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FIRMS AND UNEMPLOYMENT INSURANCE TAKE-UP

Marta Lachowska
Isaac Sorkin
Stephen A. Woodbury

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ABSTRACT

We use administrative data to quantify the employer's role in unemployment insurance (UI) take-up. First, there are employer effects in both claiming and appeals, and, consistent with deterrence effects, these are negatively correlated. Second, low-wage workers are less likely to claim and more likely to have their claims appealed than median-wage workers, and employer effects explain a large share of these income gradients. Third, high-claiming and low-appealing employers are desirable employers: they are higher-paying and have lower separation rates. Finally, the dominant source of targeting error in the UI system is that eligible workers do not apply. Our findings emphasize a novel dimension of the role of employers in the labor market, and have implications for the financing of UI.

Marta Lachowska
W.E. Upjohn Institute for
Employment Research
300 S. Westnedge Avenue
Kalamazoo, MI 49007
marta@upjohn.org

Isaac Sorkin
Department of Economics
Stanford University
579 Jane Stanford Way
Stanford, CA 94305
and NBER
sorkin@stanford.edu

Stephen A. Woodbury
Department of Economics
Michigan State University
486 West Circle Drive, Room 110
East Lansing, MI 48824
and W.E. Upjohn Institute for
Employment Research
woodbur2@msu.edu

The revival of interest in the role of employers in the labor market has focused mainly on employers' influence on pay (e.g., Abowd, Kramarz, and Margolis, 1999; Card, Heining, and Kline, 2013; Song et al., 2019; and Lachowska, Mas, and Woodbury, 2020). In this paper, we study a specific non-pay dimension of employers' behavior—their role in facilitating or hindering take-up of a social insurance program, unemployment insurance (UI).

The employer's role in UI take-up is twofold. First, employers have explicit incentives to care whether workers collect because they effectively pay for some of their laid-off workers' benefits through an experience-rated payroll tax.[1] Second, and relatedly, UI agencies involve employers in determining whether workers who claim are eligible for UI by asking them for information on the reason for separation and giving them the opportunity to appeal a worker's claim. Indeed, there is an industry devoted to helping employers minimize UI taxes (in part, by suggesting claims to appeal) and policy-makers have long expressed concerns about employers being too aggressive in appealing claims.[2] Despite this institutional setting, work on UI take-up has emphasized worker-side factors, linking incomplete take-up to UI benefit generosity (Anderson and Meyer, 1997), limited information about the program (Vroman, 2009), and the hassle of claiming UI (Ebenstein and Stange, 2010). More generally, work on program take-up rarely emphasizes the employer's role.[3]

In this paper, we use rich administrative data from Washington state from 2005 to 2013 to study the employer's role in UI take-up. We find evidence of employer-specific effects on whether laid-off workers claim UI benefits and the rate at which those claims are appealed. Moreover, we find that employer effects on claims and appeals are negatively correlated, that this negative relationship is plausibly causal, that the employer effects explain steep income gradients in claims and appeals, and that high-claim, low-appeal employers tend to have additional characteristics that appear desirable. Finally, the failure of eligible workers to claim UI is a more significant source of targeting error in the UI system than is the receipt of benefits by ineligible workers.

We begin by describing the institutional setting for UI, which highlights the detailed window into the UI take-up process offered by our data (see section 1). UI eligibility depends on three criteria: monetary eligibility (does the worker have an adequate work history?), separation eligibility (did the worker separate

[1] Baicker, Goldin, and Katz (1998) give historical perspective on how the U.S. ended up with an unemployment insurance system that combines federalism, experience rating and limited duration of benefits. Interestingly, the paper does not mention take-up being a factor in these historical debates. See Ganong and Noel (2019) and Gerard and Naritomi (2021) for recent analyses of consumption and unemployment insurance in the U.S. and Brazil.

[2] The Association of Unemployment Tax Organizations lists more than 20 companies that offer such services, and its employers webpage says: "Many employers have found Unemployment Insurance cost management companies to be a cost-effective "best practice," in terms of administering UI claims and managing UI tax liabilities. Professional service organizations ... can help you minimize your unemployment insurance taxes and exposure ...." `https://www.autax.org/employers.html` (Last accessed February 6, 2023). The concerns of some UI observers were expressed in the report of the U.S. Advisory Council on Unemployment Compensation: "Some members of the Council are concerned [that]...under a system of experience rating, some employers might make excessive use of the appeals system..." (U.S. Advisory Council on Unemployment Compensation (1996, p. 19)). For a journalistic account of the unemployment insurance cost management industry, see Jason DeParle, "Contesting job loss claims becomes a boom industry," New York Times, April 3, 2010, `https://www.nytimes.com/2010/04/04/us/04talx.html` (Last accessed July 5, 2022).

[3] More generally, few papers have discussed the role of employers in social program take-up; exceptions are Bana et al. (Forthcoming) and Aizawa, Mommaerts, and Rennane (2022), who study parental leave and worker's compensation take-up, respectively. Helpful general surveys of program take-up include Currie (2006) and Ko and Moffitt (2022).

through no fault of their own?), and continuing eligibility (is the worker able, available and searching for work?). Workers who claim UI are asked to state a reason for their separation, and the UI agency routinely asks the employer for the conditions of separation. If the employer responds with a reason that differs from the worker's, then the agency may gather additional information and formally determine or adjudicate the claim. We refer to this process as an appeal. The administrative data include the information used to determine monetary eligibility, whether the worker claimed UI, the worker's and employer's reasons for separation, and whether the worker ultimately received benefits. Thus, we observe the key relevant worker action (claiming UI) and the key relevant employer action (appealing the worker's claim).

Although we observe monetary eligibility reliably, separation eligibility is essentially unobservable — it is determined through a quasi-judicial process that depends on potentially unreliable information provided by workers and employers. Like Anderson and Meyer (1997), we construct a sample of "likely eligible" separators (section 2) and find that about 45 percent of these separators in fact claim UI (similar to Anderson and Meyer (1997)). We also find that employers disagree with the reason for separation given by the claims in about 4 percent of the cases we observe. The income gradients in both claims and appeals are steep: workers in the bottom decile of pre-layoff wages are about 20 percentage points less likely to claim UI than workers in the fifth decile, and those low-wage workers are about twice as likely to have their claims appealed. In section 6, we show that these patterns reflect claim and appeal rates among the separation eligible, and not just differences in separation eligibility by income.

To motivate the analysis, we estimate a two-way fixed effects models of claims and appeals using a sample of separators who were at least twice-eligible to claim UI. Three pieces of evidence suggest that these models' assumption of exogenous mobility is approximately satisfied in this sample (see section 3). First, the sample consists of workers who switch jobs following a spell of unemployment, implying less scope for directed search than in a standard Abowd, Kramarz, and Margolis (1999) setting. Second, following Finkelstein, Gentzkow, and Williams (2016), we show that worker moves are approximately balanced in observable employer characteristics, which minimizes concerns about mobility based on unobserved employer characteristics. Finally, following Card, Heining, and Kline (2013), we show that changes in worker-level outcomes are approximately linear and symmetric in changes among employers with different employer claim-rate and appeal-rate averages. The approximately linearity of these relationships supports the additively separable specification of the two-way fixed effects model for claiming.

Having established the approximate validity of the two-way fixed effects specification, we use a variance decomposition to show the presence of large employer effects on workers' decisions to claim and on employers' decisions to appeal. (To address limited mobility bias, we report Kline, Saggio, and Sølvsten (2020) bias-corrected variance components.) We find that employer effects are quantitatively important and dispersed. The standard deviation of employer effects on claiming is about 15 percentage points (relative to a mean of about 50 percent). The ratio of the variance of employer effects to worker effects is larges for claiming UI than for wages (the usual outcome on interest in two-way fixed-effects model). Employer effects on appeals are even more important: the standard deviation nearly equals the sample mean, and the variance of employer effects is even closer to that of worker effects. Finally, we find that if all employers with below-median claim effects moved to the median, then the UI claim rate would increase by 6 percentage

points.

Employer effects also explain a large share of the income gradient in both claiming and appeals. When we project employer effects on claims and appeals onto workers' pre-layoff wages, we find they account for well over half income gradients in both claims and appeals. Given that employer effects mechanically control for worker characteristics such as wage level, this finding buttresses the key role of employer-specific effects, rather than worker characteristics, in explaining UI take-up.

A comparison of employers facing stronger and weaker experience-rating incentives shows that employers facing weaker experience-rating incentives have larger employer effects on claims and smaller employer effects on appeals. This finding suggests that experience rating incentives influence employers' decision to appeal. Consistent with employers using appeals to deter workers from claiming, employer effects on claims and appeals are negatively correlated. Workers are less likely to claim UI when they are laid off by employers that appeal claims more frequently. More directly, evidence from an event study is consistent with appeals having a deterrent effect on claiming: when appeals persistently rise at the employer-level, claims tend to decline. The event study and the cross-sectional correlations of employer effects on claiming and appeals approach imply similar elasticities of claims with respect to appeals.

Employers with high claim effects and low appeal effects tend to have other characteristics generally associated with more desirable employers, consistent with models of imperfect competition in the labor market. In particular, higher-claim and lower-appeal employers are higher-paying and have lower separation rates. Also, sectors with higher pay and more unionization tend to have employers with higher claim effects and lower appeal effects. These sectors include mining, construction, and public administration. In contrast, retail trade, accommodation and food services, and education have low claims and high appeal rates. Consistent with the idea that unions facilitate access to UI, sectors with higher union density tend to have higher employer claim effects and lower employer appeal effects.

Previous economic literature has emphasized the strong association between the use of UI and the temporary layoffs (for example, Feldstein (1978); Topel (1983). Our main results omit workers who were recalled to their previous employer, so they drop temporary layoffs. When we include temporary layoffs, the variances of employer effects on claims and appeals are essentially unchanged, suggesting (perhaps surprisingly) that employer heterogeneity in the use of temporary layoffs plays little role in explaining the variance in employer effects.

To make precise the conceptual link between experience rating and employer effects, assess the targeting properties of UI, and validate the employer effects, we develop and estimate a stylized model of UI claiming, appeals, and experience rating (see sections 4 and 5). The key assumption in estimating the model is that the marginal workers who separate when their employers contract are eligible for UI because they are laid off for lack of work. Using this feature of the data, we find that the main source of targeting errors in UI is that eligible workers do not claim UI, rather than that ineligible workers do. This finding suggests that UI financing reforms that reduced experience rating and thus reduced employers' incentives to appeal would reduce targeting errors.

To show that the estimated employer effects on claims and appeals reflect employer-specific heterogeneity in claims and appeals among the eligible separators — rather than heterogeneity in the UI eligibility of

employers' separators — we carry out two exercises. First, we re-estimate the stylized model using employers grouped by their claim effects, which produces estimates of claim and appeal rates among *eligible* separators (section 6). We find that the claim and appeal rates among eligible separators closely track the employer effects, suggesting that the estimated employer effects reflect employer-specific variation among *eligible* separators.[4] We conduct an analogous exercise to show that the estimated income gradient in claims and appeals is not an artifact of differences in the mix of eligible and ineligible separators. Second, we consider a sample of separators who are likely *ineligible* for UI because they either left the labor force or made an employer-to-employer transition. Variation in the employer effects in this broader sample is very similar to that in the main sample, which suggests that worker effects effectively control for worker heterogeneity in UI eligibility. Thus, we conclude that employer effects reflect variation in claiming by *eligible* separators, rather than differences among employers in the mix of eligible and ineligible separators.

Although a large literature has examined the effect of experience rating on hiring and separations—see, for example, Ratner (2013), Johnston (2021), Guo (Forthcoming), and Guo and Johnston (2021) for a review—studies of the possible role of employers in limiting UI claims are surprisingly rare and lack the detailed data that we use that allows us to directly document employer heterogeneity in UI take-up and show the direct role of employer behavior and incentives in affecting take-up. Anderson and Meyer (2000) found that, after Washington's UI payroll tax became experience rated taxed in 1985, UI claim rates fell, and denial rates increased. Based on interviews with job losers, Gould-Werth (2016) found that some employers actively help workers in claiming UI, whereas others are indifferent, and still others actively impede claims. Auray, Fuller, and Lkhagvasuren (2019) and Auray and Fuller (2020) used state-by-time variation in unclaimed benefits to study the effect of denied claims on UI take-up and link their results to experience rating. And in the context of Brazil, Van Doornik, Schoenherr, and Skrastins (2023) showed that in the absence of experience rating, employers strategically use layoffs.

1 Institutional setting

Two features of the UI program are central to take-up and receipt of benefits: (1) the eligibility criteria for UI, which include the worker's employment history, conditions of separation, and availability and willingness to search for reemployment; and (2) the experience rating of the payroll tax that finances UI, which gives employers an interest in whether workers they lay off receive benefits, and creates an incentive for employers to report (perhaps strategically) that a laid off worker separated for a reason that would disqualify her. This section describes these three features in turn.

1.1 Eligibility for UI benefits

UI benefits are not automatically paid to laid-off workers. The worker needs to file a claim, and an administrative process determines whether the worker is eligible for benefits. Figure 1 illustrates this process of claiming and eligibility determination and indicates the aspects of the process that we observe in the data.

[4] This exercise is similar in spirit to the robustness checks in Anderson and Meyer (1997).

