure 1B provides the corresponding distribution of tax rates (TAX/TWB) across states). The TWB exceeded $35,000 in Alaska, Idaho, and Oregon and $40,000 in Washington and Hawaii. The wide variation in TWB across states permits us to explore its political economy and perhaps uncover the reason for the low Federal TWB.

<figure 1>

UI contributions (taxes) per employee vary substantially across states, from a little over $100 in Nebraska, Tennessee, and Louisiana to more than $900 per worker in Alaska, Oregon, and New Jersey in 2014, Figure 2. These payments are more or less directly linked to benefit payouts. In the U.S. system, states operate independent systems, and contributions (taxes) collected from a state's employers are expected to cover the aggregate benefits distributed to the same state's unemployed workers, at least over time.

<figure 2>

[1] A notable exception is Becker (1981). See Section VIII.

Employers have an obvious interest in the size of these tax payments.[2] Less obvious is employer interest in the multiplicative components that generate the tax per worker (TAX), namely the taxable wage base (TWB) and the tax rate (TAX/TWB):

$$TAX = TWB * (\frac{TAX}{TWB})$$

Across states, a graph of the two factors is not a simple inverse function only because of the large differences in total contributions per worker (TAX) and temporary mismatches of outflows and inflows, Figure 3. What does it matter if the first term is smaller and the second larger?

<figure 3>

Despite much agreement that the Federal TWB is too low, the underlying logic of state choices of the taxable wage base (TWB) and the tax rate (TAX/TWB) is not well understood. At the system level for example, the benefit replacement rate has been quite stable over the first 50 years of the system despite the limited adjustment in the tax base, Levine (1997). Critics of the low Federal TWB offer a variety of arguments in support of raising the Federal minimum TWB, often a tax incidence argument. Treating the UI "contribution" per worker as an individual tax, a payroll (flat) tax with an upper bound on the tax base is regressive—and raising the upper bound makes it less so. Whether this is an important factor in TWB setting is an empirical question.

Earlier scholars focused on UI as social insurance and considered taxes net of expected benefits (fair insurance premiums), imposed on the *employer*--which employers should be subsidized, which should subsidize others? In this framework, often the observed TWB reflects a political equilibrium between high cost, high turnover (low wage) employers seeking cost relief and low cost, low turnover (high wage) employers disinclined to fund that relief. In this argument, raising the TWB makes the system increasingly unfair to stable employers.

[2] For reviews of UI financing, see Becker (1981), Topel (1990), and Vroman and Woodbury (2014).

The next section provides some background to the Federal TWB, highlighting system features of special importance here. Section III turns to the data and some regularities of State TWB choices. Consistent with expert intuition, TWB is systematically increasing in the State's average wage; State TWB/WAGE ratios are remarkably stable across the decades. Differences across states are dramatic, however, and explanations of the highly persistent differences in TWB/WAGE ratios across states are required. Recent theories of TWB setting are reviewed in Section IV, including the common argument that low TWBs are (unacceptably) regressive. The regressivity focus would suggest that more progressive states would adopt higher TWBs, an hypothesis tested in Section V.

An alternative hypothesis, labeled here the employer (insurance) equity argument, is introduced in Section VI. This argument frames TWB choice as an extension of experience rating, with the primary conflict arising between high turnover (low wage) employers and low turnover (high wage) employers. The employer-equity hypothesis is formally modeled in Section VII, and the importance of the wage/turnover nexus highlighted; the insurance equity effect depends critically on that relationship. Anderson and Meyer (2006) provide evidence of the empirical counterpart of the theoretical distribution models in a simulation study of the distribution of taxes and net taxes (insurance premiums) across earnings deciles in the U.S., Section VIII. The employer equity argument predicts that a disproportionate number of large employers and high wage workers do indeed put downward pressure on State TWBs, a prediction that is tested in Section IX. Policy conclusions for the ideal Federal TWB are then drawn in Section X. Apparently critics were right to propose a link between payroll wages and the TWB, but ignored the fact that this matching could be done better across location. Section XI concludes.

II. The U.S. UI System: Some Historical Background

The U.S. unemployment insurance system can be viewed as a set of state systems loosely guided by Federal legislation. The core inducement for states to set up UI programs in the Social Security Act of 1935 was a Federal tax on employer payrolls, most of which would be returned to the individual states to fund a Federally approved unemployment

insurance program. The odd tax structure arose from a concern that, though the Federal government's constitutional right to tax was well established, its right to demand that a state offer a social program was not.[3]

The original Social Security Act of 1935 directed that the UI payroll tax in a acceptable state plan applied to all earnings, though that soon changed (1939) with the Federal government requiring that states impose a TWB of at least $3000 (at the time the maximum taxable wage under the Social Security retirement system). The current payroll tax is 6.0% on a TWB of $7000, of which the Federal government "returns" 5.4 percent to the individual states if the state has in place an approved UI program.[4] The residual 0.6 percent is used to finance state administrative costs and the Federal share of extended benefits.[5]

The U.S. UI system is at its core an employer-based system. Program designers were concerned that the program might subsidize unstable jobs at the expense of stable ones, with predictable and unappealing consequences, and experience rating became a hallmark of the new program. With experience rating, a firm's tax rate varies directly with the balance between the benefits distributed to the firm's employees and the firm's own contributions (payroll taxes).

"Perfect" experience rating would imply that all benefits paid to a firm's workers would be pre-paid or repaid by the firm, essentially a pure (employer) savings account system, with borrowing rights if asset levels in the system fall below zero. If interest charges on assets or debts in the system are at market rates, this arrangement could be considered equivalent to market transactions, except of course for the essentially compulsory aspect of the system as a whole. If perfect, experience rating would eliminate all redistribution across employers.

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[3] For discussions of the early history of the UI program, see Douglas (1936) and Baicker, Goldin, and Katz (1997).

[4] And is not in arears in the repayment of loans from the Federal government, in which case a credit reduction applies.

[5] The Federal portion of the tax, designed to cover administration and later its share of extended benefits, will be ignored here. See Parsons (2000) for a discussion of administrative cost allocations to the states.

Each firm would be assigned its own tax and the division of the total tax bill into its components, TWB or TAX/TWB, would be irrelevant.

Perfect experience rating is not feasible and perhaps not even desirable. Bankruptcy in a balanced budget system requires that surviving employers pay contributions in excess of their own employees' benefit draws. Other non-insurance expenditures, including family benefits, may be "socialized" and not charged to the individual firm.[6] The DOL ETA measure of total benefits charged to employers, the experience rating index (ERI), varies from two-thirds in Maryland and Nebraska to 90 percent in Missouri in 2014, DOL (2015).

