The Distributional Impacts of Unemployment Insurance Financing

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Abstract

In the United States, unemployment insurance (UI) is funded through employer-side payroll taxes that are experience-rated based on previous UI claims. States differ significantly with respect to the financing of their programs, and a majority of state programs do not currently meet minimum UI trust fund solvency standards. A common culprit in the least solvent states is a very low taxable base of earnings on which UI taxes are levied. We focus on California, which is the least solvent of the 50 state UI programs and has the lowest base of taxable earnings at $7000/year. We use matched employer and employee UI administrative data to assess the impact of reforming the financing of the California UI system. We find that raising the taxable earnings base would significantly reduce the state's UI deficit, would increase experience rating of their UI system by reducing the number of systematically subsidized firms, and would improve vertical equity of the UI system, but would also worsen horizontal equity by imposing much larger percentage increases in costs on the firms with the fewest layoffs. An alternative system which matches the higher taxable base with higher maximum and lower minimum rates could improve both experience rating and horizontal equity.

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1 Introduction

Unemployment insurance (UI), which provides weekly benefits for unemployed workers, plays an important role in the safety net as one of the largest social insurance programs in the United States. Since its inception by the Social Security Act of 1935, it has been a federally mandated benefit that has been administered at the state level. All employers with at least one stable employee or with an annual payroll of $1500 or more, must contribute payroll taxes towards UI. The importance of UI was highlighted during the Covid-19 recession, with more than 21 million workers receiving benefits at the peak of the recession (May 2020).

There is a large and influential literature exploring the effects of UI benefit generosity on worker behavior including the duration of unemployment and wages. This literature has leveraged across and within-state variation in, for example, maximum weekly benefits and the maximum duration of benefits. The protection-distortion tradeoff is front-and-center – more generous UI cushions the effects of job loss but reduces the worker's incentive to find a job. Optimal policy strives to balance those two.

However, there is much less research exploring the effects of UI financing. The program is funded by a dedicated payroll tax that is paid by employers (and invisible to workers) and is partially experience rated, such that employers who have laid off more workers in the past have higher taxes than otherwise similar employers. Experience rating creates an analogous protection-distortion tradeoff in a world of imperfect capital markets. Taxing firms who are viable in the long run but who are suffering short run shocks can lead to excessive firm closures, but protecting firms from the consequences of their layoffs can lead to persistent subsidies to inefficient firms and excessive layoffs (Feldstein (1976) and Topel (1983)). Interestingly, the U.S. is the only industrialized country that experience rates employer UI taxes.

The policy levers that influence the protection-distortion tradeoff in a UI financing system are the minimum and maximum tax rates, the slope of the tax rate schedule connecting these two tax rates, and the annual taxable wage base. Every state in the U.S. has a minimum and maximum tax rate, and a monotonically increasing tax rate in between those two extremes. Firms with relatively many past workers who claimed UI benefits face higher tax rates than their counterparts with few. These UI tax rates are then applied to a taxable base of wages for each worker. Firms pay the associated taxes into a system that offsets those payments against a firm's layoff history; in about 2/3 of states (Reserve Ratio states), that is the entire layoff history, while in the other 1/3 of states (Benefit Ratio states) it is the history over some window (e.g. the last three or five years). So, firms are more experience rated as (a) the taxable wage base is higher, (b) the minimum tax rate is lower, and (c) the maximum tax rate is higher. Reserve ratio states are also more experience-rated, since a firm in these states is only "off the hook" for the UI benefits paid to its laid off workers if it goes out of business.

To the extent that firms are not fully experience-rated, systems may not collect sufficient revenues to finance their UI benefit payments.[1] This can lead to significant revenue shortfalls, particularly when benefits are increased, and during recessionary times. The best example of this problem is the state of California. Appendix Figure 1 shows the UI trust fund balances for the state of California over time. Balances are cyclical, falling during and immediately after each recession and replenishing during the recovery. While the state was previously able to slowly replenish its reserves after recessions, in the two most recent recessions the state's UI trust fund became insolvent and required substantial loans from the federal government. Since 2020, California's UI program has been in deficit, and the outstanding debt has increased in recent

[1] Even with perfect experience rating funds will fall short due to firm exits- we return to this point below.

years since despite improving economic conditions, from $17.7 billion at the end of 2020 to $21 billion at the end of 2024.[2]

California is an extreme example, as it is one of only two states in the nation (along with New York) whose trust fund is currently below zero. But the problem of insufficient funding is widespread. At the present time, 31 states plus Washington, D.C. do not meet the standard for trust fund solvency defined by the Department of Labor [add FN here defining that]. This is partly because of the large system deficits that arose out of the Covid crisis, but even back in 2019 -- nearly a decade after the Great Recession -- 23 states did not meet that standard.

The states that are furthest from this fiscal standard share a common feature: they have very low UI tax bases, and they generally do not index their tax bases to rise over time. Currently four states -- Arkansas, California, Florida, and Tennessee -- only tax the first $7000 of annual earnings, which is the minimum federally allowable UI tax base. And an additional 14 states have the maximum annual taxable earnings at or below $10,000 annually. And 32 states plus D.C. do not index their taxable earnings base; in recent work, Lachowska, Vroman, Woodbury (2020) show that states that indexed their tax bases had much higher UI trust fund reserves going into the Covid-19 pandemic.

Raising the tax base for UI taxes would help to address trust fund shortfalls. But raising the tax base has a broad and complex set of implications for the nature of UI financing, changing the degree of experience rating, vertical equity across employees, and horizontal equity across firms. These impacts may or may not be desirable either economically or politically. But to our knowledge, no previous analysis has used large-scale administrative data to rigorously explore the impact of changing the UI tax base on the nature of system financing and the distribution of

[2] Because Covid-related claims were forgiven during the pandemic, even surviving firms are no longer "on the hook" for repaying the incurred debt.

UI costs. In this paper we do so for the nation's most populous state – and the one with the worst trust fund balance relative to system revenues – California.

To do so, we develop a simulation model for California's UI program. We are the first paper to match complete data on UI financing from the firm side with data on worker earnings to investigate the impact of UI taxes. This allows us to carry out a full distributional analysis of the effect of changes in UI financing parameters. While our model will focus only on California, there are important lessons for other states with systematically low tax bases including Florida, New York, Texas, and many others. We use data from 2014 to 2019, a period of declining unemployment (from 8.2 percent in January 2014 to 4.1 percent in December 2019) and just prior to the pandemic-induced recession, to model the impact of changes in UI financing parameters on system solvency and worker and firm tax payments. We then apply our simulation model to the distribution of firms in 2022, the latest calendar year for which we have available data.

We document several interesting and policy-relevant findings. First, simulating the status quo shows that California's UI system is not even solvent in non-recessionary conditions; without additional reforms, California will continue to accrue UI debt, because of the forgiveness of pandemic-related UI claims. As shown in Appendix Figure 2, the average employer tax rate rose during and immediately following every prior recession but not during the most recent one. More specifically, the average employer UI tax rate in California rose from 4 percent in 2008 to a peak of 5.3 percent in 2011 whereas it actually *fell* from 4 percent in 2020 to 3 percent by 2023. In the absence of other state interventions, federal FUTA credit reductions will eventually exact larger and larger surcharges from California employers until the outstanding debt is eventually

repaid.[3] However, unsurprisingly, raising the base of taxable earnings increases the revenues collected by the California UI system. Under our simulation model, doubling the tax base from $7000 to $14,000 per worker raises an incremental $25 billion over the next decade; gradually tripling it to $21,000 raises an additional $20.5 billion.

Second, raising the tax base increases experience rating in the system significantly in the near term, but by much less in the long term. Fewer firms are systematically at the maximum tax rate (currently 6.2%), since they more quickly pay back their past accumulated benefits. Eventually, however, firms move rapidly to the minimum tax rate (currently 1.5%) as they build up larger and larger UI reserves, and as a result are also not experience-rated if their laid-off workers claim UI benefits unless there are a very large number of claims as a share of the firm's total payroll.

Third, raising the tax base can increase vertical equity at the very bottom of the income distribution, as workers earning below the new taxable maximum are partially shielded from such tax increases. This has the additional desirable property of strengthening the connection between UI taxes paid and UI benefits received. Presently, an employer in California pays the same UI tax for a worker earning $8,000 annually as for a worker earning $40,000 annually. But if both of those workers are laid off, the latter worker will receive a UI benefit that is five times greater, while costing the employer five times as much in terms of future UI taxes. Of course, the ultimate impact of an increase in the taxable wage base on vertical equity will depend on how firms react to tax base increases in terms of wage setting and employment decisions, along with any corresponding effect on UI claiming; while this paper does not fully estimate such

[3] The surcharge in 2025 is equal to 1.2% on the first $7000 of earnings per worker, but will grow by 0.3% each year the debt remains outstanding. New York also has a 1.2% surcharge due to their outstanding debt.

behavioral responses, we provide some empirical evidence regarding the responsiveness of firms to UI taxes below.

Fourth, there is horizontal inequity in the revenues raised from a base increase. The firms with the lowest layoff rates would see the largest proportional rise in their taxes – because they would remain at the minimum tax rate instead of benefiting from a decline in their tax rates as past UI claims are paid off more rapidly.

To address these issues, we consider alternative reforms that pair a tax base increase with other changes in the structure of the tax schedule. We find that a system that pairs a base increase with a rise in the maximum rate and a decline in the minimum rate further promotes experience rating and horizontal equity in tax increases by firm type – while having minimal impact on the vertical equity benefits of raising the base. Going further, we could also implement a flat surcharge of 1% on all taxable wages to cover the social cost of exiting employers, that is perhaps the simplest way to replenish the UI trust fund.

Our paper proceeds as follows. Section 2 provides a background discussion of UI financing and discusses the relevant previous literature. Section 3 describes our novel employer-employee matched data set, while Section 4 discusses our simulation methodology. Section 5 presents our basic results on the implications of alternative policies for the state. Section 6 raises some additional considerations, while Section 7 concludes.

2 Background of Unemployment Insurance Financing

Unemployment insurance in the United States is administered at the state level and funded through employer-side payroll taxes that are updated annually. States are free to determine their own experience-rated tax formulas and taxable wage bases, as long as they meet federal

requirements. One such federal mandate, the size of the taxable wage base, is currently set at only $7,000. This mandate has not been updated since 1982. As a result, there is even greater variation in state tax schedules than the current variation in state UI benefit generosity. In 2024, taxable wage bases ranged from a minimum of $7,000 annually (in California, Florida, and Tennessee), to a maximum of $68,500 in Washington; in contrast, the highest state maximum UI benefit of $1,079 in Washington is only 4.6 times the lowest maximum of $235 in Mississippi.

All states assign experience-rated employer-specific tax rates that are an increasing function of previous UI claims charged to the employer. In California, as well as 28 other states, tax rates are determined by the employer's current Reserve Ratio, which is essentially equivalent to keeping employer-specific UI savings accounts. The reserve ratio is calculated by dividing each employer's current UI reserves (tax contributions minus claims) by their average taxable payroll over the last few years. Reserve ratios are then converted into employer-specific tax rates according to a preset table. Figure 1 depicts the tax schedule California uses to convert employer reserve ratios into UI tax rates. The minimum tax rate of 1.5% is assigned to employers with reserve ratios of more than 20%, while the maximum tax rate of 6.2% is assigned to employers with reserve ratios below zero. The rate declines linearly between these two extremes, so that (for example) an employer with a reserve ratio of 10% has a tax rate of 3.85%.

In terms of UI financing, the main levers of adjustment are: taxable earnings (called the taxable wage base), minimum tax rate, maximum tax rate, and the slope of the tax schedule. An additional important factor is whether states choose to use a benefit-ratio or reserve-ratio formula to calculate experience rating. While not within the scope of this paper, a benefit-ratio formula would allow "forgiveness" of past UI claims since a firm paid back only a portion of the cost of its recent UI claims by the end of the state's payback period

(typically 3 or 5 years), then it would be forgiven from its remaining debt. Forgiveness is not typically a possibility in reserve ratio states, unless the employer goes out of business.

The structure of the UI system leads to imperfect experience rating through three mechanisms. The first is a taxable wage base that is small relative to the typical benefits that workers receive when unemployed. With a low taxable wage base, it takes longer for firms to repay the system for the benefits paid to their workers. The second is a maximum rate that protects firms from the financial consequences of additional layoffs once at the maximum. The third is a minimum rate which does not impose marginal costs of layoff for firms without much past layoff history since they are far from the "bend point" in the tax schedule where experience rating begins.

Imperfect experience rating has desirable features in a dynamic labor market with capital market failures. Firms are able to restructure their labor forces in periods of economic downturns while delaying the cost of doing so until the restructured firm has the resources to repay the costs to the UI system. But it also has the undesirable feature of subsidizing systematically high layoff firms, who may not be economically viable even in the long run absent this subsidy. Feldstein (1978), Topel (1983), and Card and Levine (1994) show that higher implicit UI subsidies lead to systematically higher layoff rates. Anderson and Meyer (1993, 1997) document that experience rating is highly imperfect and that certain industries persistently pay much less in UI taxes than their laid-off workers receive in benefits.