If a worker files a claim, the state UI agency, in our case the Employment Security Department (ESD), determines the worker's eligibility for benefits based on three sets of criteria:[5]

1. *monetary* eligibility: whether she has an adequate work history to qualify for benefits;
2. *separation* eligibility: whether she lost her job due to lack of work and through no fault of her own;
3. *nonseparation* eligibility: whether she is able, available, and searching for work.

In Washington, the monetary eligibility requirement is at least 680 hours of work in approximately the year before the claim, which is known as the base period.[6] The ESD determines monetary eligibility by referring to administrative wage and hour reports that employers file quarterly.

To determine the conditions of a worker's separation, the ESD first asks claimants questions about why they became unemployed.[7] In general, workers who quit voluntarily or were discharged for work-related misconduct are disqualified from receiving benefits; however, there are exceptions.[8]

If the ESD believes the worker meets the separation eligibility requirements, then the ESD informs the worker's base period employer(s) that the worker has claimed benefits and requests information about why the worker separated. If the employer either does not respond or indicates the worker separated due to lack of work and was not at fault, then the claim is typically certified, and the worker can expect to receive benefits within four to five weeks.[9] If the claimant's and employer's reasons for separation differ, then the agency detects a separation issue and may decide to make a formal "determination," requesting additional information and adjudicating the claim.[10] As we discuss further below, when a worker and an employer give different reasons for separation, we refer to this as an appeal.

[5]The claiming process is broadly similar among the states, but we refer to specifics of the process used in Washington, which are described in an extensive "Unemployed Worker Handbook" (Employment Security Department, 2019). In 2013, most initial claims in Washington were filed either online (about 47 percent) or by telephone (51 percent), with most of the remaining few percent filed by employers. The use of the telephone filing is higher in Washington state than nationally: according to the U.S. Department of Labor's Benefit Accuracy Measurement program, nationally in 2013, 63 percent of claims were filed online and 30 percent by telephone, with the remainder filed by employers, in person, or by mail. Ebenstein and Stange (2010) show that telephone and internet claims largely replaced in-person claims between 1995 and 2005, but this apparently dramatic change had no appreciable effect on UI take-up overall or on the mix of claimants by previous earnings.

[6]This work must be for an employer covered by the UI system. The base period can be defined in either of two ways. The regular base period is the first four of the last five completed quarters before the quarter in which a claim is filed. The alternative base period, for claimants who do not meet the 680-hour requirement in the regular base period, is the last four completed quarters before the quarter of filing. Technically, "monetary" eligibility is a misnomer in Washington because the state uses *hours* to determine eligibility. All other states use some measure of previous earnings, so we use this conventional terminology.

[7]The process of determining separation eligibility varies substantially among the states and is described and analyzed in Corson, Hershey, and Kerachsky (1986) and Fishman et al. (2003).

[8]Workers discharged because they did not have the skills to perform a job, or who quit for "good cause," may still meet the separation criteria. Washington currently has several good-cause reasons for quitting: sickness or disability; need to care for an immediate family member who is sick or disabled; a cut in usual pay or work hours by 25 percent or more; and moving with a spouse or partner who is relocating, among many. The criteria are fully described in Employment Security Department (2019) and Revised Code of Washington, Chapter 50.20 ("Benefits and Claims") (`https://app.leg.wa.gov/RCW/default.aspx?cite=50.20`, last accessed April 21, 2022).

[9]Washington made the first UI payment within 28 days of the end of the week in which the initial claim was made for at least 90 percent of initial claims in most months during the time period we are examining. See US Department of Labor, "Benefits: Timeliness and Quality Reports." Employment and Training Administration. `https://oui.doleta.gov/unemploy/btq.asp`.

[10]Even without involving the employer, the agency might start a formal determination process based on the claimant's responses about either the reason for separation or their availability for work. See Corson, Hershey, and Kerachsky (1986) and Fishman et al.

The claimant must also be "able, available, and searching for work"—that is, must satisfy the nonseparation eligibility criteria. Typically, the claimant needs to keep a record of employer contacts and other job search activities.[11] A claimant may also be required to attend job search workshops and receive other employment services, including job referrals by the agency.[12]

1.2 Experience rating and the employer's role in eligibility determination

In the U.S., UI benefits are financed by an experience-rated payroll tax, collected entirely from employers in most states. Under experience rating, each employer's payroll tax rate increases as a function of the UI benefits paid to workers who separate from the employer. While the schedule mapping an employer's experience into a tax rate in Washington state is complicated, the schedule results in nearly full experience rating through much of its range, such that in expectation taxes increase by $1 for each $1 of benefits a worker collects.[13] Washington's schedule is capped and becomes flat at 5.4 percent, so at some point marginal experience rating is effectively eliminated.

Experience rating is a unique feature of the U.S. system and had three main goals at its inception (Blaustein, 1993). First, it acts as a layoff tax because in expectation some laid-off workers will collect UI; moreover, the size of the tax is counter-cyclical because workers who separate in recessions are likely to collect more UI benefits (Duggan, Johnston, and Guo, 2022). Second, it distributes the costs of UI "equitably" by charging more to employers who use the system more. Third, it provides incentives for employers to provide information to state UI agencies about the reasons for separation, improving the integrity of the system by reducing the likelihood that ineligible workers will receive benefits.

But in addition to these advantages, experience rating creates an incentive for employers to discourage workers from collecting UI. Indeed, in Appendix F we show that variation among employers in claim rates has as much power to explain employers' payroll taxes as the more traditional explanatory factor of separation rates. This is consistent with employers becoming involved when the agency contacts them about a claimant's conditions of separation, and reporting that the worker separated in a way that disqualifies them, such as by quitting voluntarily or being discharged for misconduct.

(2003). Either the claimant or the employer can appeal the outcome of this determination to a separate state agency. In Washington, the agency is called the Office of Administrative Hearings. Appeals are conducted by an administrative law judge who hears testimony and evidence given under oath. Typically, the judge reaches a decision within two to three weeks. If a worker receives benefits during an appeal, and the appeal goes against the worker, then the benefits must be repaid.

[11] On the effects of work search requirement in Washington State, see Lachowska, Meral, and Woodbury (2016).

[12] See `https://esd.wa.gov/unemployment/job-search-requirements` for a list of activities that satisfy the requirement. They include "prepare a 30-second 'elevator speech to use at job fairs" and "set up an account at worksourceWA.com."

[13] Two details are worth mentioning. First, not all benefits are chargeable; for example, benefits paid to workers who have quit with good cause are not included in the experience rating calculation. Second, to calculate an employer's experience, Washington uses a so-called benefit ratio formula under which the tax rate depends on the ratio of benefits charged to the taxable payroll in previous last four years. The taxable wage base in Washington state was $30,500 in 2005 and $39,800 in 2013. See Miller and Pavosevich (2019) and Lachowska, Vroman, and Woodbury (2020) for further discussion and analysis of experience rating methods. On the enforcement and administration of other tax systems, see the review by Slemrod and Yitzhaki (2002).

2 Data and estimates of UI claiming and appeals

2.1 Data description

We use administrative wage and claim records for Washington during 2005 to 2013, provided by the State of Washington's Employment Security Department (ESD). The wage records include the quarterly earnings and work hours for each worker-employer match, and the NAICS industry code of the employer.[14] To simplify the analysis and ensure that we correctly identify the chargeable employer, we restrict the sample to monetarily eligible claims associated with separations where the worker had only one base period employer and separated from that employer. The hours data tell us whether the worker satisfies the monetary eligibility criteria. We define a *separation* as an event in which either (i) a worker's primary employer (the employer from whom work hours in that quarter were greatest) changes between two consecutive quarters or (ii) a worker has positive work hours in quarter t and no work hours in quarter $t+1$.

The claim records contain the date the worker claimed UI, the weekly benefit amount, the benefits actually paid to the claimant, the reasons for separation given by the worker and by the employer, and basic demographic information. We link a claim to a separation when the claim occurred within one quarter of the separation.[15]

Figure 1 illustrates the claim process, with the steps we observe in the data indicated by the nodes in shown bold. Specifically, we observe job separation, whether the worker filed a claim and was monetarily eligible, and whether the claimant ultimately received benefits. As described in the next section, we almost always observe the reason for separation given by the claimant. Because the employer has discretion over responding to the agency's request for a separation reason (and thus only sometimes provides one), we interpret disagreement between an employer's and a claimant's reason as an employer appeal. While we observe the outcome of the appeal, we do not know whether the claim was settled through an agency determination or a formal appeal.[16]

2.2 Estimating the UI claim rate

Our first goal is to estimate the UI claim rate, or the percentage of UI-eligible job losers who claim benefits. The claim records tell us the numerator of this rate (the number of job separators who claim benefits), but we cannot directly observe the denominator (the number of UI-eligible separators) because it depends on both monetary eligibility and separation eligibility. Although monetary eligibility can be observed accurately in the wage records, the data have no information on non-claimants' conditions of separation. Accordingly,

[14] The employer is the entity from which UI payroll taxes are collected, and is unit of observation in the administrative wage records. An employer is not necessarily a firm. For employers with a single establishment, the employer is a firm, but multi-unit firms sometimes have multiple UI accounts (and thus appear as multiple employers), especially when the firm has establishments in different industries. For firms with establishments outside Washington, we observe only the firm's activity in Washington state.

[15] About two-thirds of the claims in the sample occurred in same quarter as a separation, with the remaining third split between the quarter before a separation (in anticipation of a layoff) or in the quarter after (when a separation occurs late in a quarter or a worker delays in filing).

[16] We know the outcome of an appeal because we know whether the claimant received benefits. A negative eligibility determination could also be made by the agency alone (without information from the employer), and this determination could be appealed by the claimant, but we do not observe this event.

we needs to make reasonable assumptions about whether a separation occurred due to lack of work and no fault of the worker.

We drop many separators who are likely to have been disqualified for not meeting the separation criteria—in particular, those who likely quit voluntarily to take a different job (i.e., job-to-job transitions) and those who appear to have left the labor force.[17] To eliminate job-to-job transitions, we drop any separator who moved to a different employer in either the same or the following quarter, and whose work hours decreased by at most 15 percent in the transition. The hours decrease is relative to the quarter before the transition, and corresponds to roughly a two-week reduction in work, during which it is unlikely a worker would claim UI. To eliminate labor force dropouts without removing seasonal workers, we drop separations that were followed by five or more quarters with zero work hours. [18]

These screens are imperfect because they do not necessarily eliminate all workers who were discharged for misconduct or separated voluntarily. Thus, because the denominator includes ineligible workers, our estimates represent a lower bound on claim rates. Nonetheless, we show below that our estimates are within the range of estimates from other data sources.

How does our inability to observe separation eligibility with certainty affect the analysis of the role of employers in claiming? If being discharged for misconduct or separating voluntarily are time-invariant characteristics of workers, then our employer effects will be purged of these factors and will represent variation in claim rates. If they are not time-invariant characteristics of workers, then employer effects will also reflect differences in the probability of separation ineligible claimants separating and evading the screens just described. We address this possibility in two ways. First, in section 3.4, we show that including workers who are likely ineligible has little impact on our estimates, suggesting that including the worker effects captures the relevant heterogeneity. Second, because marginal workers who separate from a contracting employer are more likely to satisfy the separation eligibility criteria than workers separating from a stable employer, in section 6 we use the employer contraction rate as an instrument for identifying separation eligible workers. This approach shows that the estimates of employer effects likely represent differences in claim rates among separation eligible workers.

Because our definition of separations excludes workers on temporary layoff who are recalled, we have excluded UI recipients on temporary layoff from both the numerator and denominator of the claim rate calculation. Temporary layoff unemployment was the focus of early classic work on the effects of incomplete experience rating on unemployment (notably Feldstein (1978) and Topel (1983)). As we discuss in section 3.4, our main conclusions about employer effects change very little when we include them as UI claimants.

2.3 Incompleteness of UI claiming

The first two columns of Table 1 show summary statistics for all worker-quarter observations (column 1) and for worker-quarter observations that would result in a monetarily eligible UI claim if the worker separated in that quarter (column 2). Conditioning on monetary eligibility reduces the sample size by more than one-

[17] Our approach builds on Anderson and Meyer (1994) and Anderson and Meyer (1997), as well as work by Bjelland et al. (2011), Hyatt et al. (2014), and Sorkin (2018).

[18] The data available to us do not include information on nonseparation eligibility (whether a claimant was able, available and searching for work); however, the screens may also drop many separators who did not satisfy the nonseparation criteria.

quarter. Workers who would be monetarily eligible for UI if they separated earn more, are employed by larger employers, and have accumulated more tenure at their employers.

Columns 3 and 4 of Table 1 show estimates of UI claiming. Among monetarily eligible workers, about 29 percent of separations result in a UI claim. Nearly two-thirds of separations lead quickly to a new job or to exit from the labor force. Dropping these separations increases the estimated claim rate to 45 percent. Relative to all separators, workers who separate and do not make immediate transitions or exit the labor force have lower earnings and longer work hours.

The claim rates in columns 3 an 4 are are slightly higher than those found by Anderson and Meyer (1997, Table 3) using similar samples, which makes sense because, although Anderson and Meyer were examining a time period (1979–1983) when claim rates were generally higher, the six states they examined all tend to have lower UI recipiency rates than Washington. The UI claim rate we estimate is similar to the estimate in the most recent Unemployment Insurance Nonfilers Supplement to the Current Population Survey.[19]

2.4 Differences between worker and employer reasons for separation: measuring appeals and appeal rates

We now turn to appeals. Table 2 shows the joint distribution of claims in Washington during 2005–2013, classified by the reasons for separation given by the claimant and the employer. The claimant's reason for separation is reported in more than 90 percent of the cases. In contrast, employers report a reason in only about 4 percent of cases. This low number suggests that in the vast majority of cases the employer decided not to challenge or appeal the UI claim of the separated worker.