States also impose minimum and maximum tax rates, which serve to limit experience rating. Were benefit demands random across time, this would in fact offer employers some insurance against a bad year. Alas that is not the case, with low-skilled, highly seasonal firms regularly benefiting from the upper bound of the tax rate at the expense of high-skilled, stable firms at the lower bound. In a detailed study, Anderson and Meyer (1993) reported that the UI system systematically redistributes resources (i) from stable industries (the white collar and service sector) to less stable ones (construction, manufacturing, agriculture and mining) and (ii) from some firms within industries to others, over long time intervals as well as short.[7]

Debate over the appropriate TWB immediately followed passage of the act. In a contemporary account of the passage of the Social Security Act of 1935, Paul Douglas (1936, pp.258-259) proposed an individual worker equity argument for setting a taxable wage base (as Congress soon did). In particular he noted that that the fifteen states that had already approved UI systems had all imposed an upper bound on benefits (the maximum weekly benefit amount). Drawing a parallel with the SS retirement system, he argued that it seemed inappropriate to tax workers on wages that would not translate into benefits--the TWB should be that level of earnings at which taxes no longer translate into

[6] Only seven states and DC have UI systems that include family benefits, and taxing these would encourage employers to hire only workers without dependents.
[7] See also Becker (1972).

higher benefits. As Douglas remarked, “The limitation of benefits to $15 a week will, however, prevent the upper-salaried group from receiving an undue amount of protection; and indeed will result in their giving indirect aid to the lower salaried workers.” Douglas (1936, 258-259). He proposed, “In order to avoid offending the upper-salaried employees, it will, however, be wise if the workers are not asked to make any payments on that portion of their wages and salaries which is above $30 a week or the approximate amount which would be insured under a 50 per cent benefit scale.”

The link of the TWB with the social security (SS) maximum taxable income was soon broken. The SS tax base has risen sharply with wage inflation while the UI taxable wage base has not. It is important to note that the two serve quite different program functions. In the retirement program, benefits increase with the earnings taxable wage; in the UI system, benefits increase with the worker’s full earnings (up to a separate benefit cap) and not with the worker’s taxable wage base.

III. State Taxable Wage Base (TWB) Choices

UI experts are uniformly supportive of a TWB that increases with payroll earnings across time (and presumably across states), and it seems that state policy makers are as well. A look at the graph of State TWB versus wages illustrates the substantial link between TWB and wages. Cross-state scatter of TWB level levels by average payroll wages in the State are presented in Figure 4 for 2014. Three prominent outliers—low TWB and high WAGE—are noted, NY, CT, and DC, but the relationship is a strong one.

<figure 4>

Perhaps more surprising, the ratio of TWB to average payroll wages across states has been remarkably stable over decades. The scatter diagram of the ratio at the dates two decades apart, 1994 and 2014, illustrate this regularity, Figure 5. The simple correlation across states in the TWB/WAGE ratio in 1994 and 2014 is 0.91.

<figure 5>

Equally obvious, the (stable) TWB/WAGE ratios chosen by the states vary dramatically, from a little over 10 percent to almost 70 percent. What might explain these

large differences in State choices of TWB for a given WAGE? Before investigating various hypotheses proposed by UI experts, consider a base model with lnTAX and separately its components, lnTWB and lnTAX/TWB, as dependent variables and lnWAGE and lnIUR, the natural logs of average payroll wages and the insured unemployment rate as covariates.[8] The impact of these two explanatory variables on average tax contributions per worker (TAX) is both strong and unsurprising. The regression coefficients, standard errors, and the coefficient's significance are reported in Table 1, Column 1. Because of the (long run) budget balancing requirement, the total UI charges reflect total benefits expended, and therefore presumably benefit generosity, which is strongly linked with average wages, and unemployment incidence. The R^2 of 0.78 reveals the importance of these two factors in total expenditures per worker, with the payroll wage elasticity somewhat greater than one (1.3) and the insured unemployment rate modestly less than one (0.79).

<table 1>

More interesting perhaps are the determinants of the (multiplicative) components: lnTWB and lnTAX/TWB. These are less easily "explained", with an R^2 of 0.44 for the (ln) tax base model and 0.31 for the tax rate model, Columns 2 and 3 respectively. The estimates reveal that TWB is primarily driven by payroll wages and not by the insured unemployment rate, Columns 2. The TWB-to-wages elasticity is 1.6, the insured unemployment elasticity only 0.15. This is consistent with the argument that the TWB reflects relatively permanent factors (wage levels) while the tax rate absorbs temporary shocks (the unemployment rate). The insured unemployment rate has a strong positive impact on UI expenditures, which must then find its way into a higher tax rate and does, Column 3. That is the case with the tax rate elasticity with respect to the insured unemployment rate of 0.64 and with respect to wages of -0.32, negative but insignificant.

[8] Variable definitions and sources are reported in Appendix Table 1, means and standard deviations in Appendix Table 2.

IV. TWB Setting: The Recent Struggle for Explanations

Experts appear uniformly to believe that the Federal TWB should be raised sharply and then indexed to wage inflation. Though Vroman does note that the goal of higher TWB could be accomplished by raising the rates of the individual states appropriately, he argues that would be inefficient and does not confront the question of why the states TWB should be raised to the same level in all states.

After intensive study, the 1996 report of the Advisory Council on Unemployment Compensation proposed a series of changes to UI regulations, including Recommendation 1996-20:

> The Federal taxable wage base should be raised to $9,000….[and] should be adjusted annually by the Employment Cost Index.
>
> Advisory Council on Unemployment Compensation (1996, p.40)

The Report offered the following argument for this recommendation:

> …empirical evidence indicates that, holding all else constant, those states with higher taxable wage bases have higher UI trust fund reserves. Thus, in order to promote the forward funding of the UI system—a federal responsibility—one of the most effective mechanisms is to raise the minimum taxable wage base.
>
> Advisory Council on Unemployment Compensation (1996, p.40)

The science behind this strained argument—who can seriously imagine that the most effective way to increase reserves is to increase the Federal minimum TWB?--is a fixed effect panel regression of reserves on a variety of UI system parameters and economic conditions, in which TWB has a significant positive effect, Grundman (1995). Reviewing Grundman's results, one finds that imposing a disqualification for quits or breaking up unions would also "work," Grundman (1995, Table 4, p.N19).

Other experts came to a similar policy conclusion, offering a variety of justifications. Levine (1997) predicted that the TWB restriction would induce a funding crisis in the system even as he presented a graph (Figure 8.5, p.335) that illustrates (i) a dramatic decline in the ratio of TWB to average wages between 1938 and 1997, and (ii) a steady (and in recent years increasing) benefit replacement rate, the principal measure of UI generosity.

A number of recent authors, including Topel (1990), Levine (1997), and Vroman and Woodbury (2014), focused on an apparently unattractive feature of a low Federal TWB.

Viewed in isolation, the tax system is regressive, with workers with wages below the TWB contributing a larger share of their earnings to the program than those above the TWB. This is a straightforward implication of a flat tax with an upper bound. Increasing the TWB reduces regressivity or conversely freezing TWB in a period of increasing wages increases regressivity. Whether this fact translates into an empirically important determinant of state TWB choices is an empirical question, one we turn to in the next section.

V. The Regressivity Argument: An Empirical Test

Expert concerns about the regressivity of the tax with a low TWB suggest a simple hypothesis that might explain state differences in TWB: "progressive" states prefer less regressive policies and therefore higher TWBs for a given level of payroll wages and unemployment rates. The ideal progressivity measure is difficult to define a priori, so three plausible alternative measures are in turn added to the standard lnTWB model:

> UNION, the proportion of a state's wage and salary earners who have a union affiliation. BLS (2014).
>
> DEMOCRAT, the simple average of the proportion of the two legislative houses that are democrat (DC and unicameral Nebraska are not included in these regressions) National Conference of State Legislators (2014).
>
> PROGRESSIVITY, an index constructed by political scientists, Devin Coughley and Christopher Warshaw (2016), designed to measure the liberalism of state policies.