Determining the optimal degree of experience rating is challenging and beyond the scope of this paper. But below we show some statistics that bear on how changes to UI financing parameters change experience rating.

3 Data and Descriptives

3.1 California UI Data

In this paper, we combine de-identified administrative employer-level and worker-level data from California's Employment Development Department (EDD). For the universe of private-sector employers in the state, we observe quarterly employment in the state of California from 2014:Q1 to 2023:Q2, as well as each employer's California UI tax contributions and employer-specific reserve ratios (which determine employer-level UI tax rates). The data only includes information about an employer's California-based workforce. To the extent that a firm employs workers in other states or outside the U.S., this is not captured by our data.

We match these employer data to job-level earnings for all workers covered by the UI system. Because the employer-level and worker-level datasets are sourced from two different reporting forms, there is also some degree of misreporting. Thus, we always use worker-level earnings to calculate measures of earnings and tax contributions. We do not, however, have any information about demographics, residential location, or individual characteristics beyond earnings.

Table 1 provides summary statistics for the employer-level (Panel A) and job-level datasets (Panel B). We exclude any employers that are not eligible for regular experience-rating.[4] Appendix Figure A.5 summarizes the distribution of worker-level earnings in 2022, distinguishing between single and multiple job holders. Table 1 also provides a comparison of firms that are included in our later simulation sample versus ones that are excluded. The two main groups of excluded firms are: firms who entered later than 2021:Q2, and firms who exited

[4] These include federal/state/local government employees, as well as some hospitals and nonprofit organizations. In addition, we exclude single-employee firms in the NAICS 624120 industry, because they are primarily made up of elderly caregivers receiving payments through California's In-Home Supportive Services program. Taken together, this makes up XXX% of reported employment in the state.

before 2023:Q1. Existing firms that did not report employment in the first two quarters of 2022 are also excluded. We discuss the limitations arising from these exclusions below.

As Panel A shows, California had approximately 865,000 experience-rated employers in 2022, with maximum monthly employment averaging 19 workers. Due to excluding new entrants and exiters, employers in our simulation sample are larger on average. Because of the low UI tax base of $7,000, average taxable earnings are substantially lower than average total earnings. On average, only 11% of earnings are taxable under UI. Additionally, just over half of all jobs were held by a worker with more than one experience-rated job during 2022. The fact that taxable wages are calculated at the job rather than worker level implies that, conditional on total earnings, multiple job holders face larger tax burdens than single job holders.

3.1.1 How Representative is California?

Table 2 compares California's labor force statistics to those from the rest of the nation. In terms of demographics, California has a lower White share, lower Black share, and higher Hispanic and Asian shares than the rest of the United States. Weekly earnings are also about 20 percent higher in California, likely reflecting a higher cost of living. In terms of industry composition, California has a larger share of employment in Agriculture, which is also the industry that utilizes the highest rates of UI benefits within California. California also has higher shares of white collar sectors such as Information (this includes both Silicon Valley and the Film/Music industry) and Prof/Sci/Tech Services, relative to Manufacturing.

In terms of UI benefits and taxes, California is similar to the national average in terms of maximum weekly benefit, but has higher than average duration and higher rates of benefit

claiming. On the financing side, California's taxable wage base is equal to the minimum allowable $7000, is much lower than the national average.

3.2 Descriptive Figures

Figure 2 shows the distribution of employer tax rates over the 2014-2022 period, weighted by employment. Due to low taxable earnings and a maximum tax rate of only 6.2%, a significant share of California's employers are persistently stuck at the maximum tax rate. From 2014 to 2019 as California's unemployment rate fell from 8 percent to 4 percent, the share of employees working for employers at the maximum tax rate declined by almost half. However, of the employers that survived from 2014-2019, 10% of them (19% of employment) were at the maximum rate every single one of these six years. As a result, these firms face zero marginal tax costs for additional layoffs, as they continue to pay the same maximum tax of 6.2%*$7,000 = $434 per worker, regardless of their layoff trajectory. Layoffs do, however, further reduce the reserve ratio for these firms, meaning that it would take them longer to pay back their debt.

In the wake of the Covid-19 pandemic, California forgave pandemic-related UI claims, such that UI claims utilized by a firm's workers were no longer subtracted from their firm-specific reserve balance (which is used to calculate employer tax rates). This moved even more firms away from the maximum rate, so that by 2022 only about 10% of employment faced the maximum tax.

Figure 3 illustrates that with an annual tax base of just $7,000, the industry sectors with the highest effective tax rates are not always the ones with the highest statutory tax rates. This figure graphs the statutory rate on the X-axis and the effective rate on the Y-axis. The red dots represent the 45 degree line where effective and statutory rates are equal; all industries are on

average below this line, as they all have sizeable shares of workers earning more than $7,000. A variety of industries with many low-income workers, such as agriculture and food/hospitality, have effective rates that are only 20-30 percent below their statutory rates. In contrast, higher earning industries have a much larger gap; in the information sector, the statutory rate of 3.3% is over five times the effective rate of 0.6%.

4 Simulation Model

California uses a Reserve Ratio (RR) formula to calculate employer tax rates. This takes the ratio of the employer's current UI reserves in the numerator, and the employer's average taxable payroll over the last 3 years in the denominator. UI tax rates are then determined using a fixed schedule that maps Reserve Ratios to rates.[5]

$$ReserveRatio_{it} = \frac{Reserves_{i,t-1} + Contributions_{it} - Claims_{it}}{\frac{TaxablePay_{i,t-2} + TaxablePay_{i,t-1} + TaxablePay_{it}}{3}}$$

Simulating a significant policy change such as a tax base increase requires dynamic modeling because an increase in the taxable wage base will mechanically increase the denominator of each firm's reserve ratio. In other words, each firm with a positive reserve ratio will see their reserve ratio gradually fall (and their tax rate rise) in the three years following a base increase, because $TaxablePay_{it}$ automatically increases even if there is no change in actual payroll. This leads to a mechanical *increase* in tax rates following a base increase, even if payroll is held fixed.

Therefore, in order to simulate the steady-state employer tax distribution after a base increase, we need to model how firm reserve ratios evolve for multiple years after the initial change. To do so, we need to make an assumption about how both employment and UI claims

[5] https://edd.ca.gov/siteassets/files/pdf_pub_ctr/de231z.pdf

evolve over time. For simplicity, we fix firm payroll at 2022 levels, so that there is no employment growth or decline, and no change in earnings. This also inherently shuts down new entry and firm exit, which we recognize is a limitation of our model – we discuss this below. In terms of UI claims, we infer employer-level claims using the panel aspect of our data, and this is discussed in greater detail in Appendix B. We can then use our inferred UI claims to predict future UI claims, as discussed in Appendix B.2. Each firm's future UI claims are predicted as a function of their current claims, with the prediction model fitted to the underlying distribution of UI claims in 2019.

Our simulation also assumes that total payroll is unresponsive to an increase in the UI tax base. To the extent that employers scale back their hiring or their wage growth in response to a higher UI tax base, the incremental revenue would be lower than our simulations suggest. However, to the extent that behavioral responses are similar across all firms, our simplifying assumption would affect the overall level, but not the relative impacts we observe from increases in the taxable wage base.

5 Results

Effect of Raising the Tax Base on Revenues and Tax Rates

Total UI revenues under each policy simulation are summarized in Table 3. As noted, we start our simulation in 2022 and assume that unemployment behavior over the next decade mimics the risk set of that high employment economy. We will discuss below the implications of considering alternative economic conditions.

The first row of the table shows our projected revenues with no policy change. Note that revenue collections are actually net negative, meaning California pays out more in UI claims than it collects in UI contributions. This is due primarily to firms persistently at the maximum tax rate, as the maximum caps the amount of taxes these firms pay despite higher benefit claims.

The second row of Table 3 shows the implications of doubling the tax base, to $14,000; note that while this is a major change, it would move California only from tied for last in the nation to 24th in the nation in terms of tax base size. Such a change raises revenues significantly. In the first year, net revenues rise from 0.78 billion to 3.99 billion, a 500% increase. But the revenue gain from a higher base declines over time. This is because with the higher base, firms would shift downward on the tax rate schedule as they pay back their UI tax obligations more rapidly. Additional net revenues over ten years from this tax base change are approximately $25.5 billion.

Figure 4 illustrates the evolution of tax rates in our simulation model, and is employment weighted so we refer to effects per employee not per firm.[6] We begin in year 2 (the first year that tax rates adjust) with a distribution that features 7.7% of employment at that maximum rate, and 6.6% at the minimum, with a median rate of 2.6%. In the first few years after a base increase, the share of employees at the maximum rate declines quickly, and these firms are shifted towards the middle of the rate distribution. Likewise, the share of employees near the minimum also declines because expanding the tax base mechanically increases the denominator of the reserve ratio. By year 4, the median UI tax rate has increased to 3.1%. Over time, however, the distribution of employer tax rates continues to shift downwards. The share of employment at the minimum is

[6] The corresponding simulation for the baseline scenario (no base increase) is illustrated by Appendix Figure A.3. Under business as usual, the share of employment at the maximum tax rate continues to grow over time.

falling until year 7, at which point it begins to grow rapidly, such that by year 9 the minimum rate is the modal rate.

By the 10th year after the base increase, net revenues are approximately $1 billion higher under the doubling of the tax base. That said, along the way, the state has made almost $25 billion in incremental revenues, which would go a long way towards achieving trust fund solvency. The Department of Labor uses the Average High Cost Multiple (AHCM) as a benchmark for trust fund solvency, which compares the state's current trust fund balance (divided by total annual wages), to the average of the three highest benefit cost rates in the last twenty years. Minimum solvency standards require an AHCM ratio greater than or equal to 1. California's 3-year benefit cost rate is equal to 1.83, which means it would need to raise UI revenues equal to 1.83 percent of total payroll in order to achieve solvency by Department of Labor standards. In our simulation sample this corresponds to a revenue target of $21.3 billion, which is achievable only if we ignore California's existing UI debt of almost $20 billion as of Jan 2024.

In the third row of Table 3, we show the impact of gradually tripling the tax base to 22k, which would still only place California 18th in the nation in size of tax base (and still be only about one-third of nearby Washington). Once again, this causes the largest jump in revenues as the base increase begins to take effect, but by year 10 annual revenues are only $1.6 billion higher than for the base increase of 14k. Meanwhile, over this period California would be able to raise a total of $44 billion in net revenue. In Appendix Figure A.4, we once again show the evolution of the tax rate distribution, which is very similar in pattern as the increase to a 14k base. Due to the gradual transition and the larger steady state base increase, it takes slightly longer for employers to bunch at the minimum tax rate.

Vertical Equity

A key benefit of changing the taxable earnings base is an improvement in vertical equity. By collecting revenues higher up the earnings distribution, a higher tax base will reduce the burden of tax payments borne by the lowest earning workers. Out of all California-based jobs in 2022 with earnings of $500 or more, 27 percent paid less than $7k in wages, while 40 percent paid less than $14k.

Figure 5 illustrates the impact of a base increase across the earnings distribution. Jobs are bucketed into bins, beginning with earnings of $500-$999 per year (we drop jobs earning less than $500), then $1000-$1099 per year, and so on until $14,000-$14,999 per year. It then jumps to broader ranges of $15k to $19,999 per year and $20k to $24,999 per year, before jumping to $25k to $49,999, then to $50k to $99,999, and finally those $100k per year and above. This shows, unsurprisingly, that higher tax bases are more vertically equitable. The effective tax rate from a $7000 tax base falls fairly quickly after $7000; similarly for $14,000 and $22,000. This means that higher tax bases increase the burden further up in the income distribution.

While these are job level earnings, vertical equity becomes even more pronounced when we analyze changes at the worker level. Out of the 8.6 million jobs earning less than $14,000, two-thirds were held by workers with more than one job during the year. When a worker holds two low-earning jobs, they are subject to twice the amount of taxable earnings relative to a worker holding a single job. Figure 6 illustrates the difference in tax burden across single job holders and multiple job holders. For workers earnings less than $25,000 a year, multiple job holders face smaller tax increases from a base change than single job holders do. The distribution of multiple job holders is also skewed towards lower incomes. Appendix Figure A.5 shows that

workers earning between 7k and 25k annually are twice as likely to be single job holders than multiple job holders; workers earning above 50k are almost 4 times as likely.

Horizonal Equity

Another important consideration in changing the UI financing system is the impact on horizontal equity. We assess horizontal equity by illustrating the relationship between which firms pay out the most UI benefits and which firms pay the most taxes.

Figure 7 ranks firms on the x-axis by their three-year average claim rate in years 1-3, to compare higher versus lower layoff firms. On the y-axis, we show the change in steady-state (year 5) tax revenues from raising the taxable earnings base from 7k to either 14k or 22k. The panels on the left graph the change in dollars per worker, while the panels on the right graph the change in proportional terms (a value of one represents a doubling of tax revenues, and a value of two represents a tripling). While firms with higher UI claims face larger tax increases in dollar terms, this is not the case in proportional terms. Doubling the tax base to 14k roughly doubles the taxes collected from firms with low layoffs, but as layoffs rise the proportional tax increase falls, before rising again somewhat for the highest layoff firms. Even for the highest layoff firms, the proportional increase in tax costs is lower than for the lowest layoff firms. This result is even more striking with a tripling of the tax base to 22k. In that case, revenues increase by over 200% for the lowest layoff firms, but fall dramatically with layoff rates such that high layoff firms see their tax costs rise by closer to 150%.