When the employer did give a reason for the separation, in almost 90 percent of cases it was because the worker had given "lack of work" as the reason for separation, and the employer disagreed, usually saying the worker had quit voluntarily (34 percent of cases) or was discharged (53 percent of cases).

Table 2 also shows the percentage of claims for which benefits were paid under each of the circumstances shown. For example, when the worker said the separation was due to lack of work and the employer said the worker had quit voluntarily, the case was resolved in the worker's favor 51.1 percent of the time. When the worker said the separation was due to lack of work and the employer said the worker had been discharged, the case was resolved in the worker's favor nearly 70 percent of the time.[20]

In contrast to the claim rate, we know the denominator of the appeal rate exactly because we observe the set of workers who claim. (Similarly, we observe the numerator.)

To summarize, Table 1 shows that in about four percent of the UI claims, the worker and employer gave different reasons for separation, so what we are calling appeals are relatively rare. In more than 60 percent of these cases, the appeal was decided in favor of the claimant and resulted in benefits being paid. So from the employer's standpoint, most appeals are "unsuccessful" in that the employer's reason for separation was evidently rejected in favor of the claimant's.

[19] In the 2018 Nonfilers Supplement, the UI take-up rate was about 37 percent—see U.S. Department of Labor (2019, Table 3).

[20] Interestingly, this table suggests ambiguity and confusion about what is meant by "discharge" under UI laws. Discharge can refer to either discharge for cause, in which the case worker is not eligible for UI, or to inability to perform the job, in which case the worker is eligible for UI. About a quarter of the time the worker said she was discharged the employer did not appeal the claim, suggesting that these were cases where the worker was unable to perform the job and thus eligible for UI.

2.5 Wage gradients in UI claims and appeals

Figure 2 displays five binned scatterplots based on the sample summarized in column 4 of Table 1. Panel (a) plots the UI claim rate against workers' average hourly wage rate in the base period. The relationship has an inverted-U shape. At $10 an hour, the claim rate is only 30 percent, but rises steeply to over 50 percent at about $20 an hour—workers earning the lowest hourly wage rates are least likely to claim. At wage rates greater than $20 an hour, the claims rate gradually falls.

Panel (b) plots the average weekly benefit amount against the hourly wage rate, and shows that the weekly benefit amount increases with the wage up to about $20 an hour, and is constant thereafter. Accordingly, for workers with wage rates greater than $20 an hour, both the replacement rate and the incentive to claim fall.

Panels (c) and (d) suggest that deterrence through appeals is one possible explanation for why the claim rate increases between $10 an hour and $20 an hour. Panel (c) shows that lower-wage claimants are almost twice as likely to have their claims appealed as median-wage claimants, so there is a strong wage gradient in appeals, just as in claims. Moreover, panel (d) shows that appeals of lower-wage workers are more likely to be decided in favor of the employer. This finding has at least two interpretations. One is that lower-wage workers who claim are more likely to be separation ineligible. Another is that lower-wage workers may be less likely to have the legal means or institutional understanding to present their case effectively.

Lastly, panel (e) shows that conditional on receiving UI, lower-wage workers tend to have the longest UI durations, which suggests that low expected duration of UI receipt is an unlikely explanation for why low-wage workers have relatively low claims rates.

In section 6, we show that the claim and appeal gradients in panels (a) and (c) (computed for the sample of separators who are monetarily eligible but not necessarily separation eligible) are similar to the claim and appeal gradients implied by the quantified model developed in section 5, which considers separators who are both monetarily and separation eligible. Accordingly, the gradients are unlikely to reflect differences in separation eligibility by wage rate.

3 Employer effects on claims and appeals

In this section, we estimate employer-specific effects on claims and appeals. We first describe the empirical model, then present several tests of the exogenous mobility assumption that is required to interpret the employer effects causally. We show that the model does not fail these tests. Second, we discuss the role of employer effects on UI claims and appeals, discuss some interpretive issues, and show that the employer effects explain large parts of the wage gradients in both claims and appeals. Third, we develop event-study evidence which suggests a causal relationship between appeals and claims. Fourth, we present positive correlations between employer effects and other employer-level observables, which suggest that high-claim and low-appeal employers are in general more desirable. Finally, we show some direct evidence on the link from experience rating to appeals and claims.

3.1 Empirical model of claims and appeals

We assume that worker i's decision to claim UI after separating from employer j in quarter t is described by the following model:

$$c_{ijt} = \alpha_i + \psi_{j(i,t)} + x'_{it}\beta + \epsilon_{ijt}, \tag{1}$$

where c_{ijt} equals one if the worker claims UI following the separation from j and zero if the worker does not claim. We interpret the α_i as time-invariant worker-specific factors that affect whether i claims regardless of employer, such as differences in knowledge, resources, propensity to quit voluntarily, to be discharged for misconduct, or the returns to claiming implied by wage level. The ψ_j represent the employer-specific claiming environment of employer j, and reflect differences across employers that range from some employers filing UI claims on behalf of workers, to others actively discouraging workers from claiming (see Gould-Werth (2016) for ethnographic evidence on these points). The x_{it} denotes a year-quarter dummy that controls for seasonal and business cycle fluctuations in the propensity to claim, and ϵ_{ijt} is an unobserved random error term.

To interpret ψ_j as a employer effect, we assume that workers do not sort to employers based on the error term, ϵ_{ijt}. More informally, the assumption is that workers do not seek out employers where they are especially likely to be able to claim UI beyond what they would expect based on the employer effect. Given that our analysis sample is restricted to workers who spent time in unemployment or nonemployment between spells and likely separated involuntarily, we expect this type of sorting to be less likely than in a canonical AKM analysis of wages, which typically includes all transitions. Below, we outline two testable implications of exogenous mobility.

Worker effects are identified only for workers who separate, are monetarily eligible, and satisfy our other restrictions *more than once*. Because we use the Kline, Saggio, and Sølvsten (2020) leave-one-out estimator, employer effects are identified only for employers linked by two job switchers to the dual-connected set of employers. Columns 5 and 6 of Table 1 show that, while the restrictions implied by the leave-one-out estimator cut the sample size substantially, these workers do not differ greatly from the larger set of likely eligible separators.[21] In these restricted samples, the claim rates are slightly higher, and workers earn slightly more and work slightly longer hours, but these differences are small. One notable — though unsurprising — difference is that the smallest employers are less likely to be in these samples: the median employer size is about fifty percent larger.

We structure the analysis of employer effects on appeals in a parallel way. Specifically, we restrict the sample to workers who claimed UI twice and therefore could have had their claims appealed twice. Using this set of twice-claiming workers, we estimate the analogue of Equation (1) using a dummy for whether the claim was appealed as an outcome variable. Columns 7 and 8 of Table 1 show summary statistics on these samples. Relative to the twice-eligible separators, there are only slight differences in hours worked. Again, the notable difference between the two samples is that the employers tend to be larger in the latter.

[21] In columns 5 and 7 we omit workers whose spells of eligibility occur within the same calendar year.

3.2 Tests of the exogenous mobility

In this section, we describe two tests of the plausibility of the exogenous mobility assumption.

The first test follows Finkelstein, Gentzkow, and Williams (2016) and looks at balance in the distribution of changes in the employer-level UI claim rate among twice separating workers ("switchers"). The intuition is that if workers are selecting employers on the basis of the error term in claims, then they likely also select employers on the basis of the employer effects on claims. To the extent that we do not see evidence of selection in the employer-level measure, selection on the basis of the error term is less likely.

The second test follows Card, Heining, and Kline (2013) and looks at symmetry in the change in worker outcomes when moving between employers with high and low claim rates. The intuition is that if workers move on the basis of the error term in claims, they would only move to a lower claim employer if they had a favorable draw of the error term. If so, the change in the claim rate when moving between employers with low and high claim rates would be larger than the change when moving between employers with high and low claim rates.[22] In contrast, if movement is appropriately exogenous, then we expect symmetric changes in the claim rate.

We examine whether the slope of the change in worker-level claim probability against the change in the employer-level claim rate is approximately linear.

3.3 Results from tests of the exogenous mobility assumption

Figure 3a shows the results of the switcher analysis for UI claims. The histogram in the background shows that the distribution of moves is approximately symmetric around zero change in employer-level UI claim rates, with a spike at zero because we shrink the employer-level claim rates (so switchers between small employers are assigned a change of zero). Thus, the model does not fail the first test.

The binned scatterplot in Figure 3a shows the approximately linear relationship between the change in employer- and worker-level take-up rates. We estimate a slope of 0.82 (see column 1 of Table 3). Thus, the model does not fail the second test.

Figure 3b presents the parallel analysis of the relationship between the probability of an appeal and the employer appeal rate. The histogram shows that the change in the employer-level appeal probability is approximately balanced around zero. The estimated relationship is again linear, with a slope of 1.075 (see column 2 of Table 3) and we cannot reject a coefficient of 1. Again, the slope of the relationship does not change at zero. Thus, the model does not fail either test for appeals.

In summary, the switcher analysis implies that both the worker's decision to claim UI and the appeal process satisfy an exogenous mobility condition and are well approximated by an additive model with worker and employer fixed effects. Accordingly, it makes sense to estimate an Abowd, Kramarz, and Margolis (1999) variance decomposition.

[22] This test has some limitations, which are discussed in Bonhomme, Lamadon, and Manresa (2019, p. 707).

3.4 Variance decomposition of claims and appeals

Table 4 shows the variance decomposition implied by equation (1) for both the UI claim and appeal rates. The decomposition is computed using both the Kline, Saggio, and Sølvsten (2020) (KSS) estimator, which corrects for limited mobility bias (panel (a)), and the plug-in variance estimator (panel (b)). Column 1 in panel (a) shows the decomposition for claims, and column 2 shows the decomposition for appeals (discussed further below). The variance of the employer effects, 0.022, is large, and corresponds to a standard deviation of about 0.15 $(= \sqrt{0.022})$. Panel (b) shows that the plug-in estimator is severely biased. The covariance terms suggest minimal employer-worker sorting.

The variance of employer effects is large in three senses. First, relative to the sample mean take-up rate of 0.5, the 16th to 84th percentile range (plus or minus one standard deviation) corresponds to a UI claim rate range of 0.35 to 0.65. Second, if employers with below-median claim rates had the median claim rate, then claiming would increase by about 6 percentage points, or 12 percent.[23] Third, the employer component is also large in relative terms: it is almost half the size of the variance of the worker component. Thus, employer effects play a larger role relative to worker effects in explaining UI claiming than they do in explaining earnings and wages.[24]

Columns 3 and 4 in panel (a) show that the variance of the employer component is very similar in two alternative samples. In column 3, we add temporary layoffs, and in column 4, we add back the monetarily eligible separators who we drop because they appear to have made a job-to-job transition or left the labor force. We restrict the set of employers in these alternative samples to be the same as in the main sample. In both cases, the variance of the employer component is largely unchanged.[25] The robustness across these samples suggest that, although sample choices affect the claim rate, they do not affect conclusions about the employer's role in explaining claiming.

Column 2 of panel (a) shows the decomposition for the probability of an appeal. The standard deviation of employer effects is 0.028 $(= \sqrt{0.0008})$, which is large relative to the mean of 0.036. The employer component is also large relative to the worker component: the ratio of the employer to worker variance is 0.73—larger than the analogous ratio for claiming, where it is 0.44. Thus, employer heterogeneity plays an even larger role in explaining appeals than claiming behavior.

3.5 The role of information

Lack of information among workers is one likely reason for incomplete UI claiming. It is also a threat to the logic underlying the two-way fixed effects model because it suggest that the previous employer potentially matters: if the previous employer imparted information to the worker about how to claim UI, then this information could affect claiming at the next employer.

[23] This calculation uses the normal distribution.

[24] For example, Kline, Saggio, and Sølvsten (2020, Table 2) find that the variance of the employer wage effect is about one-fifth ($\frac{.0240}{0.1119} = 0.21$) the size of the variance of worker wage effect. Similarly, Sorkin (2018, Table 1) finds that the variance of employer earnings effects relative to worker effects is $\frac{0.14}{0.51} = 0.27$. Finally, using Washington State data Lachowska, Mas, and Woodbury (2020, Appendix Table B2) find the variance of employer effects relative to worker effects is $\frac{0.123}{0.309} = 0.40$ for log earnings and $\frac{0.053}{0.247} = 0.214$ for log hourly wages.

[25] One difference is that the variance of the worker effects increases when we add the temporary layoffs, which is mechanical because we are adding a subsample of workers with take-up rates of 100 percent.

To quantify this possibility, we follow Di Addario et al. (Forthcoming) and estimate a version of the model in equation (1) that identifies the employer effect in claiming of the current employer and the employer effect on claiming of the last employer. Specifically,

$$c_{ijt} = \alpha_i + \psi_{j(i,t)} + \lambda_{h(i,<t)} + u_{ijt}, \tag{2}$$

where ψs are the current-employer effects on claiming, $j(i,t)$ indexes worker i's current employer at time t, λs are the former-employer effects on claiming, and $h(i,<t)$ indexes i's most recent previous employer at any time before t (or, if the worker is observed for the first time in t, their non-employment status). We refer to the model in equation (2) as the "dual-employer effects AKM model" (D-AKM).[26] The D-AKM model nests the model in (1) by allowing the estimates of λs to differ from zero.