UNION, average state union density in 2014, was 11.4 percent of all wage and salary earners, ranging from 3.2 percent (North Carolina) to 25.8 percent (New York). The Democrat measure is a simple average of the fraction of state legislators in each of the two houses, with DC and unicameral Nebraska not included. The average measure is 0.46, with state values ranging from 0.133 (Wyoming) to 0.911 (Hawaii). The progressivity indicator is a political science construct for the 50 states and is a positive index of "state policy liberalism." The index is centered on zero (mean 0.04) in 2014 with a range of -2.53 (Missouri) to +2.5 (California and New Mexico)—with a greater positive signaling more liberal. Definitions of all variables and their means and standard deviations can be found in Appendix Tables 1 and 2.

A review of the regression results in Table 2 reveals that one cannot reject the null hypothesis of no effect of a state's "progressive" stance on the level of TWB chosen by the state at the two-tail 0.05 percent level. The p-value of UNION or DEMOCRAT is somewhat higher than PROGRESSIVITY, but not substantially. Of greater importance to the progressivity question, the coefficients in all three cases are *negative*, not positive as one might expect—the best estimate is that more progressive states, however measured, impose lower, not higher TWBs.

<table 2>

VI. The Employer (Insurance) Equity Hypothesis

An attractive alternative hypothesis for the determination of TWB emerged in the earlier UI literature but apparently fell into neglect. This hypothesis focused on employers and asserts that UI is a social insurance scheme so that redistribution might better be judged by expected net taxes (taxes paid less expected benefits received), essentially the fairness of insurance premiums. This regression did not go unnoticed by economists whose careers spanned this period. As one of these earlier contributors (and a co-chair of an earlier Federal UI commission), Joseph M. Becker, lamented on this topic in an earlier study.

> The national commission [National Commission on Unemployment Compensation] has shed little new light on the problem of the taxable wage base. Both its final report and the study paper it commissioned are less adequate treatments of the problem than were in existence before the commission began its work. Becker (1981, p.111, footnote 2)]

The same might be said of the Advisory Council on Unemployment Compensation study of 1995-1996.

In their classic 1966 study, Haber and Murray (1966) devoted considerable attention to the UI tax base/tax rate tradeoff. They reported on what they believed to be the key public choice conflict:

> Spokesmen for high-wage, stable employers have steadfastly opposed increases in the tax base, especially on a federal basis, contending that it would be more equitable to raise any additional revenue needed for unemployment benefits by increasing the tax rate on unstable employers who, they contend, are also low-wage employers. Haber and Murray (1966, p.358)

Similarly Becker (1981, p.114) noted that the American Retail Federation made the same argument as the employers made two decades earlier to Haber and Murray,

> When the American Retail Federation stated its policy regarding unemployment insurance in 1980, it recognized that to some extent financial logic would have to yield to political pressures in the selection of a taxable wage base. "This is the most controversial issue among employers, as it tends to pit high-wage and steady employers [those paying high annual wages] against low-wage employers and those having large numbers of part-time or seasonal employees [those paying low annual wages.] Therefore, establishing a wage base above the minimum usually requires a compromise.

The employer-equity hypothesis then involves a political balance between low wage/high turnover employers and high wage/low turnover employers, with an increase in TWB shifting the tax burden from the former to the latter (once tax rates adjust downward to maintain a constant tax revenue).

Haber and Merrill (1966) provided evidence that the impact of a higher TWB on the distribution of the tax burden was much as the executives believed. They reported on a 1961 study undertaken by the New York State Department of Labor (on UI administrative data) that confirmed the impact of higher TWB on the distribution of taxes. New York used a reserve ratio accounting method, essentially treating each employer as a responsibility center for a stock of net contributions (cumulative taxes less benefits). The study calculated the impact on taxes and net benefits of a hypothetical change in the TWB from the prevailing $3,000 to $4,800, partitioning employers into those with positive balances (low turnover employers) and negative balances (high turnover employers). Positive balance firms, those who have paid taxes in excess of benefits accruing to their workers, would experience a tax increase of 35%, those with negative balances only 25%. In this instance, at least, the stable employers, who argued against an increase in TWB, were correct in assessing the equity effect of the increase.

Becker reported on a similar study, a 1965 simulation of the impact on firms of an increase in the TWB from $3000 to $4800 under state of Michigan rules. "The three high-wage firms contributed more than twice as much as the three low wage firms: [an additional] $584,800 as against $208,900." (p.121).

VII. TWB Redistribution Effects: A Formal Model

The Douglas argument appeals to individual worker equity while the Haber and Murray discussion refocus the discussion on employer equity. If firms are a collection of similarly skilled workers, as they are to a considerable extent, the worker/employer distinction blurs. What emerges as important in any equity discussion is differential turnover (and unemployment) rates. The effect of the taxable wage maximum on the distribution of the tax burden depends in an important way on one empirical regularity, the relationship between wages and job turnover. A simple model illustrates this phenomenon.

Consider firms in a competitive labor market with wages linked to skills in the usual way. Assume each firm employs N workers and, within each firm, workers are homogeneous. Because scale plays no role in this model, we set $N = 1.$ There are firms of varying skill (wages) which are say uniformly distributed over the wage interval $(\underline{w}, \overline{w})$ with density $\omega = \frac{1}{\overline{w} - \underline{w}}$. Administrative costs are assumed to be negligible throughout.

The Douglas discussion highlights several key features of the U.S. unemployment insurance system. Both taxes and benefits are proportional to earnings up to an earnings maximum, potentially different for each. Benefits are assumed to be a fixed proportion, say *b*, of wages up to a wage maximum of $\overline{w}^B$, so the worker's UI benefit if separated from firm i is $B_i = bw_i$ if $w_i \leq \overline{w}^B$ and $B^{MAX} = b\overline{w}^B$ otherwise, where B^{MAX} denotes the maximum UI benefit. Benefits are funded by a payroll tax say *t*, of wages up to the State's taxable wage maximum $\overline{w}^T$. The State's maximum cannot be less than the Federal minimum TWB, $\overline{w}^T \geq TWB$. The firm i's tax liability is $T_i = tw_i$ if $w_i \leq \overline{w}^T$ in period i and $T^{MAX} = t\overline{w}^T$ otherwise. To simplify the discussion, assume below that the benefit maximum wage equals or exceeds the maximum taxable wage, a condition that has held in the U.S. since 1939, so

$$\underline{w} < \overline{w}^T \leq \overline{w}^B \leq \overline{w}.$$

In a State's UI system, the total budget across all firms must balance over time; assume that to be the case in this single period model. In the simplest model, this means that the impact of a change in TWB will have two effects: (i) those firms with skills indexed above $\bar{w}^T$ will be made worse off because total taxes will be higher, and (ii) all firms will see an easing of the tax rate to maintain the balanced budget. Those below the initial $\bar{w}^T$ are unambiguously better off; taxes are constant in the first instance and then fall with rebalancing.

If viewed as a pure tax, a system that taxes proportionately to wages up to a wage maximum must be regressive—the i^{th} worker's taxes (T_i) increase proportionally up to the wage tax maximum and then decline as a fraction of wages above that. The distribution of net transfers (taxes paid less expected benefits) requires a little more thought. Net transfers to others in this system, say τ_i for the ith firm (or its worker in these skill-homogeneous firms), are:

$$\tau_i = T_i - E(B_i) = tw_i - \varphi_i b w_i = (t - \varphi_i b) w_i, \qquad (1)$$

where $E(B_i)$ is the ith firm's expected benefit payouts (insurable losses) Taking benefit generosity as given, a balanced budget requires that the payroll tax t^* be set so that transfers sum to zero:

$$\int_{\underline{w}}^{\bar{w}} \omega \, \tau_i(t^*) = 0, \qquad (2)$$

where again ω is the wage density.