This is a striking finding, driven by the fact that a tax base increase compresses the distribution of employer tax rates towards the middle (as illustrated in Figure 4), such that firms with low layoffs will actually face a mechanical tax increase as they are forced to build up a

larger reserve ratio. Meanwhile, the low 6.2% maximum tax rate shields high layoff firms from paying the full cost of their UI claims.

Effect of Raising the Tax Base on Experience Rating

Another important implication of raising the tax base is what it does to the level of experience rating in the California UI system. We measure this in two ways. First, we consider the share of firms "stuck" at the maximum rate. As noted earlier, the major distortion put in place by an imperfectly experience rated system is subsidizing firms that are systematically high layoff. If firms do not ultimately bear the consequences of their layoff decisions, then this will systematically subsidize layoffs in the state.

The results for this first measure are shown in Table 4. We show what raising the tax base does to the share of firms who spend 3 consecutive years at the maximum rate (years 1-3), and 5 consecutive years at the maximum (years 1-5). Under the baseline scenario with no base increase, almost 4 percent of firms remain persistently at the maximum tax rate. Raising the tax base to 14k decreases this share by half, but even a base increase to 22k does not sufficiently solve this problem.

The disadvantage of this measure is that it does not allow one to consider the full distribution of experience rating incentives over time. In particular, as Figure 4 showed, while the share of firms at the maximum rate falls with a higher tax base, ultimately the share at the minimum rate rises. For firms who are at the minimum rate with a very high reserve ratio, there is also effectively no experience rating, at least for small numbers of layoffs, as their rate will not change so long as their reserve ratio doesn't drop below 0.2. To illustrate this further, we create a

new measure of experience rating: the number of years it takes a firm to pay in taxes the amount its workers are collecting in benefits from a layoff shock.

We model a sizeable layoff shock that produces UI claims equaling 10% of taxable payroll. Even under the current tax base of $7,000, firms near the maximum tax rate but not yet at the maximum (ie: tax rate between 4.5% and 5.9%) will pay back their UI claims within two years. And firms with tax rates above 2.6% will be paid back within three years. Thus, experience rating already works well for firms located along the upward-sloping portion of the tax schedule. Doubling the tax base to $14,000 now ensures that all firms with tax rates above the minimum and below the maximum rate will pay back this layoff shock within three years (and most firms with tax rates above 4.9% are paid off within a single year). At the minimum rate, however, firms have already built up a large enough level of reserves such that even a large layoff shock does not cause them to face a meaningful increase in their tax rates.

Additional Reform: Adjust the Minimum & Maximum Rate

The limitations of the impact on experience rating, as well as the horizonal inequities, suggest that states such as California may want to consider complementary reforms to increasing the base of taxable earnings. We consider two possible alternatives here: adjusting the minimum and maximum tax rate, and implementing a fixed surcharge as a social cost tax.

First, we consider raising the maximum tax rate and lowering the minimum tax rate. The maximum rate of 6.2% in California is approximately the median (27th out of 50 states); a 50% increase in the maximum rate to 9.3% would move California to the 9th highest state in terms of the maximum rate. Likewise, California currently has the highest minimum rate among all 50 states (tied with New York and West Virginia). Even if the state were to reduce this rate by 50

percent to 0.75%, California would retain the 8th highest minimum tax rate. When we lower the minimum tax rate, we also need to flatten the slope of the tax schedule itself in order for the policy to bind. This is because in the absence of a slope change, the mechanical increase in tax rates caused by the base increase would result in less than 1 percent of employment being impacted by the minimum rate change.

By changing both the maximum and minimum rate, we can both increase experience rating in the system – since fewer firms will bunch at the maximum and minimum rates – and horizontal equity – since firms with low claim rates will see drops in their tax burdens from a higher base. As Table 5 shows, adding these tax schedule changes on top of a base increase will lower total revenues collected by the UI system. This is because a base increase alone would have increased the rate at which firms with low layoffs are forced to subsidize high layoff firms. Once we allow tax rates to fall for firms at or near the minimum, total contributions will also fall accordingly.

Figure 8 illustrates the evolution of tax rates in our simulation model, with an initial share of firms bunched at the minimum. This policy has the added benefit of "easing" the transition to a higher tax base by allowing firms' tax rates to fall while the tax bases increase. Over time, however, the distribution shifts away from the minimum tax rate, so that by year 4 and onwards less than one percent of employment faces the minimum tax rate of zero (compared to the 17 percent of employment at the minimum rate of 1.5% in year 10 shown in Figure 4).

Such a change also appreciably increases both the horizontal equity and experience rating of the UI system. As Figure 9 shows, for firms throughout the claims distribution taxes go up about 50% from this combined change, and taxes now rise proportionally more for the highest layoff firms. This is a much more horizontally equitable distribution than what is shown in

Figure 7. In terms of experience rating, the increase in the maximum tax rate rapidly reduces the share of firms consistently stuck at the maximum (Table 4). By year 5, there are no more firms that are persistently stuck at the maximum rate. And because firms no longer bunch at the minimum tax rate either, all firms are able to pay back the UI claims from a 10% layoff shock within 3 years.

A second reform to consider would be a flat surcharge on all employers to raise money to pay back the system debt, rather than simply building on the existing imperfect experience rating system. Unlike an employer-specific tax rate, the contributions collected from a surcharge would not be counted towards a firm's UI reserves. Instead, the surcharge would go towards paying the social cost of unemployment insurance; for example, the UI claims paid out to workers of exiting firms will never be paid back and thus exact an externality upon California's UI trust fund. At the existing $7k base, an additional 1% of taxable payroll surcharge would raise $1.29 billion per year. Adding this surcharge at a $14k base would raise almost double the revenues, and would basically double what the state earns from moving to a $14k base.

Impact of Firm Entry and Exits

In order to simulate the impact of reforming California's UI tax schedule, we must make some simplifying assumptions. Most notably, we fix the firm distribution as of 2022, such that there is no new entry or exit. On average from 2015-2022, 5.4% of employers (2% of employment) are new entrants and 4.4% of employers (1.5% of employment) are exiting, so these two margins roughly cancel each other out in terms of payroll. However, it's likely that exiting firms make up a much larger share of UI claims relative to new entrants. Because UI claims from exiting firms are unobservable, we are unable to quantify the impact of exiters for

total UI revenues. On the other hand, if reforms to the UI tax schedule do not impact firm exit, ignoring exiting firms should not affect the relative comparison across alternative tax schedules.

6 Other Considerations

Behavioral Responses to Changes in UI Financing

A limitation of our simulation model is that it does not consider the endogenous response of employer wage setting and employment to changes in financing. The existing literature estimating the incidence of UI payroll taxes on wages has shown evidence of responses on both the employment (Guo (2024), Johnston (2021)) and earnings margin (Anderson and Meyer (2000)), although these effects are strongest for temporary tax increases that affect a subset of employers rather than market-wide impacts.

To investigate the possibility of behavioral responses, we exploit the kink in the tax rate schedule that occurs once firms hit California's maximum tax rate of 6.2%. Once a firm's UI claims cause them to hit a reserve ratio of zero or lower, the maximum tax rate prevents them from facing any additional UI tax increases. We estimate a regression kink design (RKD) around this threshold to test for a change in slope in the firm's outcome variables of interest. Our analysis sample covers 2015-2019, and includes employers with reserve ratios between -0.05 and 0.05, that ever employed 3 or more workers, and with taxable wages of at least 10k in the prior year. Appendix Figure A.7 shows no evidence of bunching around the kink in the tax schedule. Figure 10, which plots the raw data, shows a clear change in slope to the left and right of the threshold when plotting UI contributions on the y-axis. However, there is no perceivable difference in taxable wages, the outcome most relevant for our simulation model. This is

confirmed by the RKD estimates reported in column 2 of Table 6. In terms of employment growth and exit, Figure 10 shows no change in slope but suggestive evidence of a level change for firms that hit the kink, and the RKD estimates in Table 6 show that firms that hit the flat portion of the tax schedule increase their employment growth by 0.9 percentage points, and are 0.3 percentage points less likely to exit. In future extensions we hope to incorporate this implied behavioral response into our simulation model.

Employer Taxes and UI Benefits Generosity

One motivation for California or any other state to increase revenues to its UI system through one or more of the policies outlined above is that it could facilitate increases in the generosity of UI benefits. Since 2005, the maximum weekly benefit in California's UI system has stood at $450 while the average weekly benefit among all other states increased by 56 percent among all other states. During that period, California fell from the 7th most generous state on this metric to the 32nd most generous by 2024.

To investigate whether states with increases in their taxable wage base tend to have larger increases in the generosity of their maximum weekly UI benefits, we estimate specifications of the following type:

$$(1)\quad \log(benefit_{st}) = a_t + b_1 * \log(TAXBASE_{st}) + m_s + e_{st}$$

$$(2)\quad \log(benefit_{st}) = a_t + b_1 * \log(TAXBASE_{st}) + b_2 * MINRATE_{st} + b_3 * MAXRATE_{st} + m_s + e_{st}$$

In this equation, we include both state and year-specific fixed effects while taking the log of the dollar amounts (though the results are qualitatively similar if we use levels).

Given that UI benefits and the UI taxable wage base are jointly determined, we do not assign a strict causal interpretation to our results, which are summarized in columns 1 and 2 of Table 1 below. In both cases, the coefficient estimate for the taxable wage base is highly statistically significant at 0.213 (in column 1) and 0.215 (in column 4 when both the minimum and maximum tax rates are included). This implies that on average, a within-state increase of 10 percent in a state's taxable wage base is associated with a 2.1 percent increase in its maximum weekly UI benefit. In contrast, the point estimates for both the minimum and maximum tax rates are much smaller in magnitude and neither point estimate is statistically significant.

Table 1	(1)	(2)	(3)	(4)
log(TAXBASE)	.214*** (.058)	.215*** (.057)	.325* (.166)	.203** (.089)
MINRATE		.008 (.014)		
MAXRATE		.012 (.008)		
# Observations	2,142	2,137	714	1,428
States Included	All		Index	Non-Index
Years Included	1983-2024			
State and Year Fes?	Yes			

These results strongly suggest that a state's taxable wage base for unemployment insurance may facilitate an increase in the generosity of UI benefits in a state. Of course, both UI benefit and UI tax policy levers are jointly determined and so b1 does not necessarily represent a causal parameter.

One possible explanation for the strong within-state relationship between UI benefit generosity and the UI tax base is indexing. About one-in-three states index both their taxable wage bases and, in most cases, their maximum weekly UI benefits to an index such as average annual wages in the state. For these states, a relationship between these two variables would to some extent be mechanical. In most of the remaining states, it is necessary for policymakers to

enact legislation to revise either the tax base or the maximum weekly benefit. States that index have significantly higher average tax bases than non-indexing states ($43.0k versus $11.3k in 2024) and significantly higher average weekly benefits ($653 versus $483) as well.

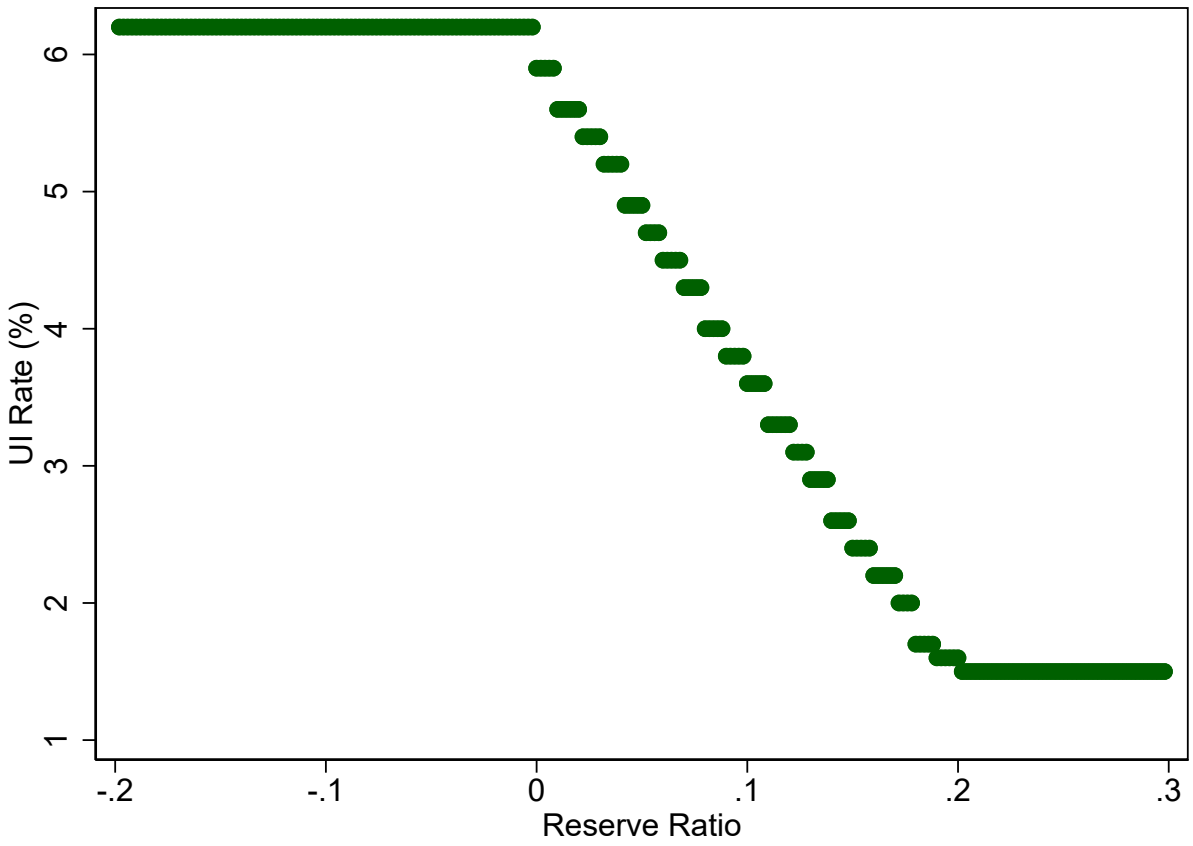
To investigate whether the relationship between within-state variation in UI benefits and the UI tax base varies between indexing and non-indexing states, we next estimated specification (1) separately for the two groups of states. As expected, the relationship is somewhat stronger for the 17 indexing states than in the 34 remaining states, as a comparison of the estimates for b_1 in columns (3) and (4) for indexing (0.325) and non-indexing (0.203) states shows, though it is statistically significant for both groups of states. And in a companion specification not shown here, we find that this difference in the estimate for β_1 between the two groups of states is not statistically significant.