Table 5 compares the variance decomposition of UI claims from equation (2) with the standard decomposition from model (1). Panel (a) shows the KSS-corrected estimates and panel (b) shows the biased plug-in estimates. The standard deviation of the "current" employer effects is slightly larger in the D-AKM model than in the AKM model: 0.20 rather than 0.15. We find a the previous employer does have some power to explain current claiming behavior, so there appears to be a role for information—or whatever else is transmitted by the previous employer—to explaining claiming. Nonetheless, the fact that the current employer has a substantially larger explanatory role reinforces the importance of focusing on the current employer.

3.6 Employer effects partially explain the wage gradient in claims and appeals

Figure 2 showed strong wage gradients in worker-level UI claim and appeal rates. Figure 4 shows that the wage gradients *in employer effects* on UI claims and appeals are very similar to the wage gradients shown in Figure 2. To construct Figure 4, we assign each worker the employer effect estimated using equation (1), so worker-specific factors like hourly wages are controlled. We then plot these employer effects against hourly wages. Employer effects on claims are strongly increasing in wages up to about $25 an hour, a pattern also seen at the worker level. And similar to the worker-level analysis, employer effects on appeals are strongly decreasing in wages.

Table 6 quantifies the extent to which employer effects explain the claiming/wage gradient. In column 1, we regress a dummy for whether a separating worker claimed UI on the decile of the worker's base-period hourly earnings.[27] Column 2 repeats the exercise, except the outcome is the employer effect on UI claiming for the separating worker. (Column 3 is the same as column 2 except that we change the sample to the leave-one-out-connected set so we can report KSS-corrected standard errors.) We quantify the importance of employer effects in explaining the wage gradients by comparing the coefficient for the employer effect at the fifth decile of base-period hourly earnings with the claim probability at the fifth decile. For example, at the fifth decile, employer effects explain nearly 60 percent ($= 0.117/0.197$) of the claiming/wage gradient. At other deciles, the important of the employer effect is similar.

[26] The model controls for year-quarter dummies and the number of quarters between separating from the current employer and the former employer. The results obtained without controlling for quarters since separation are nearly identical.

[27] Formally, we estimate $c_{ijt} = \beta_0 + \omega_{k(i)} + \epsilon_{ijt}$ where ω_k are fixed effects for the income decile of individual i, and we omit the first decile.

Table 6 shows that employer effects on appeals explain even more of the appeal/wage gradient. At the fifth decile, employer effects explain about 75 percent ($= 0.6/0.8$) of the appeal/wage gradient. In summary, employer effects play a large role in explaining wage gradients in both UI claims and appeals.

3.7 The deterrence effect of appeals: cross-sectional and event-study evidence

We have documented that there are employer effects on claims and appeals. In this subsection, we argue that they are negatively related and that this relationship reflects a deterrent effect of appeals on claiming.

In Figure 5, we plot the industry averages of the employer effects on claims and appeals. Higher-paying and more unionized sectors have higher average employer effects on claims and lower employer effects on appeals. Some of the industries that have high-claim and low-appeal rates are mining, public administration and construction. Some of the industries that have low claim and high appeal rates are education, retail trade, and accommodation and food services. Consistent with deterrent effects, Figure 5 shows a negative relationship between the industry-level employer effects on claims and appeals. We compute the elasticity of employer claims with respect to employer appeals, which is about -0.20, and is within the range of elasticities for claims to separation issue denials found by Anderson and Meyer (2000).[28]

Figure 6 shows that the negative relationship in Figure 5 in part reflects a causal response of worker claims to employer appeals. The figure reports an event-study that traces the probability that a separating worker claims UI as a function of a persistent change in the employer appeal rate.[29] Following a persistent change in the employer appeal rate (shown in circles), the probability that a separating worker claims UI (shown in squares) decreases and stays lower for at least three years following the change. This event study shows that worker behavior reacts to longer-run changes in employer appeals.[30] At baseline sample means (year $t = -2$), the elasticity of worker claim rate with respect to the persistent change in employer appeal equals is about -0.16, which is quite similar to the cross-sectional elasticity reported in the previous paragraph.

3.8 Correlates of employer effects on claims and appeals

In this subsection, we project employer effects on claims and appeals onto various employer-level characteristics to describe and interpret them.

[28] To calculate the elasticity of employer claims with respect to employer appeals, we regress employer claim effects on employer appeal effects. We then convert the KSS-corrected slope from this regression to an elasticity computed at the sample means of worker-level claims and appeal rates. Appeals and separation-issue denials are similar: Anderson and Meyer's elasticities range from -0.128 to -0.279. See Appendix C for details of this calculation.

[29] The persistent change in employer appeal rate is constructed as follows: (i) we compute a "long" change in (shrunk) employer appeal rates as the difference between the average employer appeal rates in year $t+2$ and $t+1$ and the average employer appeal rates in year t and $t-1$; (ii) we compute the median of this change; (iii) to ensure that the change is persistent, any change must be followed by an absolute proportional change between the employer appeal rate in $t+2$ and $t+1$ that is less or equal to 10 percent and an absolute proportional change between $t-1$ and $t-2$ that is less or equal to 5 percent. Employers that experience such persistent above-median (or median) change in year t are considered "treated" and employers that experience such persistent below-median change in year t are considered "controls." The calculation is done separately for each calendar year-of-event and the year-of-event panels are stacked, similarly to Cengiz et al. (2019).

[30] Interestingly, the persistent change in t in the employer appeal rate is preceded by an increase in claiming in $t-1$, possibly triggering the persistent increase in the employer appeal rate.

Figure 7 extends our empirical investigation and shows the slope of a regression of employer effects on a variety of employer characteristics. To make the units interpretable across characteristics, we standardize each to have unit variance. Panel (a) shows the coefficients for the employer effects on claims and panel (b) shows analogous coefficients for appeals.

The first two rows show that higher-claim and lower-appeal employers tend to be more desirable employers. Specifically, they have lower separation rates (in order to include voluntary separations, we use all separators to compute this rate) and higher-pay. This finding is consistent with the idea in models of imperfect competition (e.g., Lang and Majumdar (2004) and Sorkin (2018, Section 6)) that if amenities are a normal good and there is utility dispersion across employers, then some employers will offer higher utility to workers through both amenities and wages. In this case, the amenity is the employer claiming environment, which encompasses the fact that the employer is less likely to appeal claims. This positive correlation between social benefit take-up rates and employer pay is similar to that found in Bana et al. (Forthcoming).

The third row shows that larger employers have lower claim rates but also slightly lower appeal rates. There are competing intuitions about the correlation with size. Work on employer size-wage effects (e.g., Brown and Medoff (1989)) suggests that larger employers would be higher-paying and so the logic in the last paragraph might suggest a positive correlation between size and claim rates. In contrast, to the extent that there is a fixed cost to setting up an appeal infrastructure (such as setting up a human resources department or hiring an unemployment compensation claims management company), then we might expect a negative correlation. The data are mixed in adjudicating between these hypotheses.

The final row looks at the relationship with sector-level unionization rates. There is a literature (e.g., Budd and McCall (1997) and Budd and McCall (2004)) which shows that at least blue-collar unionized workers are more likely to claim unemployment insurance. The posited mechanism is that unions might help workers claim and also help workers address employer appeals. In addition, by offering help to workers with appeals, unions might deter employers from appealing. Unlike the cited papers, we can control for worker effects. Consistent with this mechanism, there is weak evidence of a positive relationship between sector-level unionization rates and claims effects, and a strong evidence of a negative relationship between unionization rates and appeal effects.

In summary, the key message of this section is that there are employer effects on UI claims and appeals, and consistent with deterrence effects these are negatively correlated. Finally, consistent with high claim rate employers being more desirable employers, such employers have on average higher pay and lower separation rates.

3.9 Linking experience rating to employer effects on claiming and appeals

To provide more direct evidence between employers' appeal behavior and experience rating, we relate average employer effects to the share of time that an employer spends on the flat part of the experience rating schedule. Employers that are—or expect to be—often on the flat have smaller marginal incentives to appeal claims than employers that expect to be on the sloped part of the schedule.

Specifically, for every employer that we observe in the data more than once, we divide them into two mutually exclusive bins: those that are always on the sloped part of the schedule, and those that are ever

on the flat part.[31] We compute the average employer effects in both groups. Figure 8 shows that employers facing weaker marginal incentives to appeal do indeed appeal less, though the relationship is noisy. The figure also shows that those employers facing weaker incentives to appeal do indeed have higher claims rates. Thus, the incentives provided by experience-rating do appear to affect employer's appealing decisions and the subsequent claiming decisions of workers. Thus, in the next section we turn to a model that links experience rating, take-up, and targeting.

4 Model of experience rating, take-up, and targeting

So far we have established that there are employer effects on UI claims and appeals, these are negatively related, and they are tied to incentives in the experience rating schedule. In this section, we write down a model which serves four purposes.[32] First, it makes precise the connection between experience rating and incomplete take-up, by showing how the presence of experience rating generates incentives for employers both to not lay workers off, as well as to deter them from claiming UI. Second, it shows how in the presence of employer heterogeneity in the perceived cost of appealing a claim it is natural to expect the type of heterogeneity we documented in the previous section. Third, the model sets up a framework to estimate and discuss the targeting properties of UI. Fourth, the model allows us to estimate claim and appeal rate among the separation eligible, which lets us show that the patterns in behavior by income and the employer effects track those of the separation eligible.

4.1 Environment and timing

An employer j enters a period with employment $E_{j,-1}$. The production function is $F(E_j, z_j) = z_j E_j^{\alpha}$ and the employer draws a productivity level z from a distribution. The wage w is set exogenously and output sells for a unit price.

Separations happen for two reasons. First, δ share of workers separate exogenously. For the appeal process to make sense and there are ineligible workers who might apply, we assume that share $\Pr(e = 1) = \sigma$ of them are fully eligible for UI, where $e \in \{0, 1\}$ is an indicator for UI eligibility status. Second, if an employer wants to lay off additional workers (because of its draw of z), then it can do so and these additional workers will *all* be eligible for UI. This assumption follows the spirit of the UI system that workers who are laid off because of shocks to employers are eligible for UI.

In order to collect benefits, a worker needs to claim UI. Workers face heterogeneous fixed costs of claiming UI. This heterogeneity reflects some combination of stigma costs, information, the returns to claiming via the replacement rate, and other worker-specific factors, some of which might be directly affected by a worker's unionization status. This cost follows a different distribution depending on the worker's eligibility status, $\mathcal{P}_e$, and we denote a worker's draw from the distribution by χ.

[31] Most employers are never on the flat part: on an employment weighted basis, about 80 percent of observations are always on the sloped part and hence face an incentive to keep their payroll taxes low. Second, as can be seen from the standard errors in Figure 8, there are not enough observations to divide the employers that are ever on the flat part more finely and say anything precise.

[32] The model follows aspects of Auray and Fuller (2020).

After a worker claims UI, the employer decides whether to appeal. The employer knows the true eligibility status of the worker and follows a different appeal rule for eligible and ineligible workers. The appeal rule is an eligibility-type employer-specific appeal probability, $p_{e,j} \in [0,1]$. Appeals are costly, with cost $c(p_{e,j}) = \eta_j p_e^{\zeta}$, with $\zeta > 1$. The key source of employer heterogeneity is in the cost of appealing function, η_j. Consistent with our previous discussion, this heterogeneity could reflect economies of scale in appealing (employer size), the perceived reputational cost of treating well or badly (correlations with wage and separation rate), the unionized status of its workforce, among other factors.

Conditional on an appeal, the probability that a worker whose eligibility status is e receives UI is r_e. Thus, r_e parameterizes the accuracy of the determination and appeal process. Accordingly, we assume that following an appeal, eligible workers are more likely to receive UI than ineligible workers, $r_1 > r_0$.

We make assumptions on payoffs such that workers want to be employed, and, if unemployed, want to collect UI. Working earns a wage w. A worker who does not collect UI receives non-labor income d, and a worker who collects UI receives benefits b, where $w > b > d$.

We model experience-rating as a flat fee that an employer pays when a worker who separates from the employer collects UI. When a worker who separated from employer j receives UI, employer j pays τ.

An equilibrium consists of employers and workers making optimal decisions. The worker's optimal decision consists of a cutoff rule of whether to apply, which depend on whether the worker is eligible and the identity of the separating employer, $\{\chi^*_{e,j}\}$. The employer's optimal decision consist of an an optimal layoff rule and eligibility-specific appeal probability $\{p^*_{e,j}\}$.

4.2 Equilibrium and its properties

We summarize the model's properties in a number of formal results (proofs are in Appendix D).

Result 1. *Employer j's optimal appeal probability for a worker of eligibility type e is given by:*

$$\left(\frac{(1-r_e)\tau}{\eta_j \zeta}\right)^{\frac{1}{\zeta-1}} = p^*_{e,j}. \tag{3}$$

The appeal probability is increasing in experience rating (τ), decreasing in the accuracy of the determination and appeal process (r_e), and decreasing in the employer-specific cost of appealing (η_j). We can see that heterogeneity in the cost of appeals, η_j, generates across-employer heterogeneity in the probability of appealing. Equation (3) shows that $1/\zeta-1$ is the elasticity of appeals with respect τ, the experience-rated layoff tax.