The nature of the resulting distribution of transfers, positive and negative, depends critically on how turnover (and insurance losses) vary with wages. Consider first a situation in which the probability of layoff (and UI benefit receipt) is the same for workers in all firms-- $\varphi_i = \varphi$ for all i. In this tax and benefit capped system, firms are partitioned into one of three wage intervals: (1) wages are below both caps, R1; (2) wages are above $\bar{w}^T$ and

below $\bar{w}^B$, R2; and (3) wages are above both policy parameters (both caps are effective), R3.

R1: $\tau_i = [t - \varphi b]w_i$ if $\underline{w} < w_i \leq \bar{w}^T \leq \bar{w}^B \leq \bar{w}$ (3a)

R2: $\tau_i = t\bar{w}^T - \varphi b w_i$ if $\underline{w} < \bar{w}^T \leq w_i \leq \bar{w}^B \leq \bar{w}$, (3b)

R3: $\tau_i = t\bar{w}^T - \varphi b \bar{w}^B$ if $\underline{w} < w^T \leq \bar{w}^B \leq w_i \leq \bar{w}$ (3c)

In the constant turnover case, the transfer rate (to others) in region R1 will be constant, increasing or decreasing with wages depending on the sign of $t - \varphi b$. The sign of this term will be positive. Transfers will be equal across the boundary of R1 and R2, with transfers above $\bar{w}^T$ falling because expected benefits continue to grow while tax payments do not. That would imply that transfers in R1 must be positive, $t - \varphi b > 0$, for the budget to balance if for example $\bar{w}^B = w_i$ so there is only two regions, R1 and R2. As with the tax distribution, net taxes would be regressive, with low wage firms paying higher insurance premiums. Permitting the upper bound on benefit accrual to be less than the maximum wage does not alter that conclusion. Transfers in R3 are constant across wages and equal to the boundary value of R2, diminish in absolute value as a function of wages.

Job turnover is of course strongly *decreasing* in wages.[9] Consider a specific functional form for the turnover function, the simple inverse function:

$$\varphi_i = \frac{\alpha}{w_i}, \qquad \alpha > 0. \tag{4}$$

In this case, expected benefits are independent of wages (the probability of a claim goes down proportionately as the cost of a claim goes up). The transfer functions in the three regions become:

R1: $\tau_i = tw_i - \alpha b$ if $\underline{w} < w_i \leq \bar{w}^T \leq \bar{w}^B \leq \bar{w}$ (5a)

[9] See Parsons (1972) and Pencavel (1972) for early attempts to explain the foundations of this relationship.

R2: $\tau_i = t\bar{w}^T - \alpha b$ if $\underline{w} < \bar{w}^T \leq w_i \leq \bar{w}^B \leq \bar{w}$ (5b)

R3: $\tau_i = t\bar{w}^T - \alpha b \frac{\bar{w}^B}{w_i}$ if $\underline{w} < w^T \leq \bar{w}^B \leq w_i \leq \bar{w}$ (5c)

Because the tax (contribution) rises proportionately to wages until $\bar{w}^T$ is reached, net transfers to others will increase in R1: the tax *rate* is constant and the ratio of expected benefits to wage falls). Specifically net transfers start negative $(-\alpha b)$ but increase in w_i at the rate *t* until $\bar{w}^T$, beyond which net transfers are constant until R3. In R2, the sign of the constant transfers depends on whether taxes are greater or less than expected benefits. That of course will depend on the balanced budget $t = t^*$. At the R3 boundary, transfers to others again begin to increase. On net high wage firms are subsidizing the insurance of low wage firms.

What then is the impact of an increase in the taxable wage base ($\bar{W}^T$) on this system? Before imposing the balanced budget restraint, the effect of an increase in $\bar{W}^T$ would be to extend the range of R1 while reducing the range of R2. A portion of the original R2 would be taxed more heavily. If the system had been budget-balanced, then the increased net revenues would place it in surplus, and the balanced budget requirement would call for a reduction in the payroll tax rate t^*. An increase in t^*, perhaps induced by an increase in an effective Federal TWB, will unambiguously transfer resources to the (original) R1 workers.

VIII. TWB Redistribution Effects: Some Empirical Evidence

As it happens, there is empirical evidence of cross-wage redistribution in the UI system and also evidence of the impact on redistribution of a large increase in the Federal TWB. Anderson and Meyer (2006) estimate the impact of a sharp increase in the Federal minimum TWB on the distribution of UI payroll taxes across worker income levels, considering the two equity principles highlighted by Becker (1981): (i) the “ability to pay” (taxes only) and (ii) benefits received (taxes less benefits). They simulated the distribution of

the payroll tax burden in response to an increase in the TWB from current level to the level of the Social Security maximum taxable earnings.[10] Although the Social Security maximum tax of $60,600 (at the time) is perhaps of no direct relevance to UI, the simulation can be viewed as assessing the impact of a substantial increase in the UI TWB. Estimates are for 1994 and are drawn from the 1993 SIPP panel dataset.

It is almost tautological that a low TWB will place the heaviest tax burden on low wage workers (the tax is regressive), and that is indeed the case in the Anderson and Meyer simulations, Figure 6 Panel A. The 1993 distribution of taxes, denoted by the solid line, is sharply skewed toward low wage workers. Increasing the TWB dramatically, from each state's TWB to a uniform TWB at the SS maximum level while reducing the tax rate to make the change revenue neutral, largely eliminates the regressivity; see the dashed line, The tax burden distributed roughly proportionally across wage deciles.

<figure 6>

More interesting is the redistribution under the insurance principle, the impact of an increase in the TWB on taxes *net of benefits* by wage decile, illustrated in Figure 6B. The calculations reveal that *the 1993 level of TWB* is almost neutral in its equity effect under the insurance principle. The large increase in the TWB shifts the burden of financing the system toward the high wage workers (employers)—the insurance premium is distinctly "unfair" to stable employers.

IX. Employer Power and State TWB Choices

The impact of the employer-equity hypothesis on the state's choice of TWB is ambiguous theoretically. Intuition suggests that a greater proportion of stable, high wage firms in a state would put downward pressure on the TWB, average wages constant. This is a simple voting power consideration—high-wage, stable firms prefer lower subsidies to unstable firms (a lower TWB) and there are more stable firms. Offsetting the direct political

[10] The results here are based on wage rate deciles, but they also report the redistribution based on individual and household income.

power is an offsetting cost or price consideration.[11] For a given generosity of transfer from stable to unstable firms, the cost to any stable firm is less if there are relatively fewer unstable firms. The impact of the distribution of high wage, stable firms on state TWB is then an empirical question.

To explore inequality effects, two measures are added to the standard lnTWB model:

FIRM500+, the percentage of a state's employment that is in firms of 500 employees or more;

GINI HH INCOME, the gini index of the inequality of income in the state.

Slightly over half (51%) of all employees in the United States were employed in firms of 500+ workers in 2011, with a range of 32% (Montana) to 59% (Nevada), SBA (2015). The Gini distribution ranges between 0 (complete equality) to 1 (all income received by one person). In the United States in 2014, the Gini for the U.S. was 0.480 and the range 0.418 (Alaska) to 0.522 (District of Columbia), U.S. Bureau of the Census (2014). To what extent does the greater voting power of large (low turnover) firms and high wage workers alter a state's TWB?