Taken together, these results demonstrate that state-level changes in UI benefit generosity are strongly positively associated with changes in the UI taxable wage base for both indexing and non-indexing states.

7 Discussion and Conclusion

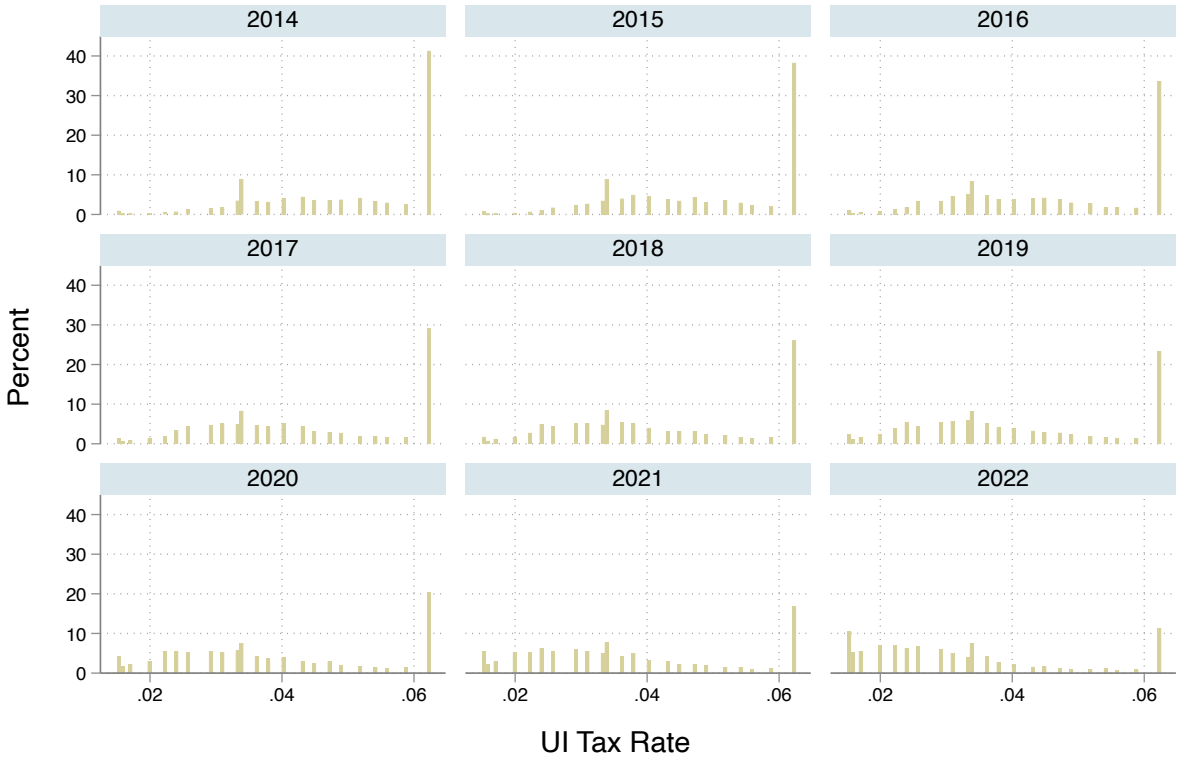
In addition to increasing the size of the taxable wage base (UI taxable earnings), states can simultaneously tweak their tax schedules (through changes to the min/max rates and/or slope). In this paper we attempt to show how states can do this in a way that minimizes the distributional impacts of a UI tax increase.

Figure 1: California Tax Rate Schedule



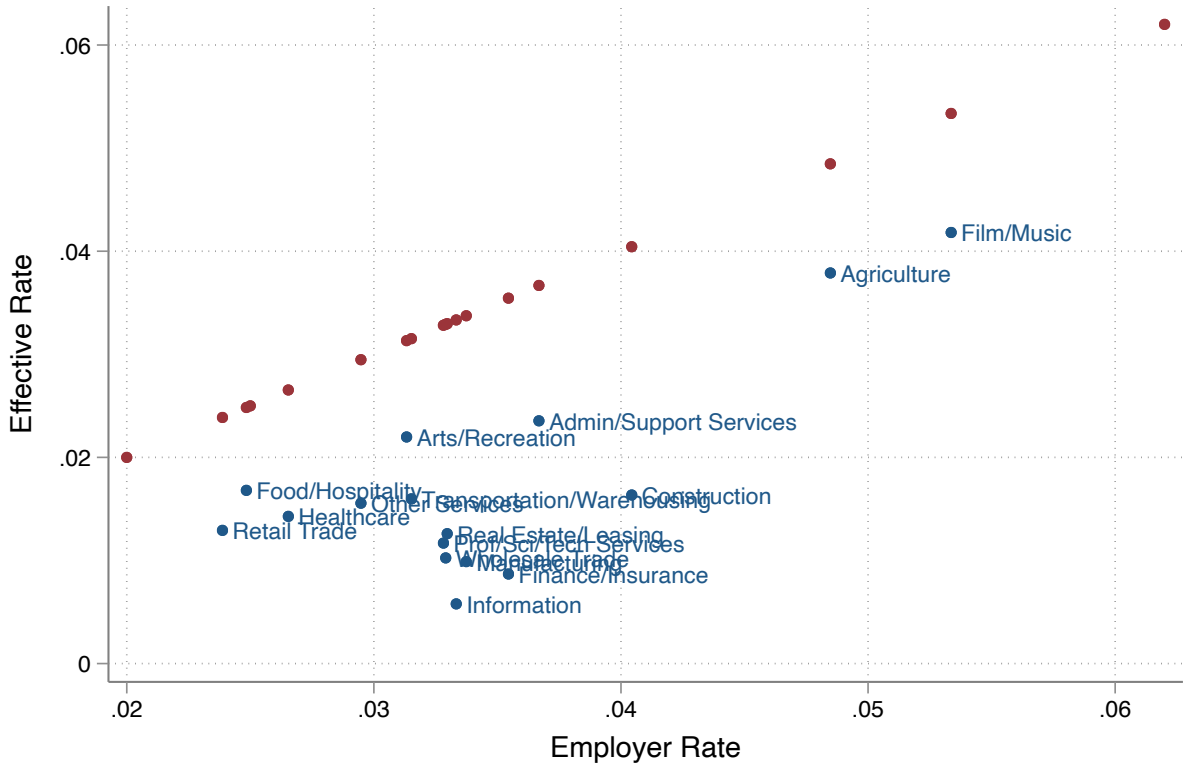
Notes: UI tax rates range from a maximum of 6.2% (RR below 0) to a minimum of 1.5% (RR above 0.2), and California's taxable wage base is $7000.

Figure 2: Employer Tax Rates, by Year



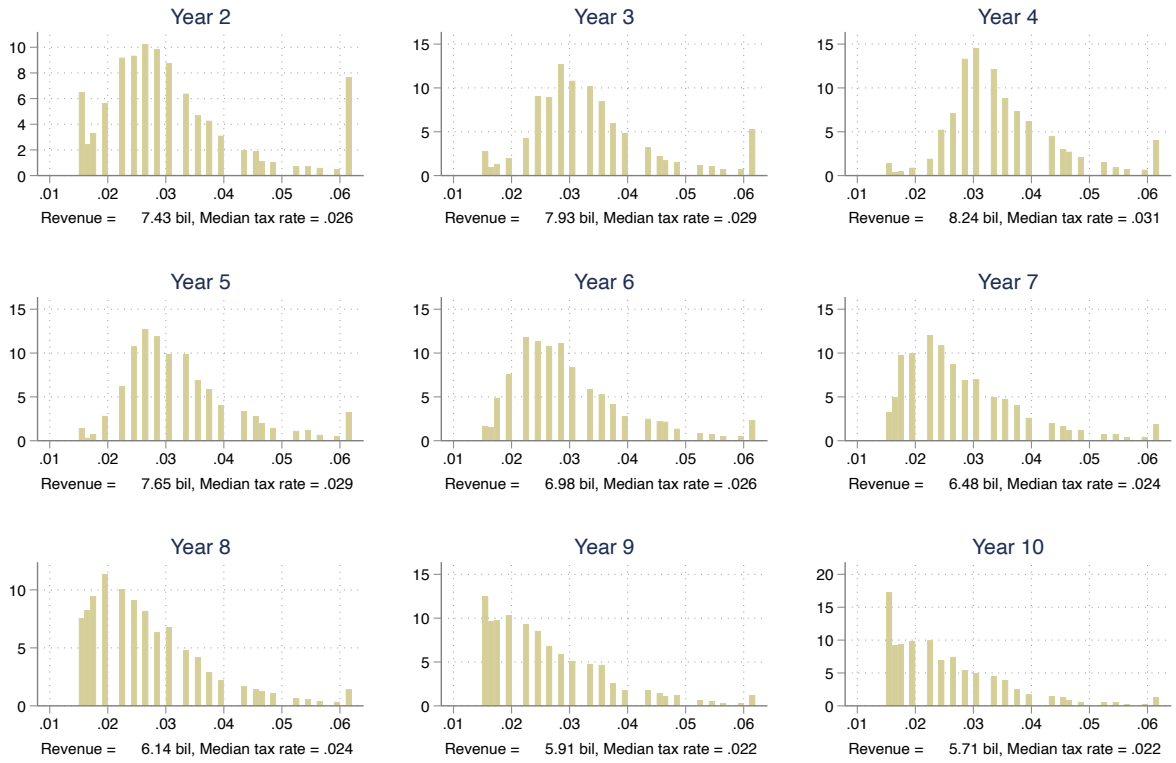
Notes: Histograms are weighted by employment.