Result 2. *The threshold cost for claiming for a worker whose eligibility type is e and who separates from employer j is given by:*

$$(1-(1-r_e)p^*_{e,j})(u(b)-u(d)) = \chi^*_{e,j}, \tag{4}$$

so a worker with $\chi < \chi^*_{e,j}$ applies and a worker with $\chi > \chi^*_{e,j}$ does not apply.

The threshold cost for claiming increases in the difference between the utility when receiving benefits and when not receiving benefits ($u(b) - u(d)$), in the probability of receiving benefits conditional on an appeal, and decreasing in the probability of appeal. We define the claim rate among the eligible workers as $C_{e,j} \equiv \mathcal{P}_e(\chi^*_{e,j})$. This claim rate is heterogeneous across employers because of the heterogeneity in the cost of appeals.

Result 3. *If the productivity shock, z_j, is such that* $\left(\frac{\alpha z_j}{w}\right)^{\frac{1}{1-\alpha}} > (1-\delta)E_{j,t-1}$ *then the employer hires and optimal employment is* $E^*_{j,t} = \left(\frac{\alpha z_j}{w}\right)^{\frac{1}{1-\alpha}}$.

If z_j is such that $\left(\frac{\alpha z_j}{w - C_{1,j}\tau[1-p^*_{1,j}(1-r_1)]}\right)^{\frac{1}{1-\alpha}} > (1-\delta)E_{j,t-1} > \left(\frac{\alpha z_j}{w}\right)^{\frac{1}{1-\alpha}}$ *then the employer neither hires nor fires and* $E^*_{j,t} = (1-\delta)E_{j,t-1}$.

If z_j is such that $(1-\delta)E_{j,t-1} > \left(\frac{\alpha z_j}{w - C_{1,j}\tau[1-p^*_{1,j}(1-r_1)]}\right)^{\frac{1}{1-\alpha}} > \left(\frac{\alpha z_j}{w}\right)^{\frac{1}{1-\alpha}}$ *then the employer lays workers off and* $E^*_{j,t} = \left(\frac{\alpha z_j}{w - C_{1,j}\tau[1-p^*_{1,j}(1-r_1)]}\right)^{\frac{1}{1-\alpha}}$.

This result illustrates the employment "smoothing" benefits of experience rating. Because experience rating acts as a layoff tax, it creates a wedge between the cost of hiring and firing a worker (the $C_{1,j}\tau[1 - p^*_{1,j}(1 - r_1)]$ term) and induces a region of inaction. Similarly, because of this wedge, when an employer does lay off workers, it lays off fewer workers. However, because experience rating decreases the odds that an eligible worker will claim and ultimately receive UI, the employment smoothing effects of experience rating are dampened.[33]

Result 4. *An increase in experience rating (increase in τ):*

- *increases the appeal probabilities* ($\frac{\partial p^*_{e,j}}{\partial \tau} > 0$),
- *decreases claim rates* ($\frac{\partial C^*_{e,j}}{\partial \tau} < 0$),
- *and has an ambiguous effect on the firing cost* ($\frac{\partial C_{1,j}\tau[1-p^*_{1,j}(1-r_1)]}{\partial \tau} \lessgtr 0$).

The first two parts of this result ask: what happens to appeals and claiming among a fixed pool of separators when experience rating increases? The result shows that increasing experience rating reduces errors of inclusion in that fewer ineligible workers apply, but it also increases errors of exclusion in that fewer eligible workers claim (and more of their claims are appealed). The third part of the result shows that the employment smoothing benefits of experience rating are at least partially undone by its effects on take-up. Increased experience rating has the direct effect of increasing the layoff tax, which smoothes employment. At the same time, it results in an increase in the appeal rate and a decrease in the claim rate, thus reducing the effective layoff tax because laid-off workers are less likely to claim and receive UI.

[33] Interestingly, MaCurdy, Pearce, and Kihlthau (2004, p. 10) emphasize that the incomplete UI take-up decreases the desirability of work-sharing arrangements in the United States: "Because only a fraction of employees who are laid off will collect UI benefits, employers can expect total claims to be lower if they choose to lay off workers instead of selecting work sharing."

5 Quantifying the model

We now quantify the model and discuss the targeting properties of UI, the effect of experience rating on targeting, and use the model validate the employer effects.[34]

5.1 Assumptions

We make two assumptions:

Assumption.

1. *When an employer contracts, the additional (marginal) separators are all eligible for UI;*
2. *The degree of experience rating, τ, does not vary with the employer's growth rate.*

The first assumption follows the spirit of the UI system that workers who separate because the employer contracts are eligible for UI. This assumptions allows us to use the change in the claims and appeal rate of a contracting employer relative to when it is not contracting to identify the share of eligible workers and their behavior.

The second assumption allows us to use the variation in employer growth rates to identify model parameters. Assuming that the extent of experience rating is invariant to an employer's growth rate allows us to bypass concerns that employers' incentives change from year to year. We show below that this assumption is approximately satisfied within employer.

5.2 Aggregation

Because we do not have sufficient data to estimate the model parameters for each employer, we quantify the model by analyzing an aggregated, or representative employer version of the model. Accordingly, we define $C_e \equiv \sum_j \omega_{e,j} C_{e,j}$ and $p_e^* \equiv \sum_j \omega_{e,j} p_{e,j}^*$ as the employment-weighted employer averages, where $\omega_{e,j}$ is the share of all separators of type e who separate from employer j. Thus, we need to estimate six parameters: $\{C_0, C_1, p_0, p_1, r_0, r_1\}$.

We use Equation (3) to solve for the elasticity of appeals with respect to experience rating, $1/\zeta - 1$, in terms of $\{r_1, r_0, p_1, p_0\}$:

$$\frac{1}{\zeta - 1} \approx \frac{\ln p_1/p_0}{\ln 1-r_1/1-r_0}, \tag{5}$$

where this approximation is exact when $\omega_{1,j} = \omega_{0,j} \forall j$. The details of this derivation are in Appendix E. The intuition for this expression is that the model implies that there is an experiment in the data that identifies the effect of experience rating: in expectation, eligible workers are more experience-rated than ineligible workers, and so the difference in the appeal probabilities for these two types of workers identifies

[34] There is a conceptually distinct set of questions about how take-up affects optimal UI calculations in the spirit of Baily (1978)-Chetty (2006).This question is distinct because it involves a change in benefits while also changing the tax rate. implicitly, this literature assumes that UI is 100 percent experience rated. The paper in the literature that comes closest to studying this point is Kroft (2008).

the elasticity of appeals with respect to experience rating. Combining this parameter with an estimate of the elasticity of take-up with respect to appeals allows us to conduct counterfactual policy analyses of how a change in experience rating affects appeals, claiming, and targeting.

5.3 Using employer growth rates to estimate parameters

To estimate the parameters, the feature of the data we use is how various outcomes change as employers contract. Heuristically, the employer contraction is an instrument for the number of eligible separators. The assumption that the marginal separators are eligible for UI means that the compliers with this instrument are all eligible. Hence, the change in the claim rate, the appeal rate , and the rate of receipt conditional on appeal for the eligible (C_1, p_1, and r_1) are identified from this experiment. We need one more data moment to estimate these parameters for the ineligible, and we discuss this moment below.

We estimate the following regression (as in Davis, Faberman, and Haltiwanger (2012, Figure 6) or Flaaen, Shapiro, and Sorkin (2019, Figure 1)):

$$y_{jt} = \psi_j + \sum_{g'=-10}^{+10} \mathbf{1}(g = g')\eta_g + \epsilon_{jt}, \tag{6}$$

where y_{jt} is one of five employer-level outcomes, ψ_j is a employer fixed effect, and g denotes 5 percentage-point bins of the employer growth rate. The employer growth rate is defined as the annual change in the total hours at the employer. The η_g are the parameters to be estimated. We estimate equation (6) with and without including ψ_j.

Figure 9 plots the estimates of η_g, with and without controlling for ψ_j, where we normalize the employer effects so that we match the sample means in the zero growth bin. Panel (a) shows the relationship between the employer growth rate and the probability of being on the flat portion of the experience rating schedule next year. The OLS estimate shows, as expected, that employers that expand or contract are more likely to be on the flat of the tax schedule than employers where hours are constant. But, when employer effects are added, and the comparison is made within a employer, the relationship is near zero and invariant to the employer's growth rate. This finding supports the approximate validity of the second assumption made above that employers face constant marginal experience rating incentives even when they contract.

Panels (b) through (e) of Figure 9 show the relationship between the employer growth rate and separation rates, claim rates, appeal rates, and receipt rates conditional on appeal. Panel (b) of Figure 9 shows that as employers contract, the separation rate increases.[35] Panel (c) shows that as employers contract, the claim rates increases, which is consistent with the model (and with robustness checks in Anderson and Meyer (1997)) in that, the marginal separators are more likely to be UI eligible. It is notable that even during a massive contraction the claim rate never exceeds 60 percent, which implies that claiming even among the

[35]This increase is lower than the rates reported in Davis, Faberman, and Haltiwanger (2012, Figure 6) where at a 50 percent contraction, the separation rate is closer to 50 percent. The reason is that we focus on separations of a more stable subset of the workforce: workers who are monetarily eligible and who only have one base-period employer (and who do not make an employer-to-employer transition when separating). The small increase (about 5 percent) in the separation rate is similar to in Flaaen, Shapiro, and Sorkin (2019, Figure 1) who look at separations among workers with at least a year of tenure. Appendix Figure A1 plots the same relationship for *any* quarter-to-quarter separation in the data. The average separation rate is much higher in the overall sample.

eligible is incomplete. Panel (d) shows that as employers contract, the appeal rate decreases, which implies that employers are less likely to appeal claims of eligible workers. Panel (e) shows that the relationship between employer growth rates and receipt rate conditional on appeal is very noisy (because appeals occur relatively rarely) but that it is increasing, consistent with the idea that eligible workers are more likely to receive UI when their claims are appealed.

To compute the share of ineligible separators and the same three outcome, we need an estimate of the share of ineligible workers who receive UI at employers that are neither growing nor shrinking. The reason is that even once we know the claim rate among the eligible, the observed claim rate reflects a mix of the share of ineligible workers and the claim rate among the ineligible. To identify the ineligible share, we use the U.S. Department of Labor's Benefit Accuracy Measurement (BAM) program, under which each state investigates random samples of weekly benefit payments to determine whether claimants were paid the proper benefit amount (Department of Labor, 2020). For each investigation, the BAM record indicates what the payment should have been. From 2005 to 2013, 12.7 percent of payments in the Washington sample, should have been zero.[36]

Appendix E provides details, which includes formalizing the heuristic identification arguments.

5.4 Results from quantifying the model

5.4.1 Parameter estimates for eligible and ineligible claimants

Table 7 reports parameter estimates from the model.[37] The claim rate among eligible workers is about 60 percent, which is about four times the rate among ineligible workers. The appeal rate for ineligible claimants is four times that of eligible claimants (12 percent vs. 3 percent), and the receipt rate conditional on appeal of eligibles is twice that of ineligibles (80 percent vs. 37 percent). Finally, about two-thirds of separators are eligible for UI.

To summarize the model fit, we use the separation rate from panel (b) and the model parameters to predict the claim rate, appeal rate, and receipt rate by employer growth rate, which are shown in panels (c) through (e) of Figure 9. Since it was used in estimation, the model fits the data perfectly at the zero growth rate bin, and the contraction of 15 percent. The model is fairly close for the claim and receipt rates at non-targeted moments. The model struggles with the appeal rate—its predictions are higher than the data at very negative growth rates, which suggests that our estimate of the appeal rate for eligible claimants are too high.

We find that the elasticity of appeals with respect to experience rating, $1/\zeta_{-1}$, is about 1.4. The feature of the data that pins this elasticity down is that the change in the receipt rate as employers contract is small relative to the change in the appeal rate as employers contract. We convert changes in appeals into changes in applications using the cross-sectional elasticity of -0.20 that we estimated in Section 3.8.

[36] This compares with 11.8 percent of payments for the entire U.S. We thank Ross Miller of the Employment and Training Administration, U.S. Department of Labor, for providing the data and documentation of the BAM data, and for helpful advice.

[37] See Appendix Table A2 for a summary of the moments we use.

5.4.2 Targeting properties of unemployment insurance

In the analysis of social programs, we are often interested in the targeting properties of the program: are the people who receive the program the intended recipients? Are the people who do not receive the program supposed to not receive the program? There exist attempts to quantify such targeting properties for other programs,[38] here we offer to our knowledge the first quantification of the targeting properties relative to program eligibility for unemployment insurance.[39]

Following Kleven and Kopczuk (2011), we distinguish among three sources of targeting errors, and Table 7 reports the results. First, Type IA errors are false negatives that stem from eligible workers not claiming: about 28 percent of workers are in this category. Second, Type IB errors are false negatives that stem from eligible workers who claim but do not receive (because their claim was appealed): only 0.2 percent of workers are in this category. Finally, Type II errors are false positives that stem from ineligible workers who claim and receive: about 5 percent of workers are in this category.

We arrive at two important conclusions from this analysis. First, targeting errors are wide-spread: about a third of separators incorrectly receive or do not receive UI. Second, the main source of targeting errors in UI are eligible workers who do not claim.