In Table 3, the two variables are introduced into the basic model, first individually, Columns 1 and 2, and then together, Column 3. Both variables have a negative impact on State TWB as one would expect if the voting power effect dominates the cost (price)-reduction effect on transfers to less stable firms. The income distribution effect is the substantially stronger of the two, both in the adjusted R^2 when introduced individually and in statistical significance of the coefficient when entered jointly.[12] A greater share of stable, high-wage firms depresses a state's TWB.

<table 3>

[11] See Parsons (1982) for a discussion of this same ambiguity in predicting the consequences of a greater aged population on the generosity of state provision of Old Age Assistance (OAA), the first Federal welfare program.

[12] Schwabish (2008) provides a detailed review of the somewhat inconclusive evidence on inequality effects on state spending patterns.

X. The Federal TWB: Policy Thoughts

The thirty-five year Federal minimum TWB freeze has provided the states with the freedom to adjust TWBs to local labor market conditions. The response by the states has been to align UI program TWBs to the distribution of wages *in the state*. States apparently balance the competing pressures from high-turnover (low wage) firms and low-turnover (high wage) firms to transfer program costs to the other, and a TWB that adjusts to state payroll wages, then maintains an equilibrium. The implicit reversion of TWB policies to the states simply extended the basic notion of intertemporal matching of TWB to wages to one of locational matching.

The potential social gains are obvious. Imagine, not implausibly, that there is an optimal level of transfers from stable firms to unstable firms. The impact of an effective Federal minimum TWB on what is essentially 51 local markets is intuitively unappealing. The impact on high wage states will be minimal or even zero if the states prefer to set a TWB above the new, higher Federal TWB standard. A higher Federal minimum will of course force stable employers in low wage states to make additional transfers to unstable firms and industries.

A Federal override of State decisions could be justified if there is an externality across states that required remedy. An assumption underpinning the entire Federal UI program, for example, is that workers do not value the program at cost--though they "should"--so that unfettered competition across states for business would induce states to limit unemployment insurance or perhaps offer none at all. However, the negative effects of interstate competition in TWB are difficult to imagine. That California and Arizona have not expanded their TWB beyond the statutory minimum would not seem to bestow (or forfeit) a competitive advantage on those states relative to say Washington and Hawaii, which have TWBs six times higher. Neither can one presume that it reveals a level of state planning incompetence that requires direct Federal management of the program. California and Arizona as governments have operated UI tax systems for decades that are the equivalent

of a lump sum tax with the corresponding redistribution across employers that this TWB implies. There seems little reason to question these long-standing state choices.

It would appear that critics of the current Federal TWB policy failed only in their policy target, focusing on the *Federal* minimum TWB, which of course represses the ability of states to align TWB with wages. In the absence of any obvious externalities, the calls of experts to align the TWB with wages makes reversion of TWB decisions to the states good policy. Or as Joseph Becker (1981, 125) argued, the Federal tax base should be kept as low as possible. "When the federal government raises the federal tax base, it imposes on the states a requirement unadjusted to state differences and innocent of state history." (181, 124).

XI. Conclusion

Experts have repeatedly expressed concerns about the low Federal TWB, a lament logically linked to an appeal to raise the TWB and to index it to future wage growth. What analysts overlooked, however, is that the Federal TWB is only a statutory minimum for state TWB levels. Freezing the minimum TWB permitted the individual states to tailor their UI financing program to their own labor markets.

The elimination of an effective minimum TWB opened up analysis of the political economy of this policy tool. As critics of the Federal TWB freeze would find reassuring, state TWBs vary systematically (and positively) with average payroll wages. Indeed the TWB/WAGE ratio within states has been surprisingly stable for decades, suggesting that it is not simply a neglected, minor policy tool.

Recent critics of the Federal TWB freeze ignored the large state differences in labor markets and framed the TWB discussion as a simple tax (only) question. A flat tax with an upper bound is by definition regressive, the more so the further the TWB falls behind wage growth. The underlying political economy issue would then be over tax progressivity, with the expectation that cross-state variation in TWB would be driven by political leanings as well as wage levels. The hypothesis that more progressive states choose less regressive (higher) TWBs is rejected by the data.

An earlier generation of UI policy analysts had developed and provided evidence for a richer measure of gains and losses in TWB setting built around the primary financial unit, the employer. Low-wage firms and industries are systematically high turnover (high unemployment) firms and industries. If experience rating is incomplete, then a critical conflict is between low cost, low turnover (high wage) firms and high cost, high turnover, low wage employers. A higher TWB makes insurance "premiums" of low cost employers increasingly unfair. Earlier analysts established that variations in TWB have the predicted reallocation effects across firms of different turnover characteristics, and that owner/mangers frame the policy dispute in this light. More recent evidence reveals that the UI system is approximately insurance premium equitable across firms of varying wage levels. A cross state analysis of TWB reveals that states with proportionately more large (stable) firms and a greater inequality of income (proportionately more high wage firms) do indeed set lower TWBs.

As George Stigler (1946, p.358) began his post-World War II assessment of minimum wage legislation, "The minimum wage provisions of the Fair Labor Standards act of 1938 have been repealed by inflation." That would appear both true and less controversial as a policy outcome when applied to the Federal TWB. The "repeal" of the Federal (minimum) taxable wage base by inflation has freed the states to tailor the TWB policy parameter to wages levels in their own labor markets, not to those thousands of miles distant.

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Table 1
Regression Estimates of
Economic Determinants of Key UI Finance Features
U.S. States and DC 2014

	LnTAX	LnTWB	LnTAX/TWB
	(1)	(2)	(3)
LnWAGES	1.289**	1.606**	-0.316
	(0.176)	(0.283)	(0.234)
LnIUR	0.787**	0.1521	0.635**
	(0.097)	(0.1555)	(0.128)
CONSTANT	-8.590**	-7.739**	3.753
	(1.862)	(2.997)	(2.470)
Adj. R^2	0.78	0.44	0.31

The dependent variable is noted at top of column. Standard errors in parentheses.
A single asterisk denoted 0.05 level, a double asterisk 0.01.

Table 2
Regression Estimates of Political Economy Effects on State lnTWBs
Fifty-one U.S. States and DC 2014

	(1)	(2)	(3)
LnWAGES	1.855**	1.951**	1.972**
	(0.303)	(0.289)	(0.307)
LnIUR	0.389*	0.128	0.0319
	(0.193)	(0.180)	(0.167)
UNION	-0.031		
	(0.016)		
DEMOCRAT		-0.618	
		(0.362)	
PROGRESSIVITY			-0.0419
			(0.0453)
CONSTANT	-10.249**	-11.113**	-11.547**
	(3.178)	(3.029)	(3.249)
Adj.R^2	0.48	0.52	0.51
Obs	51	49	50

The dependent variable is the natural log of State TWBs. Standard errors are in parentheses. Column 2: no DC nor Nebraska. Column 3: No DC. A single asterisk denotes a 0.05 level of significance for the estimate, a double asterisk 0.01.