Figure 3: Scatterplot of Statutory versus Effective Rates, by Sector (2022)



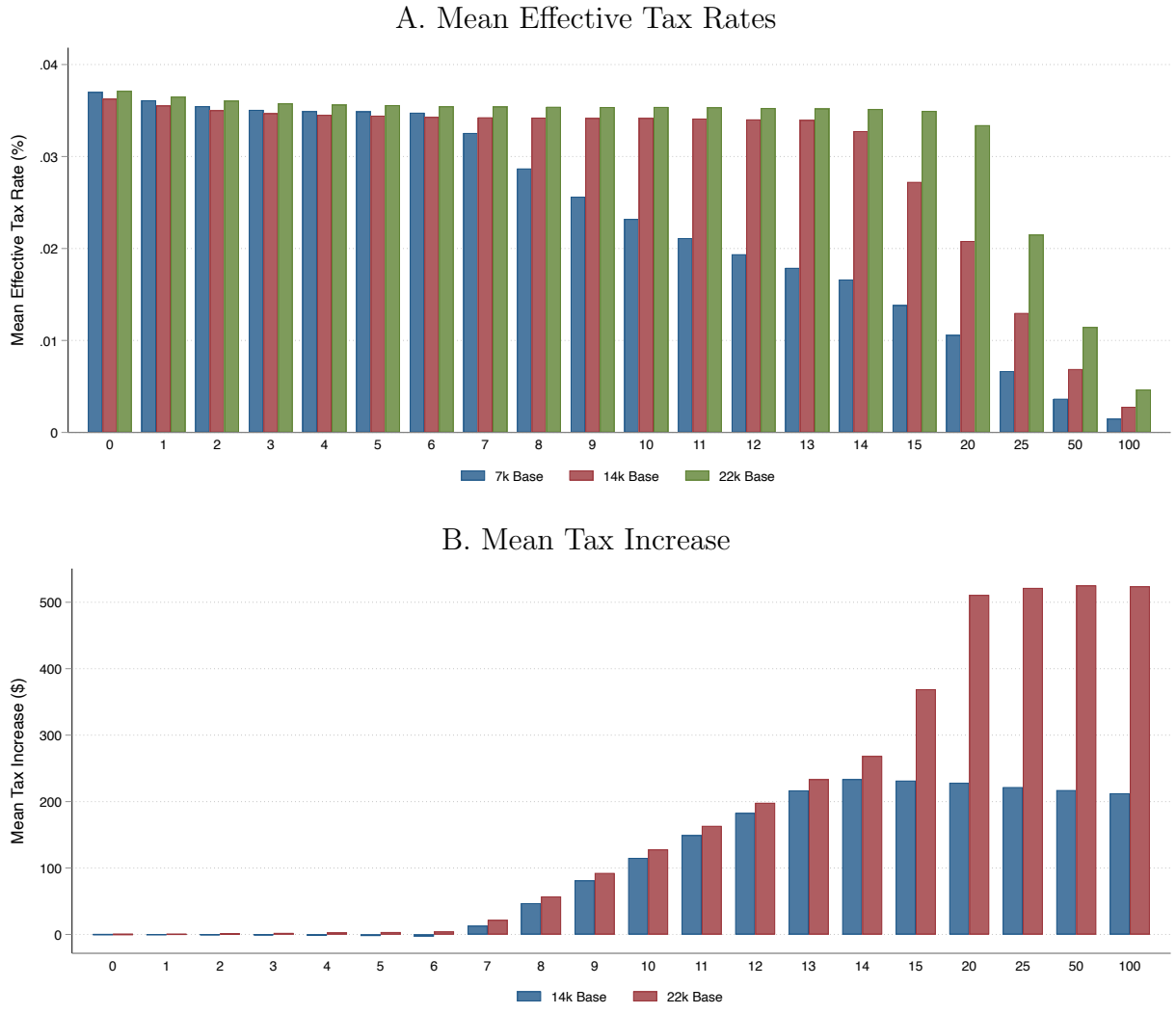
Notes: Orange dots represent the 45 degree line. Each plotted point takes the average across all workers in a 2-digit NAICS sector. NAICS 512 (Film/Music) is separately plotted from the rest of NAICS 51 (Information).

Figure 4: 10-Year Simulation of Doubling Tax Base to 14k



Notes: N = 708,204. Histograms are weighted by employment. Models a doubling of the tax base that begins in 2022, with rates adjusting in 2023 (Year 2).

Figure 5: Mean Tax Cost by Job-level Earnings



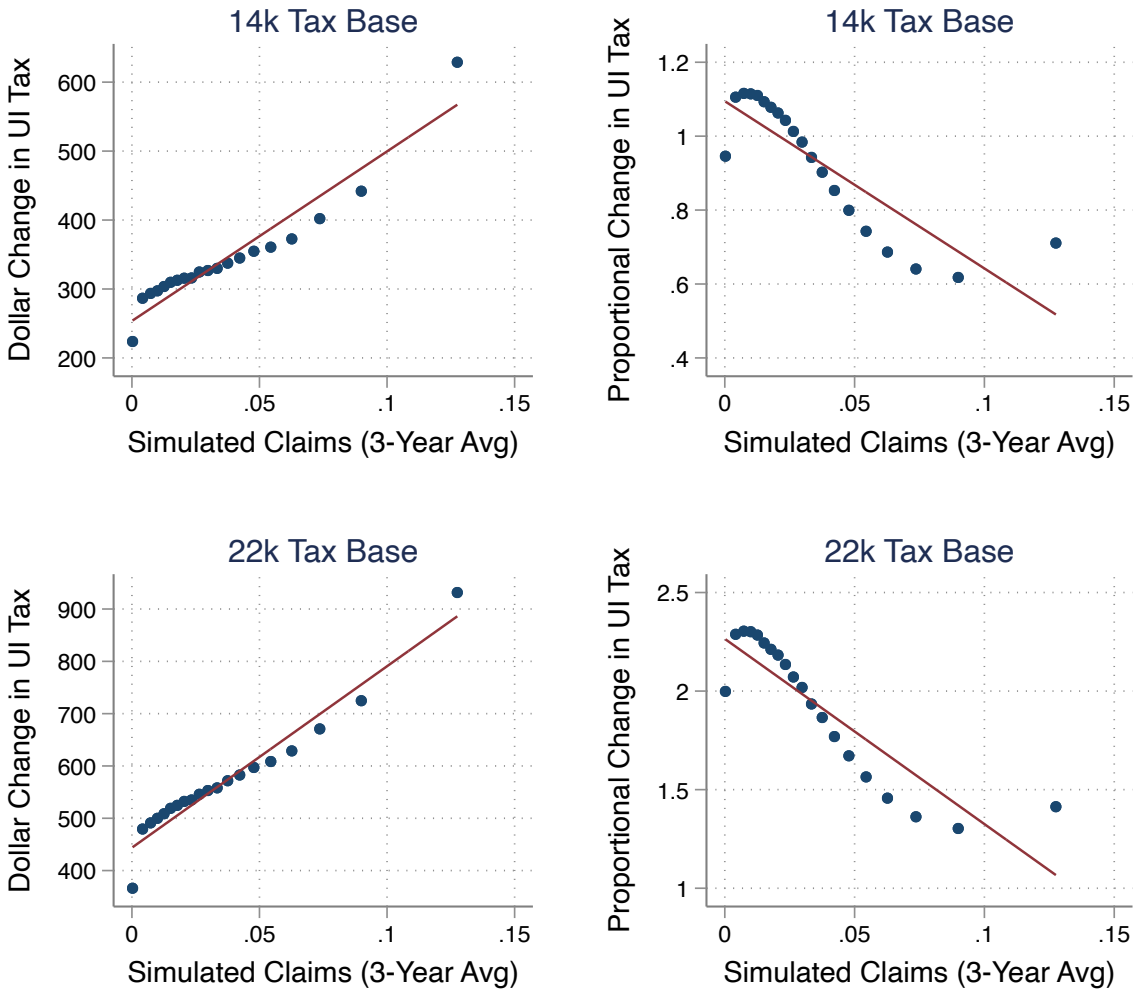
Notes: Plots mean statutory tax rates over $1k earnings bins. Bin 15 includes earnings from 15-20k, bin 20 includes earnings from 20-25k, bin 25 from 25-50k, bin 50 from 50-100k, and bin 100 includes earnings 100k+. Jobs with earnings below $500 (7.7%) are dropped.

Figure 6: Mean Tax Cost by Worker-level Earnings



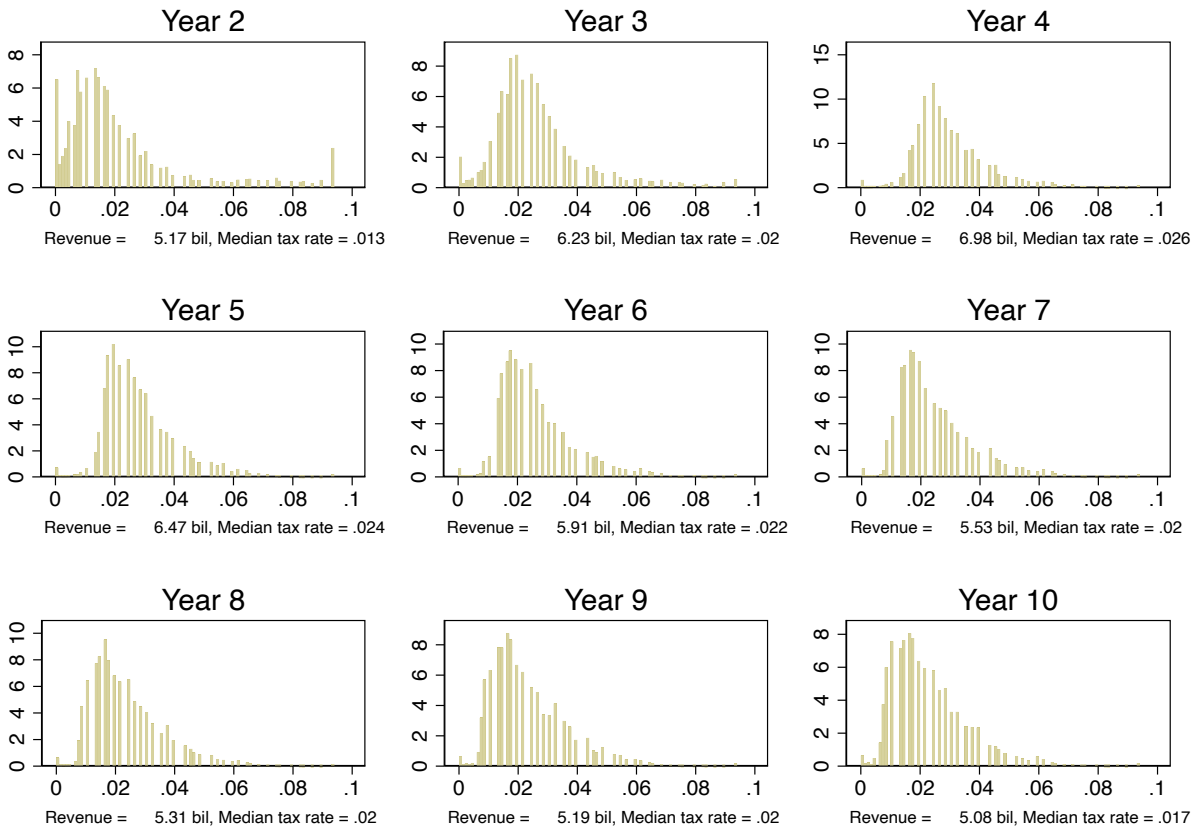
Notes: Plots mean statutory tax rates over $1k earnings bins. Bin 15 includes earnings from 15-20k, bin 20 includes earnings from 20-25k, bin 25 from 25-50k, bin 50 from 50-100k, and bin 100 includes earnings 100k+. Jobs with earnings below $500 (7.7%) are dropped.

Figure 7: Experience Rating Across Base Increases



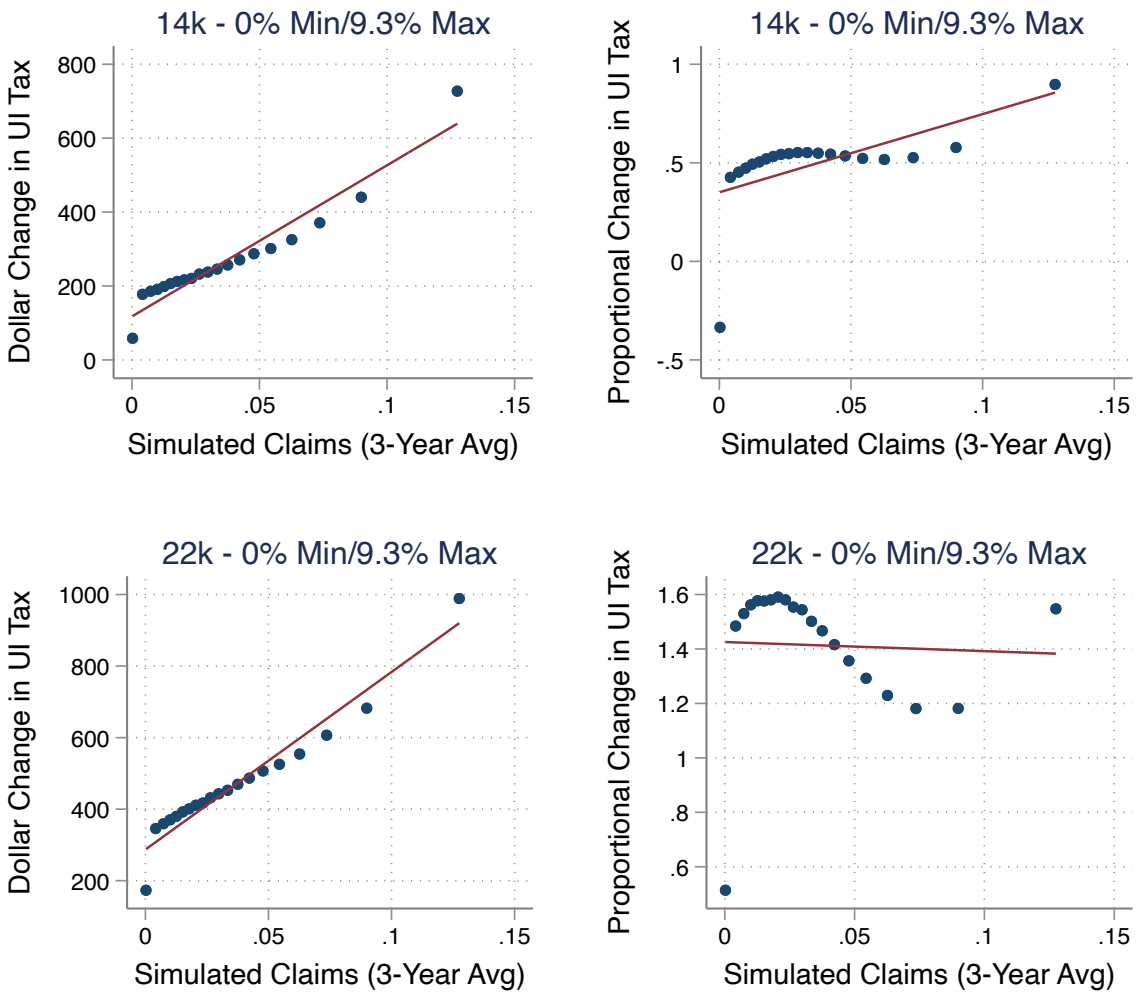
Note: Excludes 28,664 firms with taxable payroll of less than $7000. The x-axis plots ventiles of simulated claims, calculated as a percentage of each firm's original taxable payroll. On the y-axis, the change in UI tax is calculated as the difference between year 5 taxes paid under a base increase, and year 5 taxes paid under the baseline 7k base. On the left side, the dollar change is calculated by dividing the tax increase by maximum monthly employment. On the right side, the proportional change is calculated by dividing the tax increase by year 5 taxes paid under the 7k base.