5.5 The effects of a change in experience rating

The model posits a tight link from how UI is financed to the take-up rate of the program. Experience rating affects employer's decisions to appeal claims which in turn affects worker's decisions to claim. Thus, changing how UI is financed potentially affects claiming behavior of workers and appeals behavior of employers, and thus the targeting properties of the system.

To get a sense of the magnitudes, Table 7 shows how a 10 percent decrease in experience rating (τ) affects take-up and targeting; see Appendix E.5 for details. We find that the claim rate for eligible and ineligible workers both rise. This result highlights the trade-off presented by experience rating: decreasing experience rating encourages ineligible workers to claim, which is undesirable, and encourages eligible workers to claim, which is desirable. The mechanism for this change is that employers appeal claims less often.

Table 7 shows that decreasing experience rating increases targeting efficiency. Mechanically, what drives this result is that there are more eligible workers who claim than ineligible workers, and so increasing their claim rates by the same percent — as we assume in our model by having the same elasticity of appeals to claims and appeals to experience rating for both types — increases the number of applications more for eligible workers. We view this qualitative result as quite robust, however, in that undoing it would require that the responsiveness of claims to experience rating is about seven times higher for ineligible workers

[38] Reeder (1985) studies housing assistance, Benitez-Silva, Buchinsky, and Rust (2004) study Supplemental Security Income and disability insurance, Low and Pistaferri (2015) and Deshpande and Li (2019) study disability insurance, Finkelstein and Notowidigdo (2019) study food stamps, and Lieber and Lockwood (2019) study Medicaid home health care.

[39] Some of the cited studies look at targeting in terms of the marginal utility of consumption; we instead look at targeting relative to program rules, which is also of interest to policy-makers.

than eligible workers.[40] Thus, if the policy-maker weights different types of targeting errors equally, then decreasing experience rating is desirable.[41]

One important caveat to these results is that this analysis represents a partial assessment of such a reform in that it does not take into account any changes in layoff behavior of employers.

6 Validating estimated relationships using the model

In this section, we link the results from the empirical sections 2 and 3 with the quantified model from section 5. Specifically, we use the quantified model to confirm that the empirical relationships — employer effects on UI claims and appeals as well as the wage gradient in claims and appeal — reflect the behavior of eligible separators, rather than differences in an employer's mix of eligible and non-eligible or differences in the eligibility of low- vs. high-wage separators.

6.1 Validation of employer effects

The basic idea of the validation exercise is to relate employer-level estimates of claiming among the eligible to the employer effects on claiming. The model gives us an estimate of the claim rate (C_1) among the eligible. If we had enough data (and variation) to estimate the model at the employer-level, then we could relate the employer effects in claims (the $\hat{\psi}_j$) to the employer-level claim rate of eligible separators ($C_{1,j}$). A high correlation would indicate that the estimated employer effects reflect variation in claims among eligible separators.

As noted above, we do not have sufficient data and variation to estimate employer-level measures of claiming among the eligible. Instead, we group employers into five bins based on the quintiles of the estimated employer effects on claiming. We then assess the relationship between the average employer effect in each bin and the estimated take-up rate among eligible separators in each bin.[42] Parallel reasoning and an analogous procedure holds for the appeal rates, except that we use same grouping of employers for the appeals as for claiming. Figure 10, panel (a), shows that the claim rates among the eligible claimants are tightly related to the estimated employer effects on claiming. The corresponding regression coefficient on the claim rate is 0.54 (with a standard error of 0.17). Panel (b) shows that the appeal rate among the eligible claimants track the employer appeal effects even more tightly with a coefficient of 1.31 (with a standard error of 0.19).

[40] The numbers in Table 7 imply that there are about seven times as many applications from eligible workers than ineligible workers: $\frac{0.575 \times 0.661}{0.164 \times 0.329} \approx 7$.

[41] The estimates in the table also imply that the endogenous response of appeals undoes some of the direct effect of changing experience rating on the effective layoff tax facing employers. When experience rating declines the layoff tax decreases. At the same time, employers are also less likely to appeal claims which means that workers are more likely to collect, which increases the effective experience rating. Our estimates imply that the behavioral responses undo just over a quarter of the direct effect.

[42] Even with five groups of employers, we do not have enough data to use narrow growth rate bins and so we use the following four coarse categories: $[-0.40,-0.05)$, $[-0.05,0.05)$, $[0.05,0.40)$, and $[0.40,1.0]$. Using either more than five groups of employers or narrower growth rates bins generated some cases where the restrictions of the model failed. For example, separations rates did not increase as employers contracted. For the purposes of this exercise, we are only interested in parameters for eligible separates and so do not need the additional moment from the BAM data that allowed us to estimate various rates for the ineligible separators.

Naturally, regressions with five data points should be interpreted with a grain of salt. Nevertheless, we do find tight relationships between employer effects on claims and claim rates among eligible separators, and similarly for appeals. Thus, this exercise provides further evidence that the employer effects reflect differences in the employer environment, rather than employer differences in eligibility among a employer's separators.

6.2 Validation of wage gradients

We extend the logic of the previous exercise to validate the wage gradients reported in Figure 2, panels (a) and (c). Interpreting the relationship between claims and wages as differences in claiming due to wage differentials could be confounded by differences in UI eligibility between low- and high-wage separators. To show that the wage gradients reflect patterns among eligible separators, we group workers into equal-sized bins of base-period earnings, and estimate the model for each earnings bin (we use the same coarsened employer-growth rate bins as in the previous validation exercise).[43] We then relate the claim-wage gradient among the eligible separators to the claim-wage gradient of all separators (as in Figure 2, panel (a)). We repeat the same exercise for appeal rates.

Figure 10, panel (c), plots the relationship between claim rates and wages among eligible separators (marked in xs) and all separators (marked in circles). In both cases, there is an inverted-U shape between claim rates and wages. Figure 10, panel (d), shows the relationship between appeal rates and wages among eligible separators and all separators. In both cases, appeal rates are negatively related to wages.

In summary, the validation suggests that the wage gradients in claims and appeals largely reflect a relationship between these outcomes and wages, rather than differences in eligibility.

7 Summary and conclusion

The UI payroll tax is experience rated at the level of the employer, and each employer's UI payroll tax rate is based on the "charging" of benefits paid to workers laid off by that employer. Using administrative wage and claim records from Washington, we have shown that employers affect UI take-up by appealing workers' claims for UI. UI take-up is far from complete, and the income gradients in both claims and appeals are steep: low-wage workers are less likely to claim and more likely to have their claims appealed than median-wage workers. We examine whether these relationships depend on factors relating to the worker or the employer by decomposing the variation in UI claims and appeals into worker and employer effects. We find that employer effects on both claiming and appealing are highly dispersed—for both, one standard deviation of the employer effect is at least one-third of the sample mean, and the relative variance of employer effects to worker effects is larger for both of these outcomes than for wages.

Consistent with employer appeals deterring workers from claiming, employer effects on appeals and claims are negatively correlated, a finding supported by an event study. Moreover, we find that well over half of the income gradients can be explained by employer effects. Consistent with models of imperfect

[43] We pick the largest number of bins such that the model returns claim and appeal rates that are positive in all bins.

competition in the labor market, we show that high-claim and low-appeal employers are more desirable employers: they are both higher-paying and lower-separation. Similarly, high-claim and low-appeal employers are more likely to be unionized, consistent with the idea that unions facilitate access to UI.

Motivated by evidence showing a link from experience rating to appeals and claiming, we write down and estimate a simple stylized model of UI take-up, and use the model to study the targeting properties of UI. We find that the dominant source of UI targeting error is that eligible workers do not claim benefits. In the context of the model, some of this incomplete claiming results from the deterrent effects of employer appeal, which is ultimately due to experience rating of the UI payroll tax. We show that decreases in experience rating would likely reduce the extent of targeting errors. In summary, the paper highlights a novel dimension of the role of employers in the labor market, and relatedly emphasizes a little-studied factor affecting the take-up of UI.

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Table 1: Summary statistics and UI claim rates for alternative samples

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Worker-quarter observations[1]		Monetarily eligible transitions[2]		Likely eligible separations of at least twice eligible workers[3]		UI claims among at least twice eligible workers[4]	
	All	Monetarily eligible in quarter	All	Likely eligible separations	Twice eligible separators	Leave-out connected set	Twice eligible claimants	Leave-out connected set
Claimed UI	0.020	0.023	0.288	0.453	0.474	0.505	1.000	1.000
	(0.141)	(0.150)	(0.453)	(0.498)	(0.499)	(0.500)	0.000	0.000
Claim challenged (conditional on claiming)	0.035	0.033	0.041	0.041	0.036	0.039	0.033	0.036
	(0.184)	(0.178)	(0.197)	(0.198)	(0.185)	(0.193)	(0.180)	(0.186)
Benefits received (conditional on appeal)	0.567	0.622	0.618	0.626	0.593	0.639	0.622	0.661
	(0.496)	(0.485)	(0.486)	(0.484)	(0.492)	(0.480)	(0.485)	(0.474)
Base-period earnings (in 2005 $)[5]	39291	51073	42470	38752	40179	40337	41103	40415
	(78026)	(50332)	(46024)	(39911)	(37091)	(40590)	(31239)	(41471)
Base-period work hours	1477	1885	1810	1837	1917	1862	1973	1904
	(793)	(457)	(516)	(545)	(559)	(556)	(516)	(529)
Base-period quarters	3.44	3.90	3.82	3.83	3.85	3.79	3.87	3.76
	(1.01)	(0.37)	(0.50)	(0.50)	(0.46)	(0.55)	(0.43)	(0.58)
Mean size of base-period employer	27	32	92	157	153	162	270	317
	(328)	(361)	(686)	(978)	(833)	(884)	(1277)	(1457)
Median size of base-period employer	5	6	18	28	44	48	76	98
Number of workers	5,925,293	3,779,604	2,350,011	884,430	71,037	62,117	20,767	16,641
Number of employers	286,285	226,705	186,009	118,311	16,962	16,737	7,171	6,160
Number of worker-quarters	80,787,086	58,486,190	3,193,088	1,010,961	142,074	160,708	20,767	39,623

1. The sample starts with 80.8 million worker-quarter observations in Washington from 2005:1 to 2013:4 in which the worker had the same employer (and only that employer) in the current and five previous quarters (column 1). (Employment in all five previous quarters is not required.) In 58.5 million of these quarterly observations, the worker had at least 680 work hours in either the previous quarters, or the first four of the previous five quarters, and hence would have been "monetarily" eligible for UI if s/he had separated in that quarter (column 2).

2. Column 3 shows summary statistics for the 3.2 million job transitions observed among the 58.5 million worker-quarters in column 2. Of these 3.2 million transitions, we drop those where (i) the worker transitioned to another employer in either the same or the following quarter and experienced a decrease in work hours of at most 15% in the quarter of transition or between the two quarters when the transition took place, and (ii) the separation was followed by five or more quarters with zero reported work hours (so it was an apparent labor force withdrawal). We refer to the remaining 1,010,961 transitions (column 4) as "likely eligible separations," and 45.3% of these resulted in UI claims.

3. Column 5 restricts the sample in column 4 to separations of workers who had two likely eligible separations during 2005:1 to 2013:4, but not within the same calendar year. These restrictions reduce the sample to 142,074 worker-quarter observations. Column 6 restricts the sample in column 4 to the largest leave-one-out connected set.

4. Column 7 restricts the sample in column 5 to workers who separated and claimed twice during the period 2005:1 to 2013:4, but not within the same calendar year. These restrictions reduce the sample to 20,767 worker-quarter observations. Column 8 restricts the sample in column 5 to the largest leave-one-out connected set.

5. Base period is the standard base period (i.e., the first four of the last five completed quarters).

Table 2: Cross-tabulation of reason for separation given by the employer and by the claimant

Panel A: Joint distribution of claims by reason for separation (cell counts)

	Employer reason for separation					
Claimant reason for separation	Lack of work	Voluntary quit	Discharge	Other	Not reported	Row sums
Lack of work	449	5,887	9,043	276	235,293	250,948
	(0.10)	(1.29)	(1.98)	(0.06)	(51.48)	(54.90)
Voluntary quit	70	84	42	12	44,187	44,395
	(0.02)	(0.02)	(0.01)	(0.00)	(9.67)	(9.71)
Discharge	247	135	164	5	110,512	111,063
	(0.05)	(0.03)	(0.04)	(0.00)	(24.18)	(24.30)
Other	366	182	97	53	12,180	12,878
	(0.08)	(0.04)	(0.02)	(0.01)	(2.66)	(2.82)
Not reported	0	0	0	0	37,791	37,791
	(0.00)	(0.00)	(0.00)	(0.00)	(8.27)	(8.27)
Column sums	1,132	6,288	9,346	346	439,963	457,075
	(0.25)	(1.38)	(2.04)	(0.08)	(96.26)	(100.00)

Notes : This panel shows the number of UI claims jointly classified by the reason for job separation given by the claimant and the employer. The "other" category includes reduced hours, leave of absence, partially employed, still employed, gross misconduct, labor dispute, and unknown. The sample is restricted to claims associated with "likely eligible" separations, defined as monetarily eligible claims associated with separations preceded by at least five quarters of employment with the same unique employer.

Calculations from Panel A:
Probability claimant did *not* report a reason for separation = 37,791/457,075 = 0.083.
Probability employer did report a reason for separation = (457,075 – 439,963)/457,075 = 17,791/457,075 = 0.037.
When the employer reported a reason, the probability the employer reported "voluntary quit" or "discharge" and the claimand reported "lack of work" = (5,887 + 9,043)/(457,075 – 439,963) = 14,930/17,112 = 0.87.