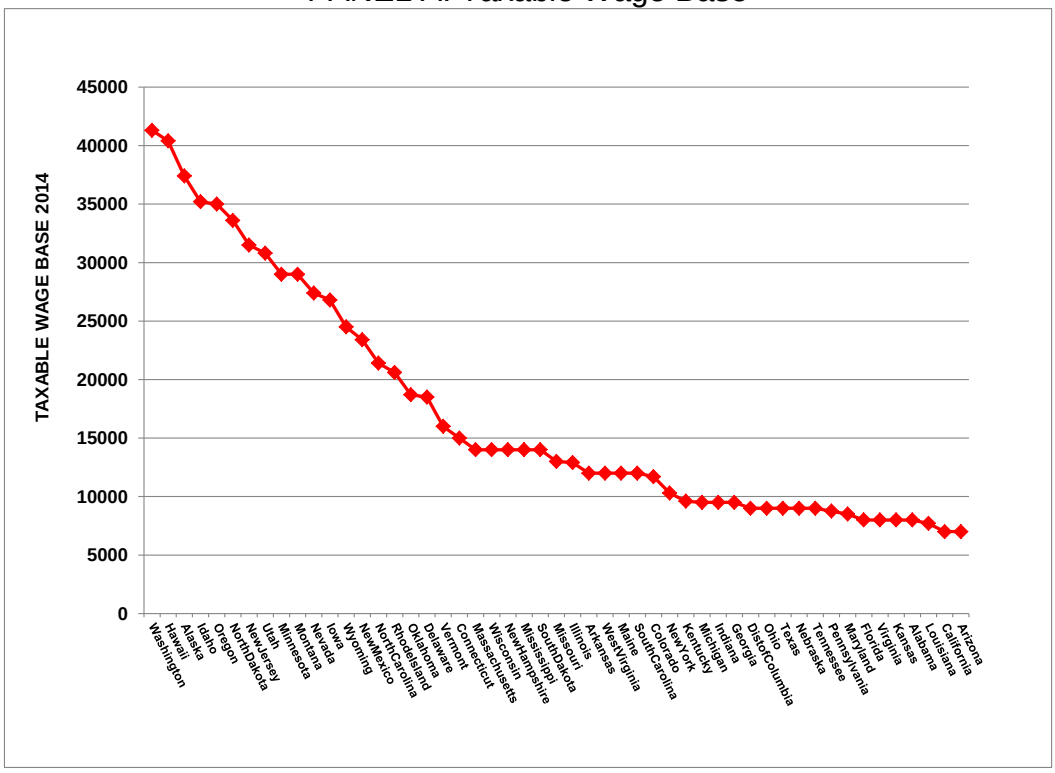
Table 3
Regression Estimates of Inequality Effects on State lnTWB
Fifty-one U.S. States and DC 2014

	(1)	(2)	(3)
LnWAGES	1.527**	1.684**	1.624**
	(0.268)	(0.226)	(0.219)
LnIUR	0.137	0.0692	0.0663
	(0.146)	(0.125)	(0.120)
FIRM SIZE 500+	-0.0285**		-0.0192*
	(0.0105)		(0.00878)
GINI HH INCOME		-11.645**	-10.638**
		(2.181)	(2.148)
CONSTANT	-5.467	-3.115	-1.986
	(2.937)	(2.541)	(2.4987)
Adj. R^2	0.51	0.65	0.67

The dependent variable is the natural log of State TWBs. Standard errors are in parentheses. A single asterisk denotes 0.05 level, a double asterisk 0.01.

Figure 1
The Distributions of State Taxable Wage Bases and Tax Rates (TAX/TWB) 2014

PANEL A: Taxable Wage Base



PANEL B Tax Rate (TAX/TWB)