Figure 8: 10-Year Simulation of 14k Tax Base, 0% Min rate, and 9.3% Max rate



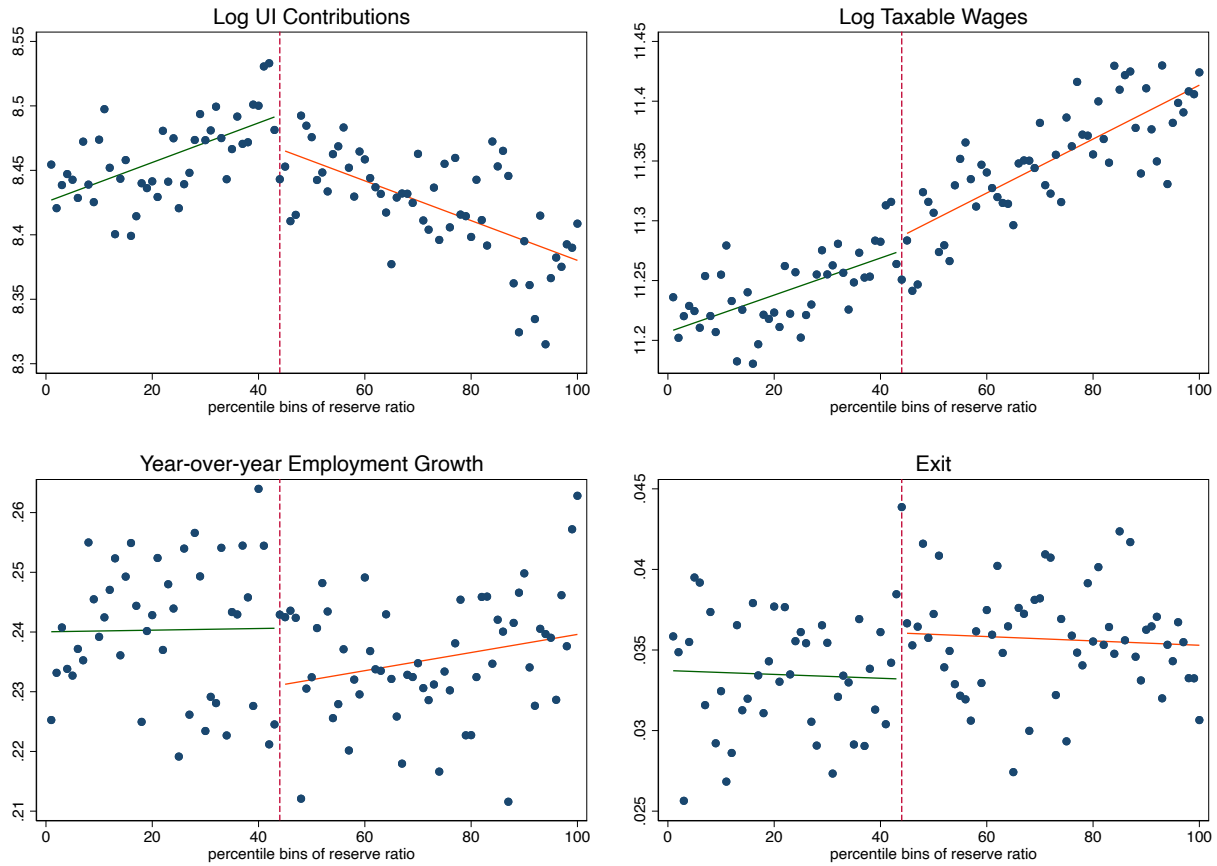
Notes: N = 708,204. Histograms are weighted by employment. Models a doubling of the tax base that begins in 2022, with rates adjusting in 2023 (Year 2). Starting in year 2, the maximum tax rate is increased from 6.2 to 9.3 percent, and the minimum tax rate is decreased from 1.5 to 0 percent (with a corresponding flattening of the slope between 0 and 6.2%).

Figure 9: Experience Rating Across Alternative Reforms



Note: Excludes 28,664 firms with taxable payroll of less than $7000. The x-axis plots ventiles of simulated claims, calculated as a percentage of each firm's original taxable payroll. On the y-axis, the change in UI tax is calculated as the difference between year 5 taxes paid under a base increase, and year 5 taxes paid under the baseline 7k base. On the left side, the dollar change is calculated by dividing the tax increase by maximum monthly employment. On the right side, the proportional change is calculated by dividing the tax increase by year 5 taxes paid under the 7k base.

Figure 10: Firm Outcomes Around RKD Threshold



Note: N = 292,770. Includes employers with reserve ratios between -0.05 and 0.05 that ever employed 3 or more workers, and with taxable wages of at least 10k in year $t-1$. Each graph plots the binned scatterplot of an outcome variable, with unconditional best fit lines to the left and right of the reserve ratio equals zero threshold.,

Table 1: Summary Statistics (2022)

A. Employer Level

	All Firms	Simulation	Excluded
UI tax rate	3.0%	2.9%	3.4%
Share at min rate	20.6%	23.0%	9.8%
Share at max rate	7.2%	8.0%	3.3%
Reserve Ratio	12.7%	14.3%	5.6%
Employment	19	22	7
Taxable wages ($k)	158	182	50
Total wages ($k)	1397	1650	253
Share new entrant	7.4%	0%	40.9%
Share exiter	4.0%	0%	22.1%
N	864,708	708,204	156,504

B. Job Level

	All Firms	Simulation	Excluded
UI tax rate	3.2%	3.2%	3.4%
Share at min rate	10.1%	10.3%	5.8%
Share at max rate	13.6%	14.1%	4.4%
Taxable wages	5456	5474	5069
Total wages	48499	49415	28760
Share w/ only one employer	46.7%	47.5%	31.2%
N	24,643,851	23,551,020	1,092,831

Notes: Excludes non-experience rated firms. Simulation sample covers firms that entered by 2021:Q2 and survived until 2023:Q1. Bottome panel excludes 5.4 million jobs that do not match to employer-level data.

Table 2: California versus Rest of United States (2019)

	California	United States
	Labor Force Composition	
Age	41.6	41.7
Female	45.7%	47.6%
White	59.7%	74.3%
Black	5.4%	13.3%
Hispanic	37.9%	15.4%
Asian	16.3%	5.0%
HS Grad or Equiv	87.9%	91.1%
College	37.1%	34.7%
Weekly Earnings	$1367	$1107
	Industry Shares	
Agriculture	3.2%	0.8%
Construction	5.8%	5.9%
Manufacturing	8.6%	10.1%
Retail Trade	11.2%	12.6%
Information	3.6%	2.0%
Prof/Sci/Tech Services	8.8%	7.3%
Healthcare	15.7%	15.8%
Food/Hospitality	11.1%	11.1%
	Unemployment Insurance	
Maximum Weekly Benefit	$450	$452
UI Claim Rate	3.1%	1.8%
Average Weekly Benefit	$335	$354
Average Duration (weeks)	17.4	13.9
UI Taxable Wage Base	$7000	$18,739

Sources: American Community Survey, Quarterly Census of Employment and Wages, and Department of Labor UI Data

Table 3: Net Revenues Raised

Policy	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10	Total
7k base	0.78	-0.31	-0.49	-0.35	-0.32	-0.31	-0.37	-0.35	-0.21	-0.02	-1.94
14k base	3.99	3.11	3.23	3.47	2.86	2.17	1.57	1.18	1.03	1.00	23.62
gradual to 22k	2.23	2.95	4.86	6.94	6.62	5.91	4.95	3.92	3.09	2.60	44.08

$N = 708,204$. Net revenues calculated as annual contributions minus annual claims.
Year 1 claims = \$3.3b, Year 2 claims = \$4.3b, and average claims in Years 3-10 = \$4.8b.

Table 4: Measures of Experience Rating

policy	statutory rate (yr 10)	effective rate (yr 10)	3-yrs at max	5-yrs at max
7k baseline	3.57%	1.17%	5.06%	3.90%
0% min/9.3% max	3.75%	1.26%	2.22%	0%
14k baseline	2.63%	1.41%	3.23%	1.78%
0% min/9.3% max	2.44%	1.36%	0.70%	0%
gradual to 22k	2.44%	1.65%	3.75%	1.62%
0% min/9.3% max	2.15%	1.50%	0.99%	0%

Table 5: Net Revenues Raised Under Alternative Policies

Policy	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10	Total
7k baseline	0.78	-0.31	-0.49	-0.35	-0.32	-0.31	-0.37	-0.35	-0.21	-0.02	-1.94
0% min/9.3% max	0.78	-1.46	-1.34	-0.88	-0.64	-0.51	-0.46	-0.38	-0.19	0.02	-5.07
1% surcharge	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	12.91
14k baseline	3.99	3.11	3.23	3.47	2.86	2.17	1.57	1.18	1.03	1.00	23.62
0% min/9.3% max	3.99	0.85	1.53	2.21	1.69	1.09	0.62	0.35	0.32	0.37	13.03
1% surcharge	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	23.00
gradual to 22k	2.23	2.95	4.86	6.94	6.62	5.91	4.95	3.92	3.09	2.60	44.08
0% min/9.3% max	2.23	0.78	2.93	5.26	4.98	4.24	3.29	2.34	1.71	1.33	29.09
1% surcharge	1.75	2.30	2.80	3.27	3.27	3.27	3.27	3.27	3.27	3.27	29.73

$N = 708,204$. Net revenues calculated as annual contributions minus annual claims.
Year 1 claims = \$3.3b, Year 2 claims = \$4.3b, and average claims in Years 3-10 = \$4.8b.

Table 6: Regression Kink Discontinuity Estimates (2015-2019)

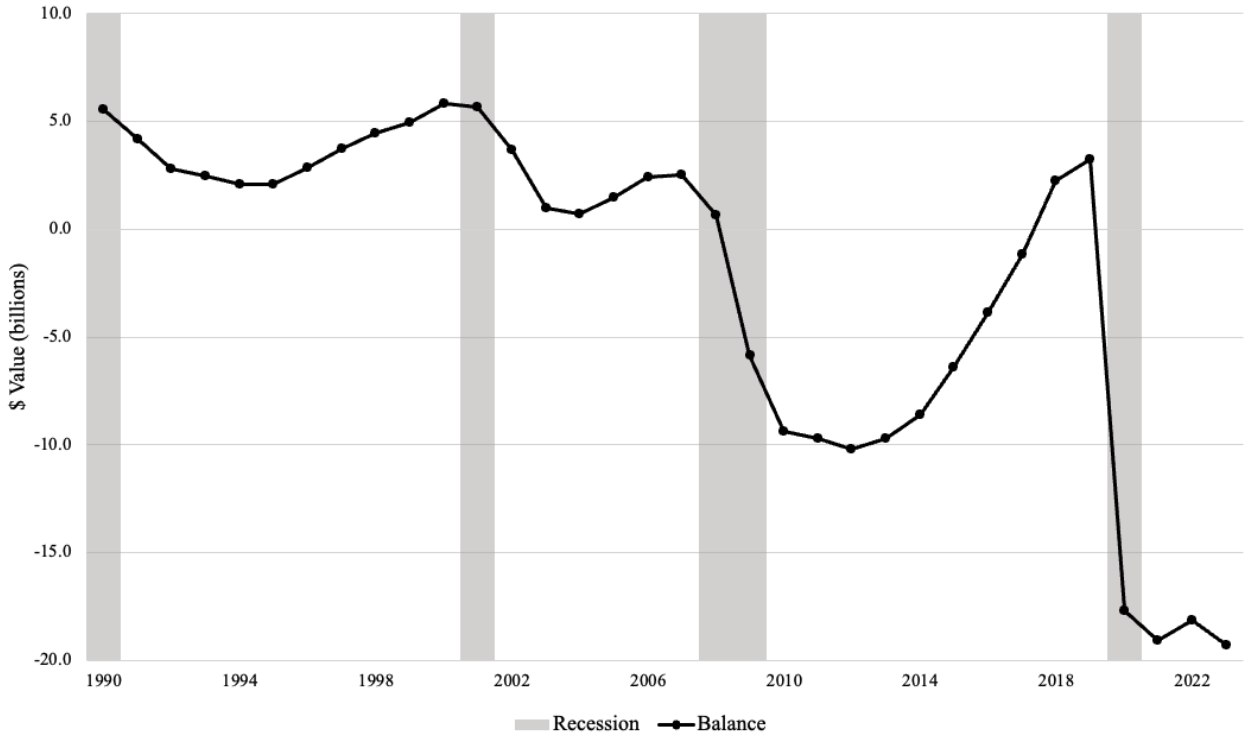
	(1) log(Contributions)	(2) log(Taxable wages)	(3) Empl Growth	(4) Exit
D	0.036***	0.003	0.009**	-0.003**
	(0.003)	(0.003)	(0.004)	(0.001)
Reserve Ratio	-4.060***	0.202***	0.372***	-0.085***
	(0.076)	(0.076)	(0.092)	(0.031)
D*Reserve Ratio	4.142***	-0.108	-0.191	0.061
	(0.115)	(0.115)	(0.140)	(0.047)
$\log(\text{taxwages}_{t-1})$	0.994***	0.994***	-0.074***	-0.003***
	(0.001)	(0.001)	(0.001)	(0.000)
$\log(\text{emp}_{t-1})$	0.000***	0.000***	0.000***	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Constant	-2.801***	0.014	1.072***	0.071***
	(0.009)	(0.009)	(0.010)	(0.004)
R^2	0.889	0.889	0.045	0.011
Mean Outcome	8.439	11.303	0.238	0.035
Year FE	X	X	X	X
4-digit NAICS FE	X	X	X	X
N	292,770	292,770	292,770	292,770