Panel B: Percentage of claims on which benefits were paid, by reason for separation

	Employer reason for separation					
Claimant reason for separation	Lack of work	Voluntary quit	Discharge	Other	Not reported	Row means
Lack of work	95.3	51.1	69.3	65.9	93.7	91.8
Voluntary quit	72.9	46.4	40.5	50.0	32.6	32.7
Discharge	85.4	54.1	64.6	100.0	63.8	63.8
Other	89.9	50.5	57.7	77.4	77.9	78.5
Not reported	n/a	n/a	n/a	n/a	72.7	72.7
Column means	90.0	51.1	68.9	67.6	77.8	77.3

Notes : This panel shows percentages of UI claims resulting in payment of benefits, for each joint classification category of reason for job separation given by the claimant and the employer. For example, the claimant received benefits in 51.1% of the cases for which the worker reported lack of work and employer reported voluntary quit as the reason for separation. Row and columns means are claim-weighted. See also the notes to Panel A.

Table 3: Switcher analysis of UI claims and appeals

Outcome variable	ΔPr(Claimed UI)	ΔPr(Claim appealed)
	(1)	(2)
Predictors		
ΔFirm UI claim rate	0.816***	
	(0.022)	
ΔFirm appeal rate		1.075***
		(0.116)
Constant	0.036***	0.003
	(0.004)	(0.002)
Mean UI claim rate	0.474	
Mean appeal rate		0.0334
Number of workers	71,037	20,767
Number of worker-quarters	142,074	41,534
Subsample	Workers who separated twice	Workers who claimed twice
Adj. R-squared	0.0871	0.00397

Notes : The analysis sample in column 1 consists of separations as defined in Table 1, column 5. The analysis sample in column 2 consists of separations as defined in Table 1, column 7. Average firm take-up and appeal rates are computed as a leave-one-out firm-by-year averages and adjusted for measurement error using the approach described in the appendix. Standard errors, clustered at the employer level, are in parentheses (*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$).

Table 4: Variance decomposition of UI claims and appeal rates

Outcome	Pr(Claimed UI)		Pr(Claim appealed)		Pr(Claimed UI)		Pr(Claimed UI)	
	(1)		(2)		(3)		(4)	
Sample	Main sample		Main sample		Main sample + temporary layoffs		All monetarily eligible separators	
Panel (a): Leave-one-out (KSS) estimates: main samples and alternative samples								
Total variance	0.250		0.0348		0.218		0.220	
Variance components								
Worker effects	0.049	*0.196*	0.0012	*0.031*	0.062	*0.282*	0.049	*0.223*
Firm effects	0.022	*0.088*	0.0008	*0.024*	0.021	*0.095*	0.02	*0.091*
Cov(worker, firm)	0.001	*0.000*	0.0005	*0.013*	-0.0003	*-0.001*	-0.001	*-0.005*
Std. dev. firm effects	0.148		0.028		0.145		0.141	
N firms	16,737		6,160		16,737		16,737	
N worker-qtrs	160,708		39,623		275,673		918,686	
N movers	62,117		16,641		71,876		340,258	
Panel (b): Plug-in estimates: main samples only								
Total variance	0.250		0.0348					
Variance components								
Worker effects	0.169	*0.676*	0.029	*0.834*				
Firm effects	0.079	*0.316*	0.0195	*0.562*				
Cov(worker, firm)	-0.038	*-0.152*	-0.0121	*-0.347*				
Std. dev. firm effects	0.281		0.140					
N firms	16,737		6,160					
N worker-qtrs	160,708		39,623					
N movers	62,117		16,641					

Notes : The main samples consist of separations as defined in Table 1, columns 6 (for claims) and 8 (for appeals). Panel A shows variances, covariances, and standard deviations of firm effects corrected using the KSS correction. Panel (b) shows the variances, covariances, and standard deviations using the "plug-in" estimates of effects. The first two columns in panel (a) row estimates the model in equation (1) using the main samples. The third column in panel (a) row estimates the model in equation (1) by using the sample in Table 1, column 6 and adding any claim not associated with a separation (which we refer to as temporary layoffs). The fourth column in panel (a) row estimates the model in equation (1) using the sample of all monetarily eligible separators from Table 1, column 3.

Table 5: Variance decomposition of UI claims using the dual employer effects model

Outcome	Pr(Claimed UI)		Pr(Claimed UI)	
	(1)		(2)	
Method	Standard AKM		Dual firm effects AKM	
Panel (a): Leave-one-out (KSS) estimates				
Total variance	0.250		0.250	
Variance components				
Worker effects	0.049	*0.196*	0.081	*0.323*
Current firm effects	0.022	*0.088*	0.039	*0.154*
Former firm effects			0.011	*0.046*
Cov(worker, current firm)	0.001	*0.000*	-0.021	*-0.082*
Cov(worker, former firm)			-0.020	*-0.082*
Cov(current firm, former firm)			0.002	*0.006*
Std. dev. current firm effects	0.148		0.197	
Std. dev. former firm effects			0.107	
Variation explained	0.290		0.331	
Panel (b): Plug-in estimates				
Total variance	0.250		0.250	
Variance components				
Worker effects	0.169	*0.676*	0.231	*0.925*
Current firm effects	0.079	*0.316*	0.099	*0.397*
Former firm effects			0.048	*0.194*
Cov(worker, current firm)	-0.038	*-0.152*	-0.061	*-0.245*
Cov(worker, former firm)			-0.037	*-0.147*
Cov(current firm, former firm)			-0.001	*-0.004*
Std. dev. current firm effects	0.281		0.315	
Std. dev. former firm effects			0.220	
Variation explained	0.692		0.742	
Panel (c): Number of observations				
N movers	62,117		59,992	
N current firms	16,737		10,414	
N former firms			6,454	
N total firms	16,737		16,868	

Notes : Both samples consist of separations as defined in Table 1, column 6. The first column in panel (a) estimates the standard the Abowd, Kramarz, and Margolis (AKM, 1999) firm effects model in equation (1). The second column in panel (a) row estimates the current- and former-firm effects D-AKM model in equation (2). Panel (a) shows variances, covariances, and standard deviations of current and lagged firm effects corrected using the KSS correction. Panel (b) shows the variances, covariances, and standard deviations using the "plug-in" estimates of effects. Both models control for year-quarter effects.

Table 6: UI claims and appeals by earnings decile: worker-level probabilities and employer effects

Outcome variable	Pr(Claimed UI)	Firm claim effect	Firm claim effect	Pr(Claim appealed)	Firm appeal effect	Firm appeal effect
	(1)	(2)	(3)	(4)	(5)	(6)
Deciles of base-period hourly earnings						
Decile 2	0.067	0.037	0.039	0.007	0.006	0.007
	(0.010)	(0.022)	(0.006)	(0.003)	(0.006)	(0.007)
Decile 3	0.126	0.073	0.070	0.002	0.004	-0.003
	(0.011)	(0.024)	(0.007)	(0.003)	(0.007)	(0.007)
Decile 4	0.178	0.11	0.099	-0.004	-0.003	-0.002
	(0.013)	(0.027)	(0.007)	(0.003)	(0.007)	(0.007)
Decile 5	0.197	0.117	0.109	-0.008	-0.006	-0.007
	(0.012)	(0.026)	(0.008)	(0.003)	(0.007)	(0.007)
Decile 6	0.198	0.12	0.114	-0.009	-0.006	-0.009
	(0.011)	(0.025)	(0.008)	(0.003)	(0.007)	(0.008)
Decile 7	0.186	0.121	0.123	-0.016	-0.007	-0.009
	(0.012)	(0.025)	(0.009)	(0.003)	(0.008)	(0.008)
Decile 8	0.165	0.133	0.133	-0.02	-0.012	-0.015
	(0.013)	(0.025)	(0.009)	(0.003)	(0.008)	(0.009)
Decile 9	0.108	0.126	0.138	-0.021	-0.014	-0.014
	(0.014)	(0.025)	(0.010)	(0.003)	(0.008)	(0.009)
Decile 10	0.014	0.131	0.133	-0.02	-0.016	-0.013
	(0.014)	(0.025)	(0.011)	(0.003)	(0.009)	(0.010)
Sample	Baseline	Baseline	Leave-one-out connected set	Baseline	Baseline	Leave-one-out connected set
Standard errors	Robust	Robust	KSS-corrected	Robust	Robust	KSS-corrected

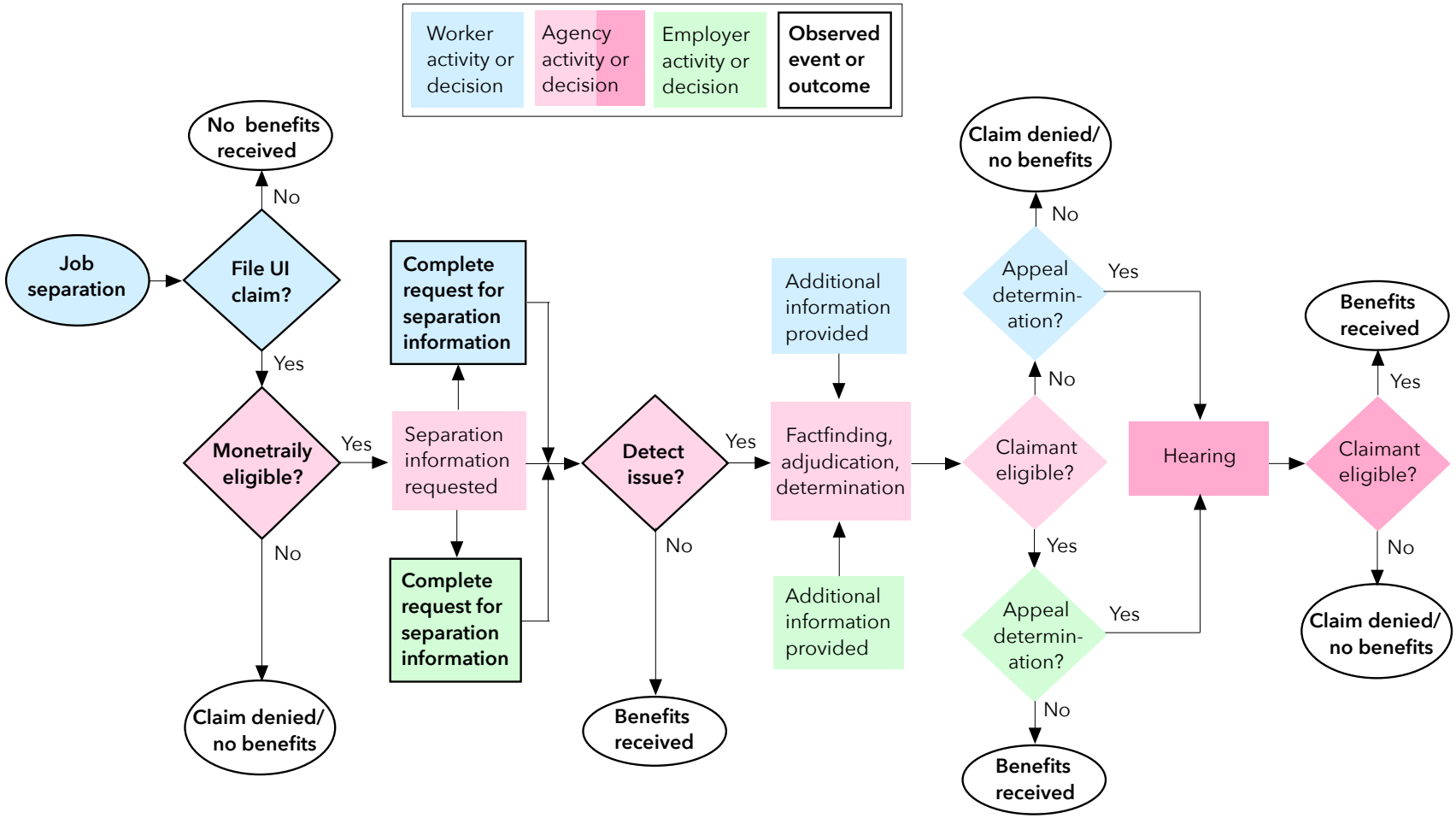
Notes: The baseline analysis sample in column 1 and 2 consists of separations as defined in Table 1, column 4. Column 3 consists of observations in the leave-one-out connected set from Table 1, column 6. Columns 4 and 5 show the baseline sample restricted to worker-quarter observations where a UI claim is observed and column 6 shows consists of observations in the leave-one-out connected set.The outcome variable in column 1 equals one if the separation resulted in a UI claim and zero otherwise. The outcome variable in columns 2 and 3 is the firm claim effect estimated using the Abowd, Kramarz, and Margolis (AKM, 1999) approach. The outcome variable in column 4 equals one if the UI claim resulted in an appeal and zero otherwise. The outcome variable in columns 4 and 5 is the firm appeal effect estimated using the AKM model. Deciles are the indicators for deciles of base-period hourly earnings computed using workers in Table 1, column 1. Standard errors are in parentheses: columns 3 and 6 show standard errors corrected using the approach described in KSS, while all the other columns shows standard errors clustered by employer.