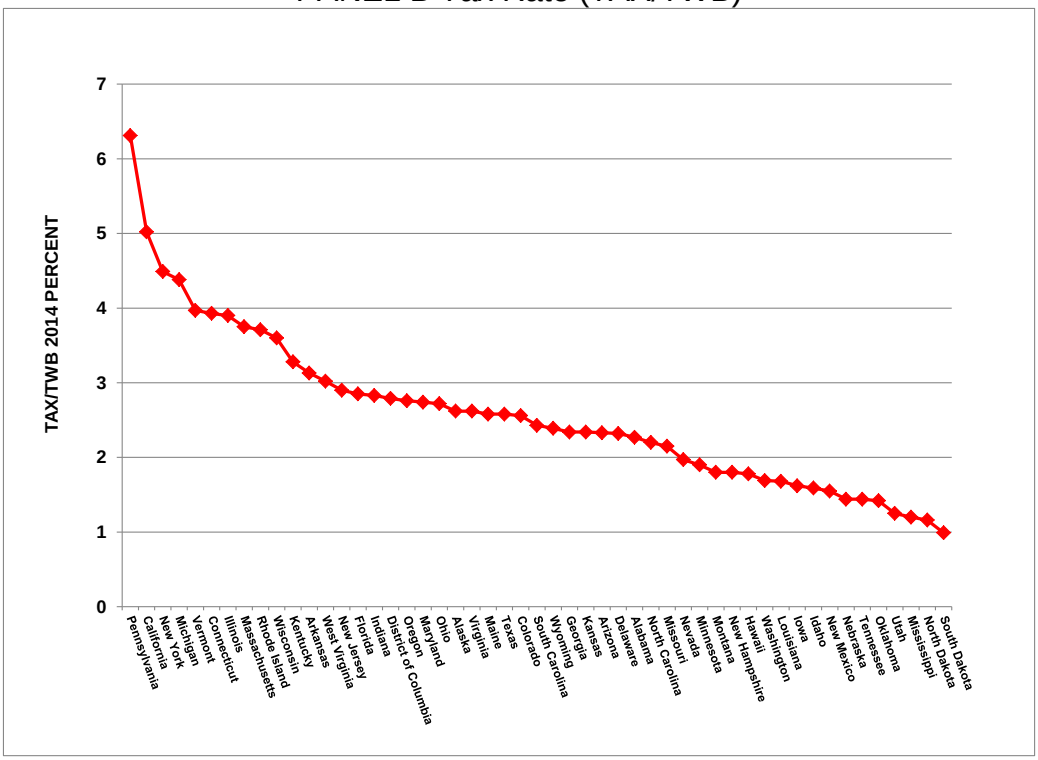


Figure 2
UI Tax Rate (TAX/TWB) vs TWB 2014 By State and DC

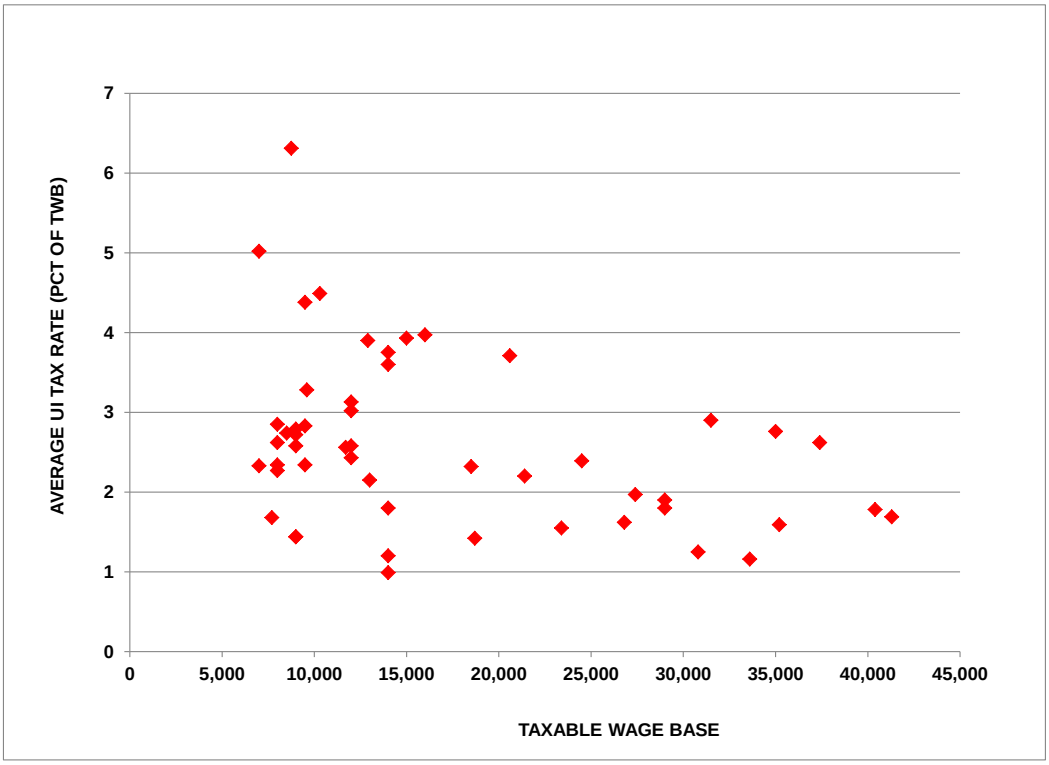


Figure 3
Total UI Contributions (Taxes) Per Worker, by State and DC, 2014

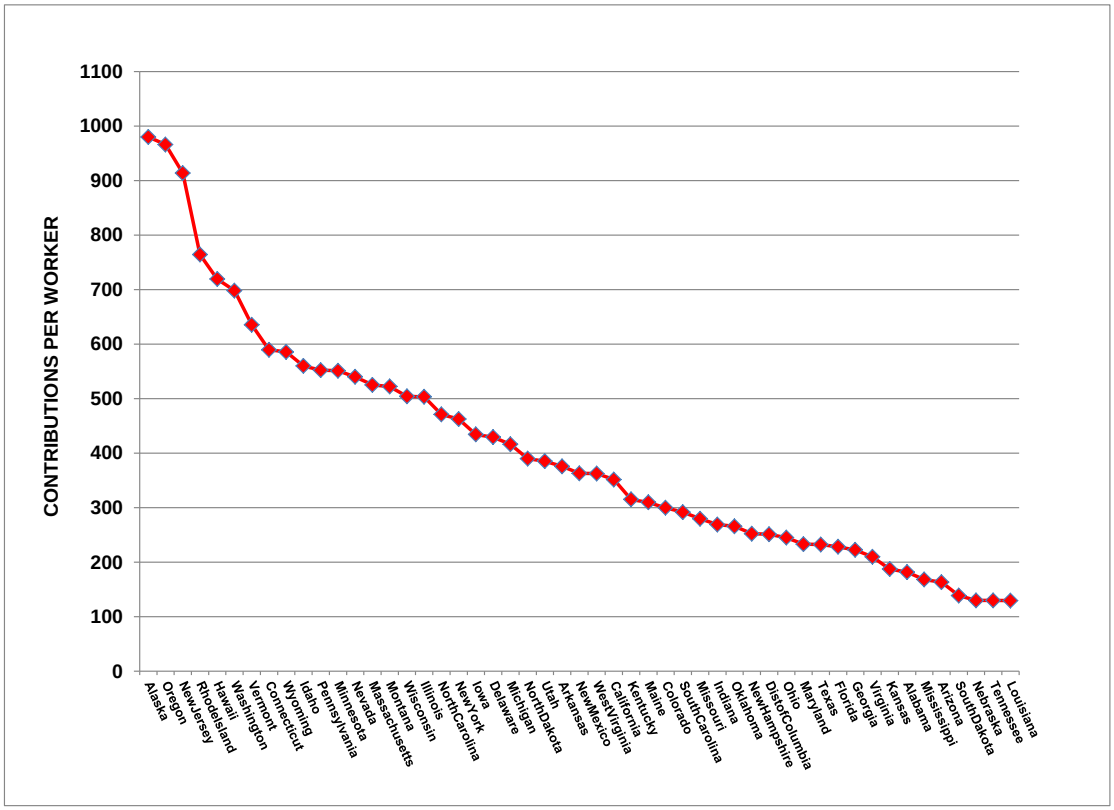


Figure 4
Taxable Wage Base vs Ave UI Wages, States and DC, 2014

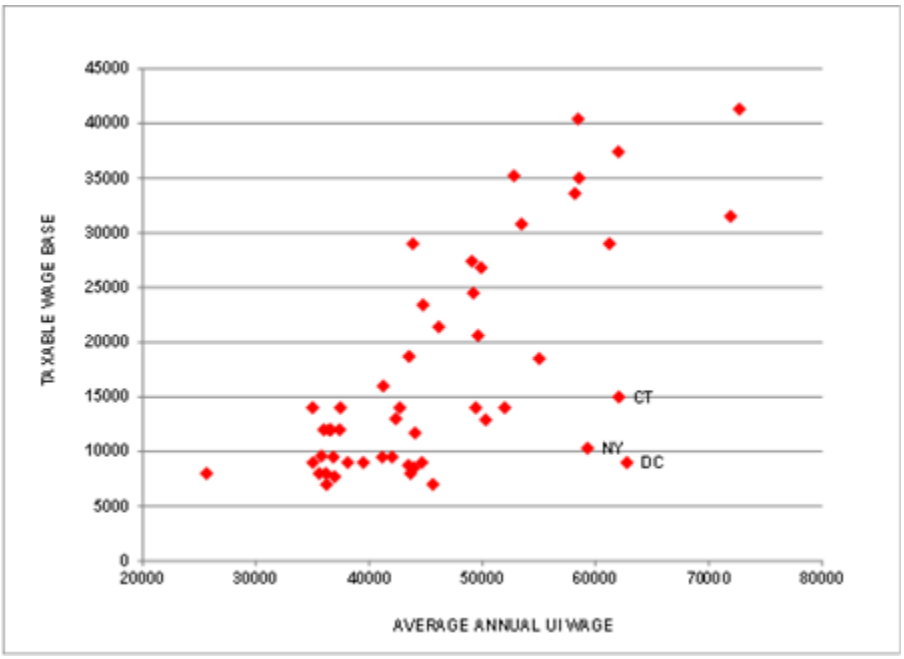


Figure 5
TWB/WAGE Ratio 2014 vs TWB/WAGE Ratio1994
Fifty States and DC

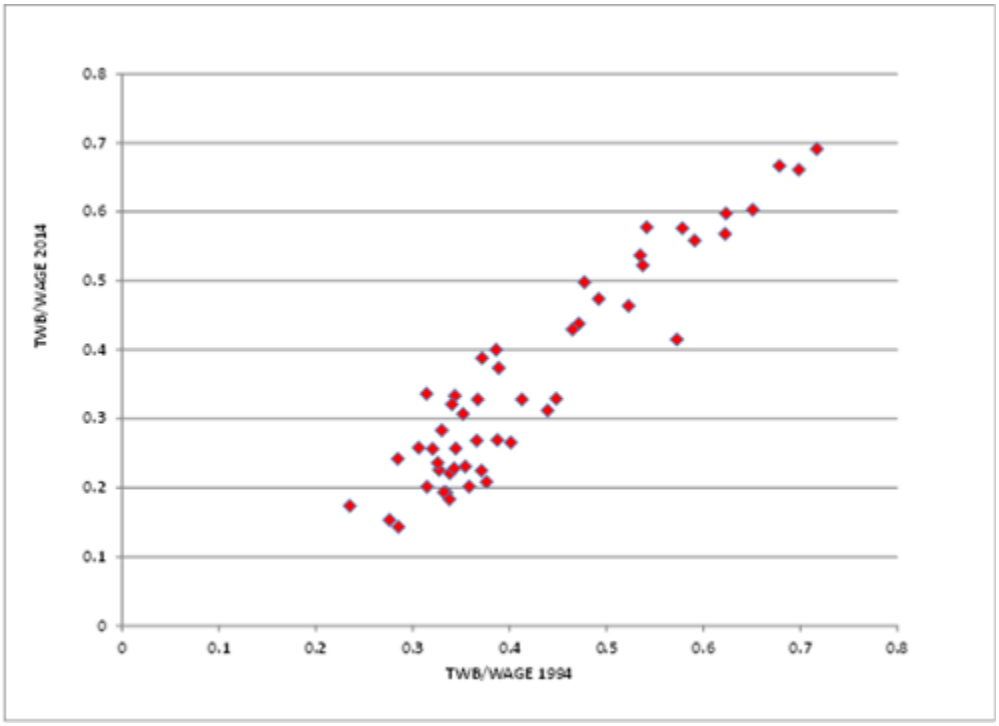
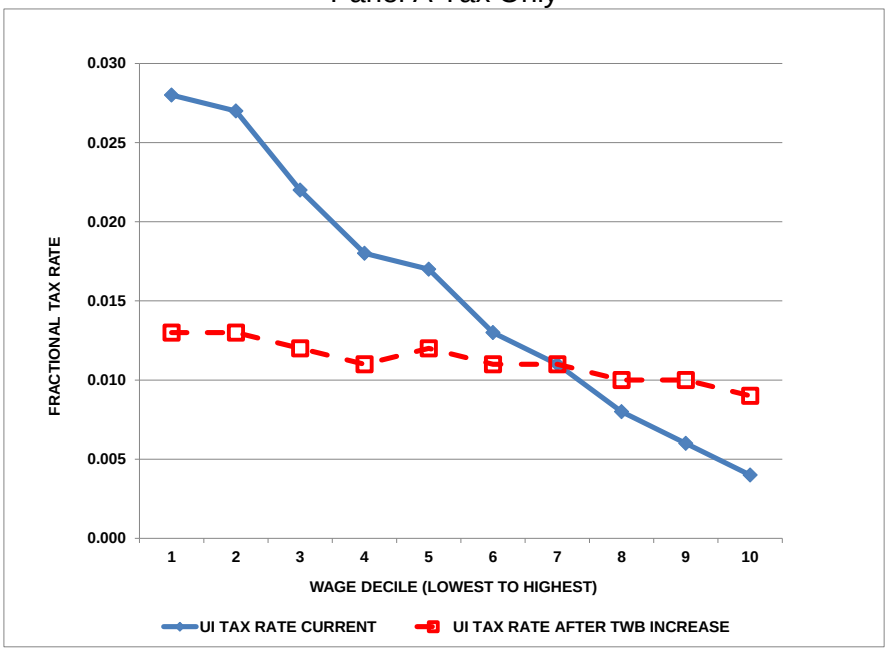
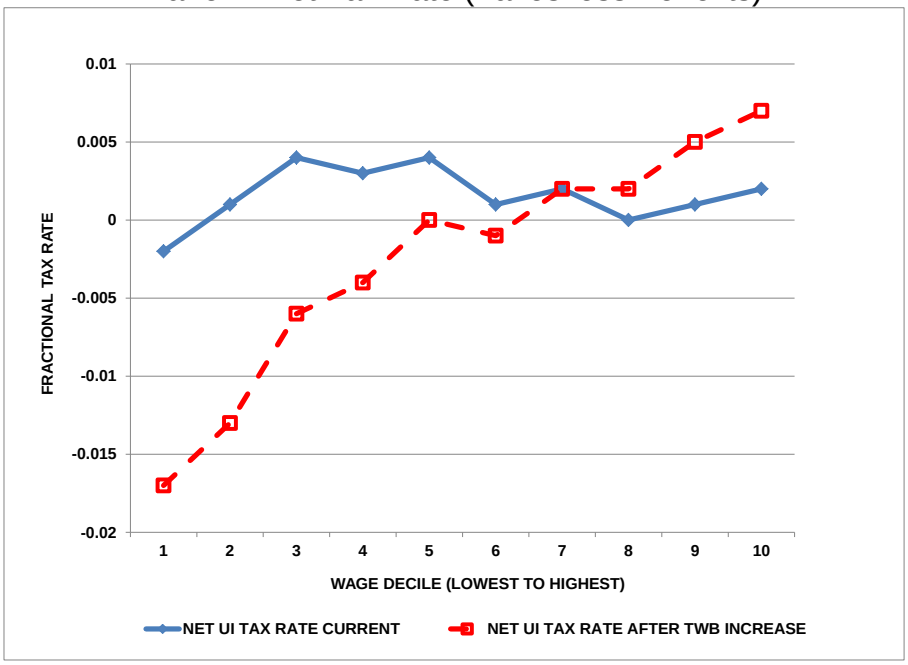


Figure 6
UI Payroll Tax and Net Tax Rates by Income Decile
Before And After Revenue Neutral TWB Increase Anderson And Meyer (2006)

Panel A Tax Only



Panel B Net Tax Rate (Taxes less Benefits)



Source: Author calculations from Anderson and Meyer (2006, Tables 2 (p.82) and 3 (p.86).

Appendix Table 1
Variable Definitions and Data Sources, Fifty-one U.S. States and DC
(All 2014 unless otherwise noted)

TAX	State average UI contributions (taxes) per worker Author's construction from US DOLETA (2014).
TWB	State UI taxable wage base US DOLETA (2014).
TAX/TWB	State UI tax rate (TAX to TWB ratio) US DOLETA (2014).