Notes: Includes employers with reserve ratios between -0.05 and 0.05 that ever employed 3 or more workers, and with taxable wages of at least 10k in year $t-1$. D is an indicator for having a negative reserve ratio (ie: assigned the maximum tax rate). Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Supplemental Appendix

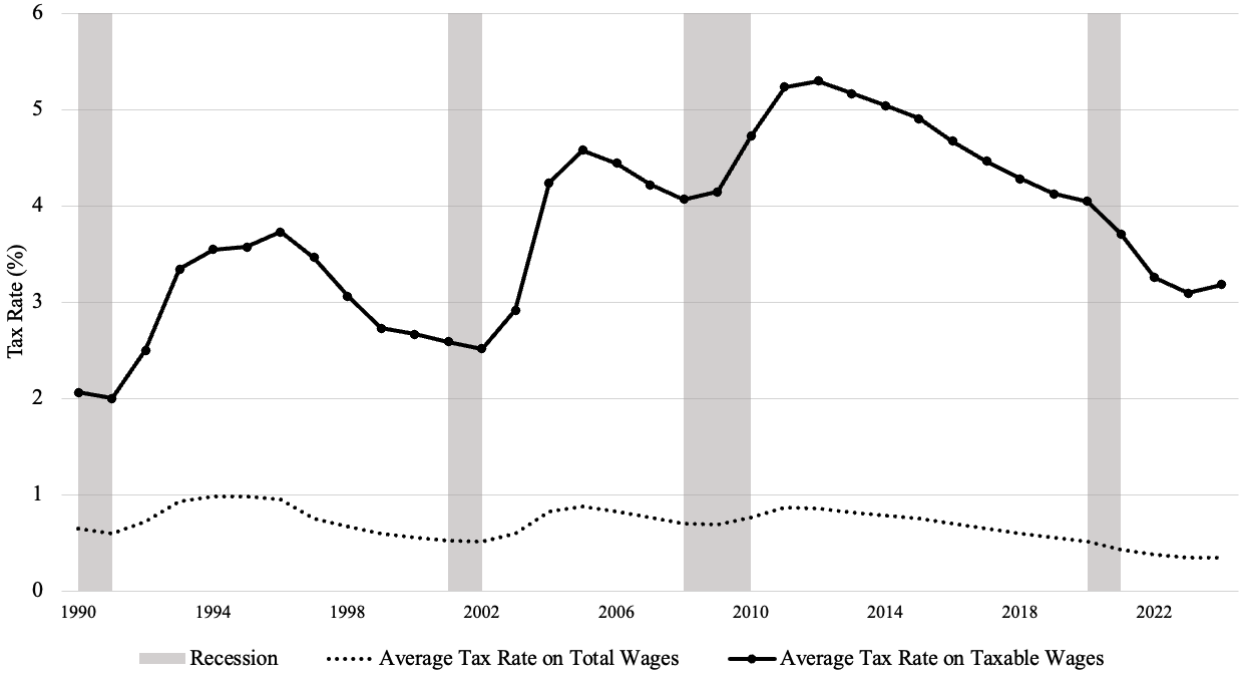
A Appendix Figures and Tables

Figure A.1: California UI Trust Fund Balance (1990-2023)



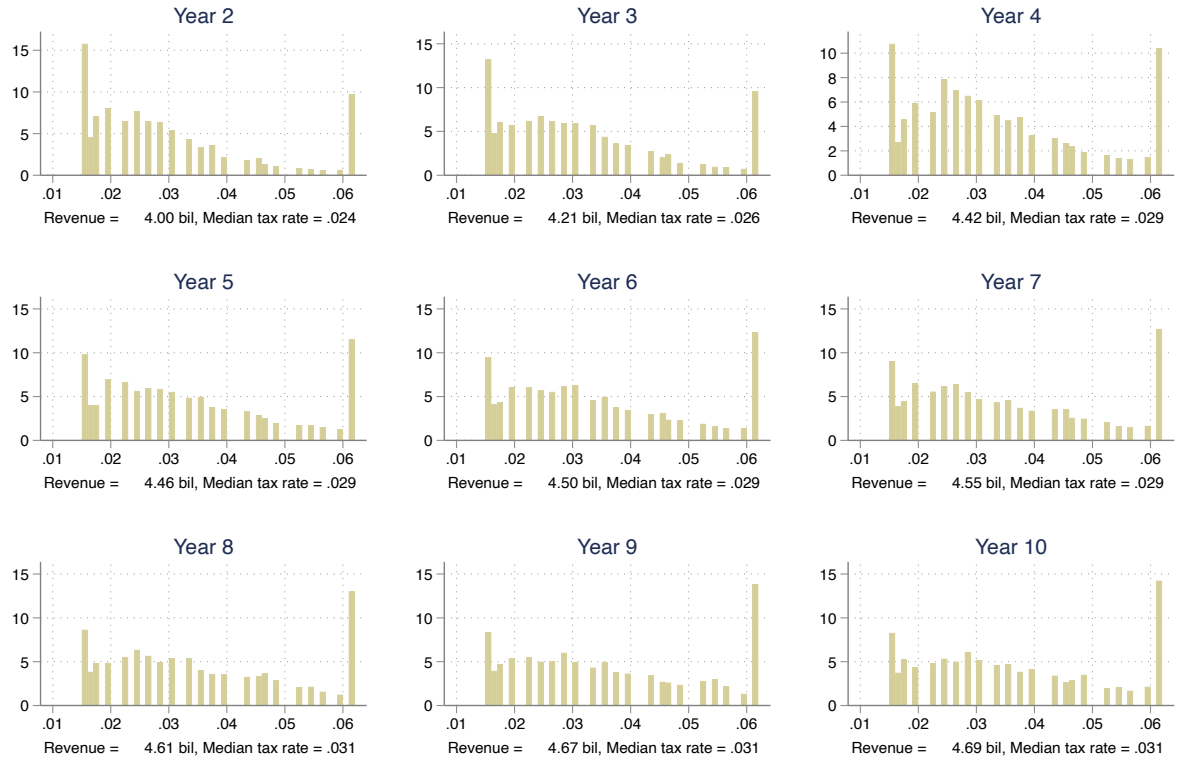
Source: U.S. Department of Labor

Figure A.2: California UI Tax Rate (1990-2024)



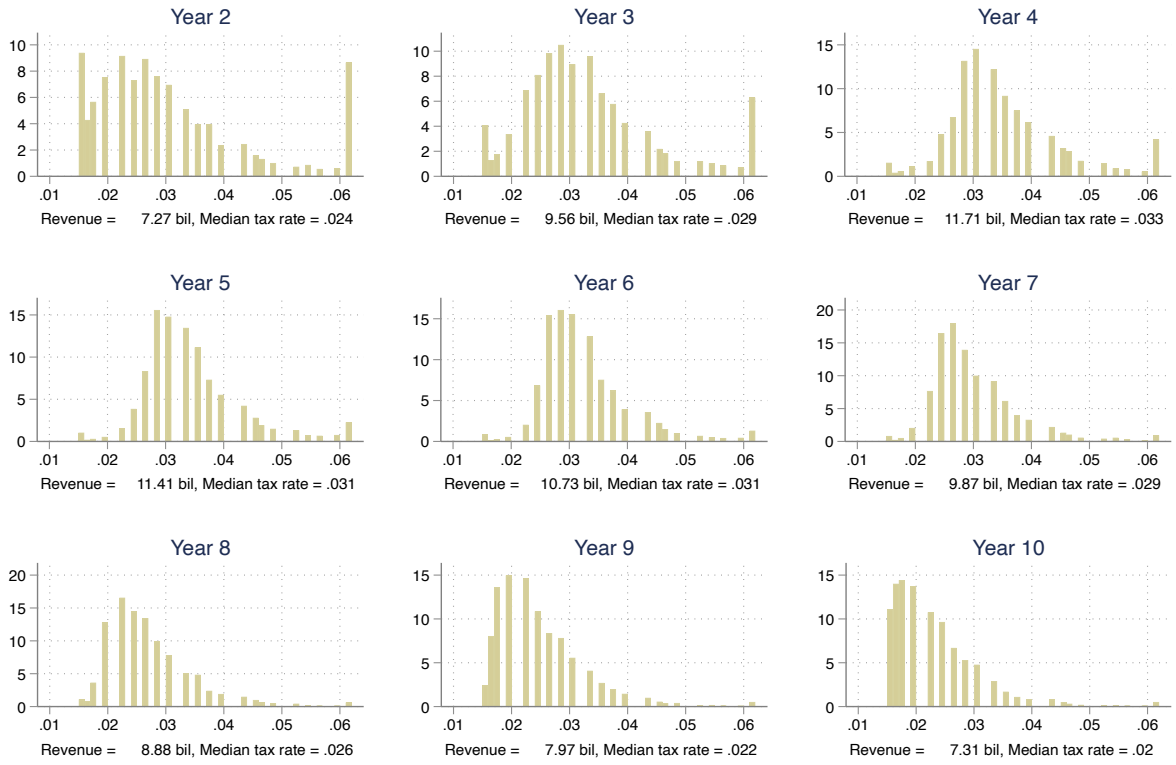
Source: U.S. Department of Labor

Figure A.3: 10-Year Simulation of Baseline 7k Tax Base



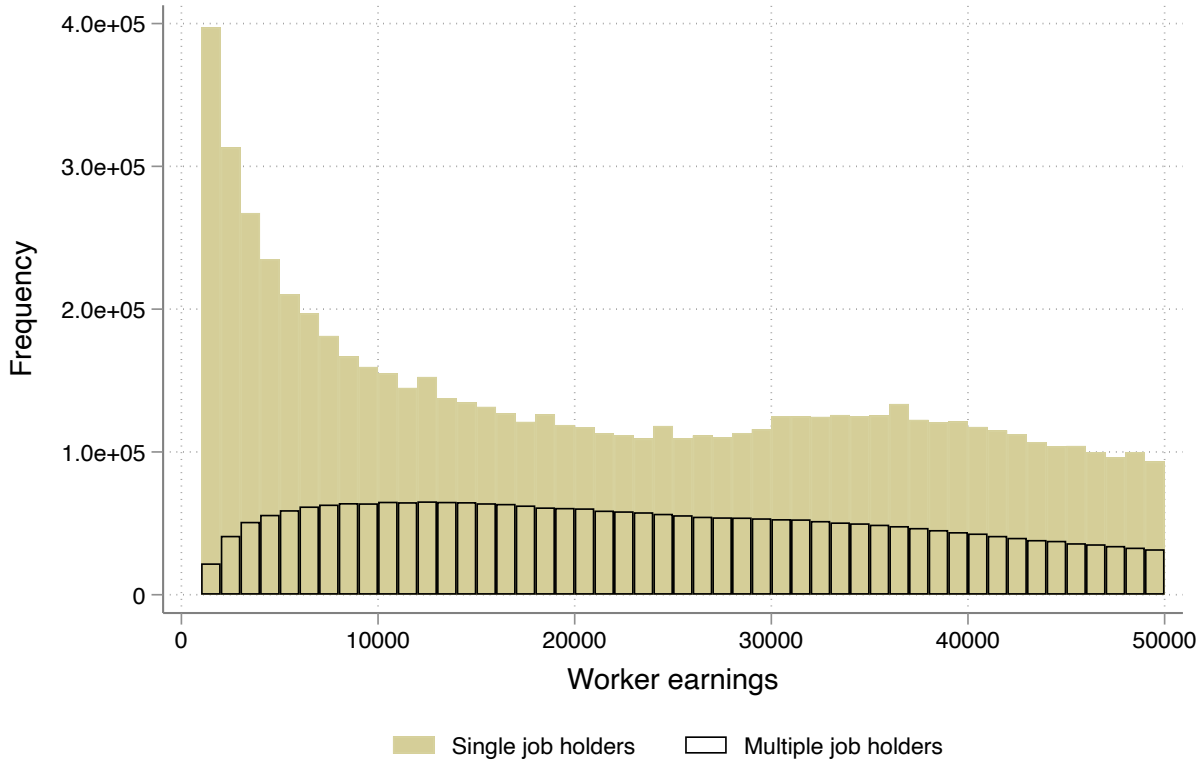
Notes: N = 708,204. Histograms are weighted by employment.

Figure A.4: 10-Year Simulation of Gradual Transition to 22k Tax Base



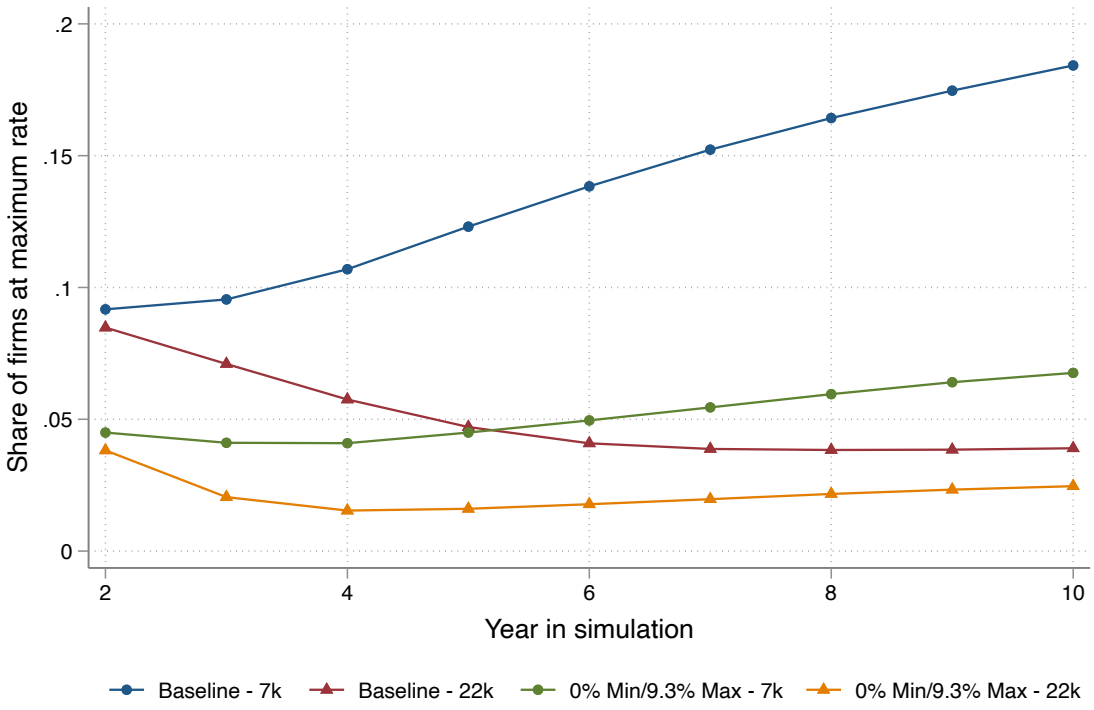
Notes: N = 708,204. Histograms are weighted by employment. Models a gradual transition to 22k, with base increases to 10k in year 1, 14k in year 2, 18k in year 3, and 22k in years 3-10.

Figure A.5: Distribution of Worker-level Earnings



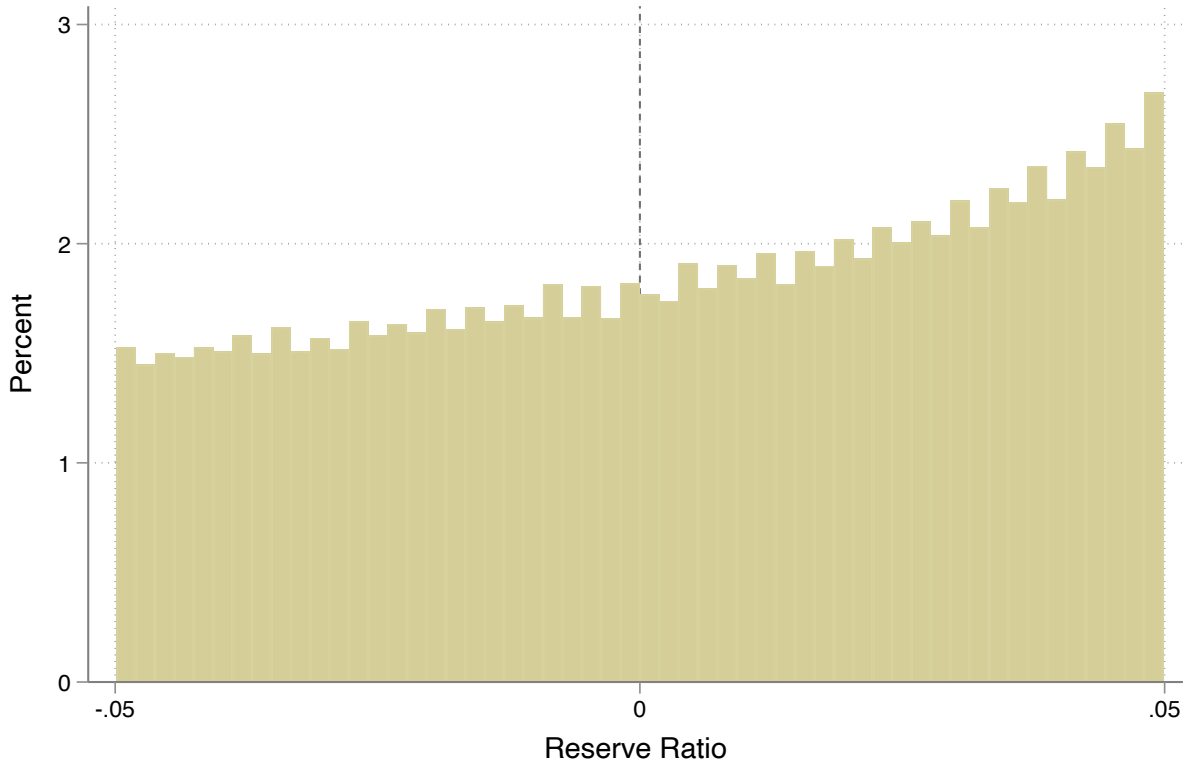
Notes: N = 9,455,452. Aggregates earnings over all jobs included in our simulation sample. Workers with earnings below $1000 or above $50,000 are dropped. There are 5.23 million single job holders earning 50k or more, and there are 1.34 million multiple job holders earning 50k or more.

Figure A.6: Comparison across Policy Reforms of Max Rate Share



Notes: N = 708,204. Plots the share of firms at the maximum tax rate in each year of our simulation, across four different policy scenarios.

Figure A.7: No evidence of bunching around maximum tax rate threshold



Notes: N = 292,770. Includes employers in 2015-2019 with reserve ratios between -0.05 and 0.05 that ever employed 3 or more workers, and with taxable wages of at least 10k in year $t-1$.

B Simulation Model

B.1 Inferring Employer-level UI Claims

While we observe annual reserve ratios and tax contributions for experience-rated firms, we do not observe the underlying measures of employer-specific UI claims. However, it is possible to use the Reserve Ratio (RR) formula and data starting from 2018:Q3 to impute a firm's UI claim rates in 2022 (technically 2021:Q3 to 2022:Q2), which will be used as an input into our simulation model.:

$$RR_{2023} = \frac{Reserves_{2023}}{\frac{1}{3}(TaxablePay_{2019:Q3-2022:Q2})}$$
$$\text{where } Reserves_{2023} = Reserves_{2022} + Contrib_{2021:Q3-2022:Q2} - Claims_{2021:Q3-2022:Q2}$$

We can then solve for Claims in the following expression:

$$Claims_{2021:Q3-2022:Q2} = Reserves_{2022} - Reserves_{2023} + Contrib_{2021:Q3-2022:Q2}$$
$$\text{where } Reserves_{2022} = RR_{2022} * \frac{1}{3}(TaxablePay_{2018:Q3-2021:Q2})$$
$$Reserves_{2023} = RR_{2023} * \frac{1}{3}(TaxablePay_{2019:Q3-2022:Q2})$$

One limitation of our administrative data is that Reserve Ratios are left censored at -0.21 (ie: this is the lowest value recorded). This creates two problems:

(1) Once a firm hits a reserve ratio of -0.21, we can't infer anything about whether their reserves are going up or down. This results in a systematic underestimation of UI claims for firms at the maximum tax rate, and some share will even get imputed a UI claims rate of zero.

(2) For firms far below -0.21, the simulation will assume a reserve ratio of -0.21 when calculating future tax rates, thereby forgiving a portion of the firm's negative balance.

As a solution, we will replace imputed claim rates with a claim rate of 15% for all firms that have a reserve ratio of -0.21 in both the current and prior year. Additionally, for the purposes of our simulation model, we adjust each firm's reserve ratio to equal -0.27 if the firm was censored in the last two years This measure was constructed by adding to -0.21 the standard deviation of the reserve ratio among non-censored firms at the maximum tax rate (0.056), and only affects 0.5% of firms in 2023.

B.2 Predicting Future Claims

To predict the UI claims each employer utilizes every year in our simulation model, we fit a simple model of claims in year $t+1$ using observed claim in year t. In order to estimate this model, we use the distribution of UI claim in 2018 to predict the distribution of UI claims in 2019. These measures of UI claims are inferred based on the method described in the previous section.

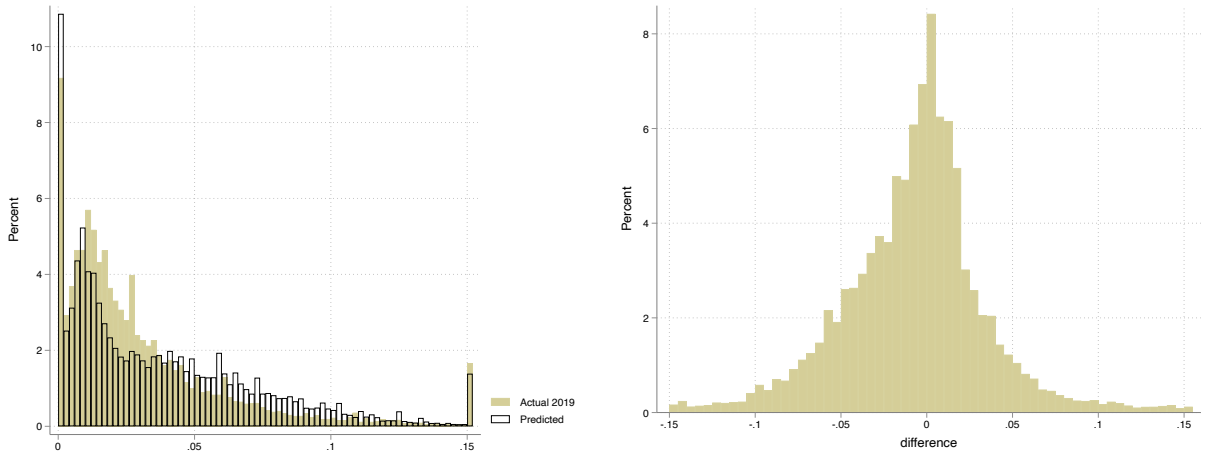
We estimate the following regression, weighted by 2018 employment:

$$log(1 + rate_{i,2019}) = \Sigma_{n=1}^{10} \beta_n [bin_i = n] + \gamma log(1 + rate_{i,2018}) + \delta zero_{i,2018} + \epsilon_i$$

Because total claims (in dollars) are a function of employer size, we calculate the claim rate $rate_{i,t}$ by dividing total claims in year t by mean taxable payroll over the last three years (ie: the denominator of the RR formula). We also include an indicator $zero_i$ for having a claim rate of zero, as well as deciles of claim rates for non-zero claims (bin_i).

When using this linear probability model to predict future claims, it is possible to get negative values. To deal with this, we set any value below -0.03 equal to zero. Any remaining negative values $\hat{rate}_i$ are set equal to max(0, rnormal(0.01,0.005)). Additionally, we simulate large exogenous shocks by randomly assign $\hat{rate}_i = 0.15$ to one percent of the firm population. The figure below summarizes our model fit. The prediction model matches the actual claims distribution relatively well, and differences are symmetric about zero.

Figure A.8: Model Fit



Notes: Left panel plots distribution of 2019 claims rates, where yellow bars represent the actual rates, and black bars represent the predicted rates using our model. Rates above 0.15 are winsorized. Right panel plots a histogram of the difference between each firm's actual 2019 claim rate and their predicted 2019 rate. All plots are employment-weighted.

While this model is only based on the prior year's claims, in reality some firms are persistently at the maximum or minimum tax rate. To build in some of this persistence, we also flag firms that are far beyond the maximum tax rate (ie: are observed to have reserve ratios below -0.2 for two or more years). For these firms, we replace their predicted claims with $max(\hat{rate}_i, 0.07)$. Meanwhile, we also flag firms that are far below the minimum tax rate (ie: are observed to have reserve ratios above 0.3). These firms are automatically assigned a claims rate of zero.