WAGES	State average UI payroll wages (Author's construction from U.S. DOL ETA (2014).
IUR	State insured unemployment rate (2014Q1), BLS (2014Q1).
UNION	State union density (percent of wage and salary workers with a union affiliation) BLS (2014).
DEMOCRATIC	Fraction of state legislators who are Democrat (Average of two chambers) National Conference of State Legislators (2014).
PROGRESSIVITY	State policy liberalism index 2014, Coughly and Warshaw (2016).
FIRM SIZE 500+	Percent of State workers employed in firms with 500 or more employees, Small Business Administration (2015).
GINI HH INCOME	Gini coefficient of State household income distribution (0-1, with 1 denoting complete income inequality—all income earned by one household. U.S. Bureau of Census (2014).

Appendix Table 2
Means and Standard Deviations

	Obs	Mean	Standard Deviation
TAX	51	405.4256	30.21129
TWB	51	17166.86	1408.763
TAX/TWB	51	2.59	0.150072
WAGES	51	46393	1430.256
IUR	51	2.401961	0.127617
UNION	51	11.44902	0.744409
DEMOCRAT	49	0.462036	0.026018
PROGRESSIVITY	50	0.044725	0.202602
FIRM SIZE 500+	51	49.60784	0.723325
GINI HH INCOME	51	0.463649	0.002953