Table 7: Model estimates and effects of reducing experience rating by ten percent

	Baseline estimates		Experience rating reduced 10%	
	Eligibles (e = 1)	Ineligibles (e = 0)	Eligibles (e = 1)	Ineligibles (e = 0)
Estimated rates				
Claim rate (C_e)	0.575	0.164	0.592	0.169
Appeal rate | claim (p_e)	0.026	0.122	0.023	0.105
Receipt rate | appeal (r_e)	0.792	0.368	0.792	0.368
Targeting errors				
Type IA (eligible, no claim)	0.281		0.270	
Type IB (eligible, claim, no receipt)	0.002		0.002	
Type II (ineligible, receive)	0.052		0.054	
Total	0.334		0.325	

Notes : The proportion of the sample eligible in steady state, $g = 0$, (σ) is 0.661. The implied elasticity of appeal with respect to experience rating ($1 / (\zeta - 1)$) is 1.38.

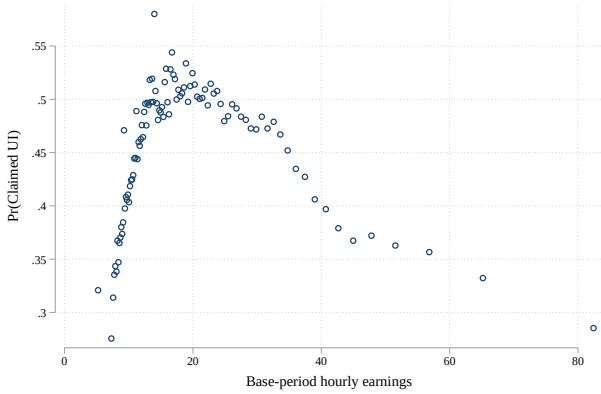
Figure 1: Flowchart summarizing the claiming, determination, and appeal process



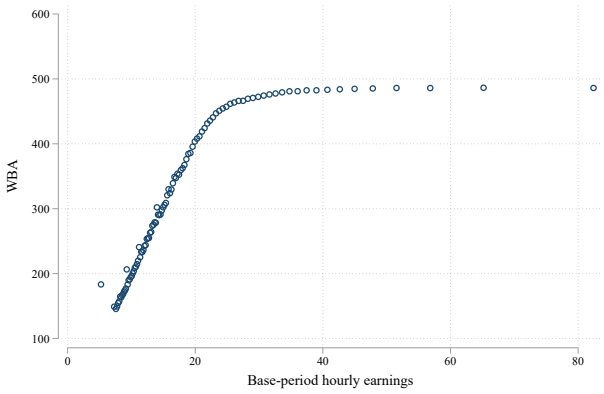
Notes: This flowchart illustrates the process of claiming and determining eligibility for UI benefits. Events and decisions we observe in the data are shown in bold. Following job separation, a worker decides whether to claim benefits, and if she does, the UI agency determines whether the claimant is monetarily eligible (i.e., has an adequate work history to qualify). If the claimant is monetarily eligible, the agency requests information about the worker's conditions of separation from both the worker and the employer(s). If the agency detects a separation issue (for example, due to conflicting reasons for separation conflict), the agency requests further information in order to adjudicate the issue and make a formal eligibility determination. The outcome of this determination can be appealed by either the worker of the employer, and the appeal will be heard by an administrative law judge, who makes a final eligibility determination.

Figure 2: Worker-level UI outcomes versus base-period hourly earnings

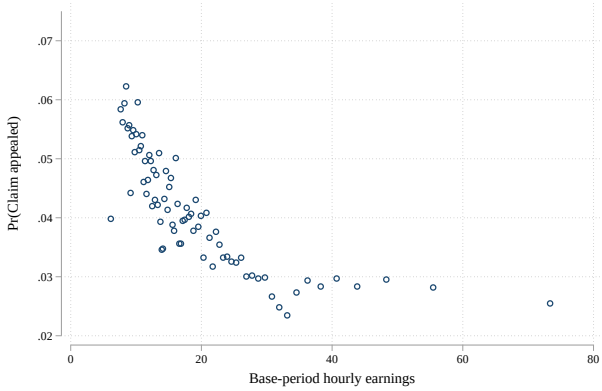
(a) UI claims



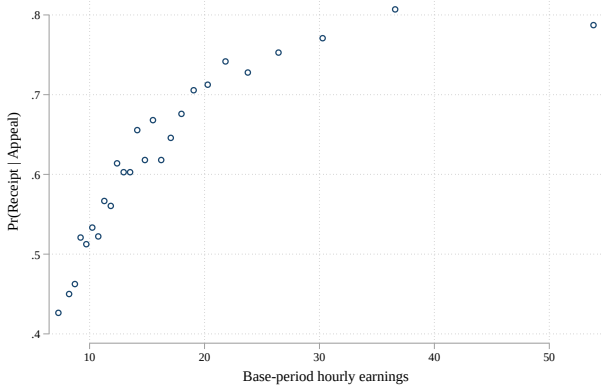
(b) Weekly benefit amount



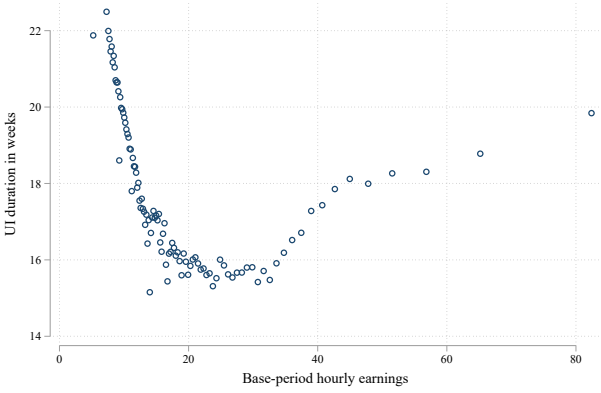
(c) Claim appealed



(d) Receipt rate, conditional on appeal



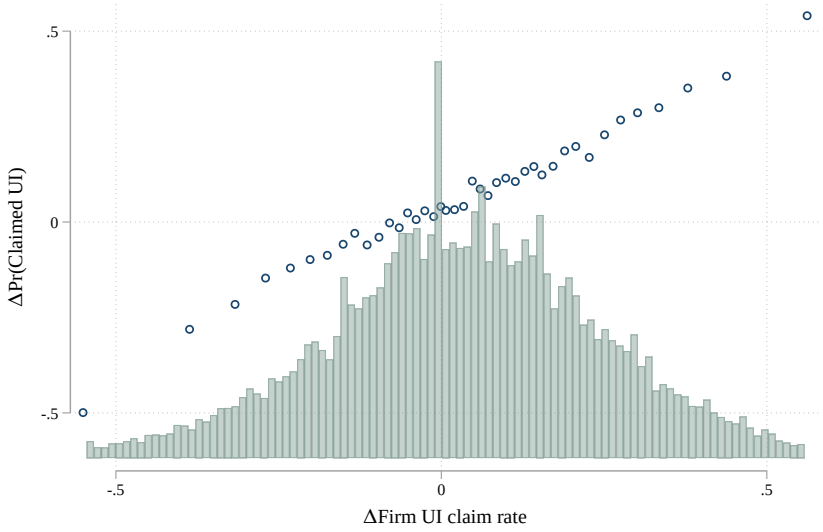
(e) UI duration



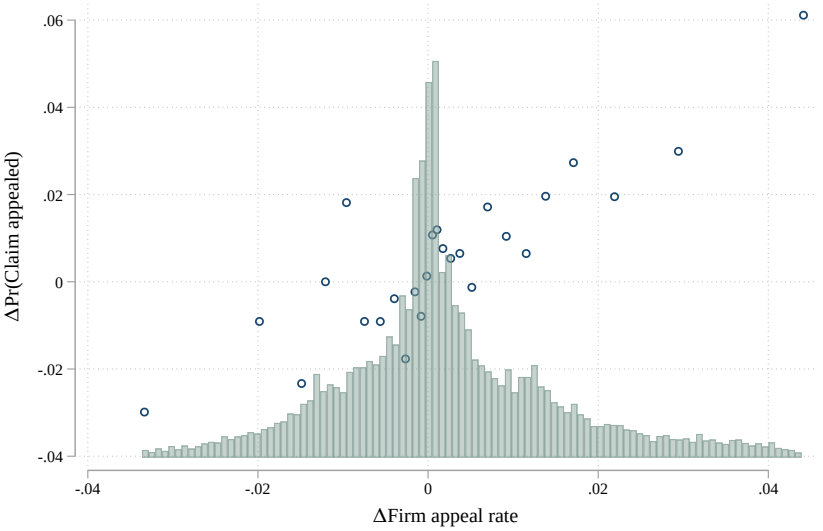
Notes: The panels of this figure show scatter plots of the UI claim rate, appeal rate, receipt rate (conditional on appeal), the weekly benefit amount, and UI duration as a function of base-period hourly wages, based on the sample summarized in Table 1, column 4. UI duration in weeks is calculated as the smaller of (i) the maximum payable amount of that claimant divided by the total amount of weekly benefits paid to the claimant, and (ii) 26 weeks.

Figure 3: Switcher analyses of UI claims and appeals

(a) UI claims



(b) UI appeals

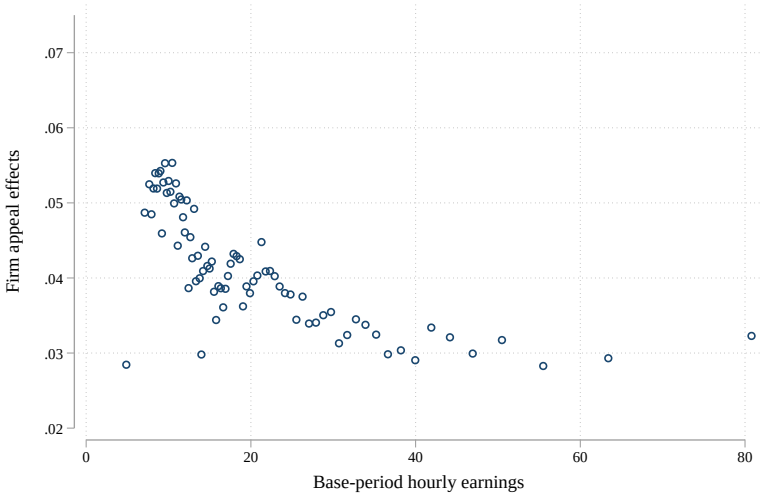


Notes: The figure shows a switcher analysis of claims (panel (a)) and appeals (panel (b). Panel (a) is based on the sample of separators summarized in Table 1, column 5. Panel (b) is based on the sample of claimants summarized in in Table 1, column 7. The top figure shows the change in the probability that a worker claims UI against the change in the employer-level UI claim rate. The bottom figure shows the change in the probability of the worker having their UI claim appealed for workers who separate and claim twice against the change in the employer-level UI appeal rate. See Table 3, columns 1 and 3 for the associated regression estimates. Both the employer-level rates are computed as leave-one-out employer-year averages shrunken using the procedure described in Appendix B. The histograms in the background show the distribution of the change in the employer-level UI claims and appeal rate. The number of points in the scatterplots are based on the cubed root of the sample size.

Figure 4: Employer effects on claims and appeals vs. worker-level earnings

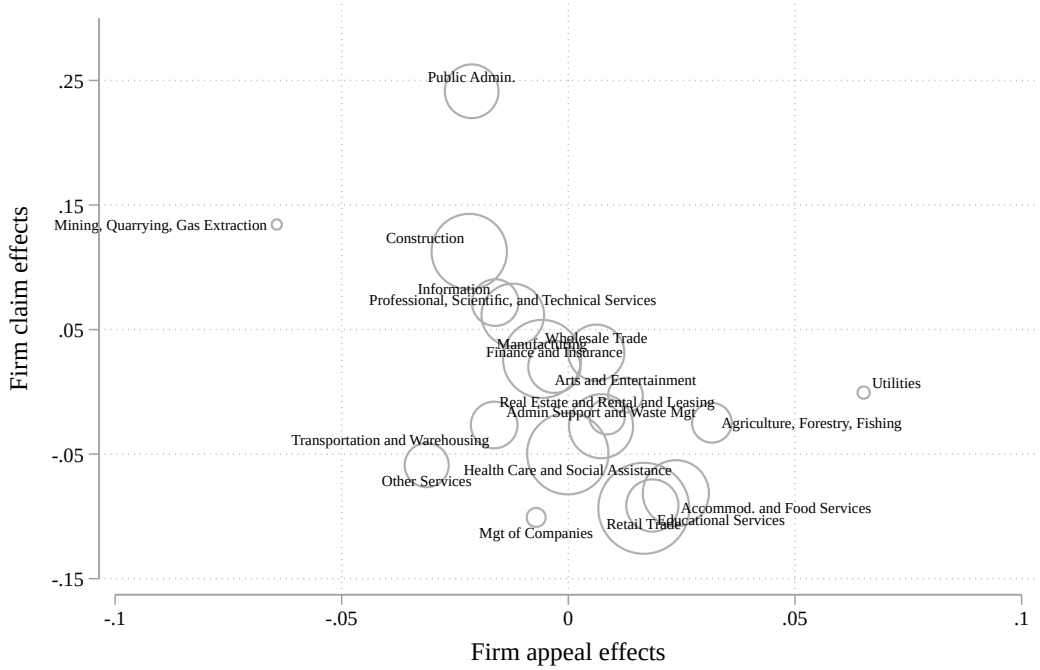
(a) Employer effects on claims and worker-level earnings

(b) Employer effects on appeals and worker-level earnings



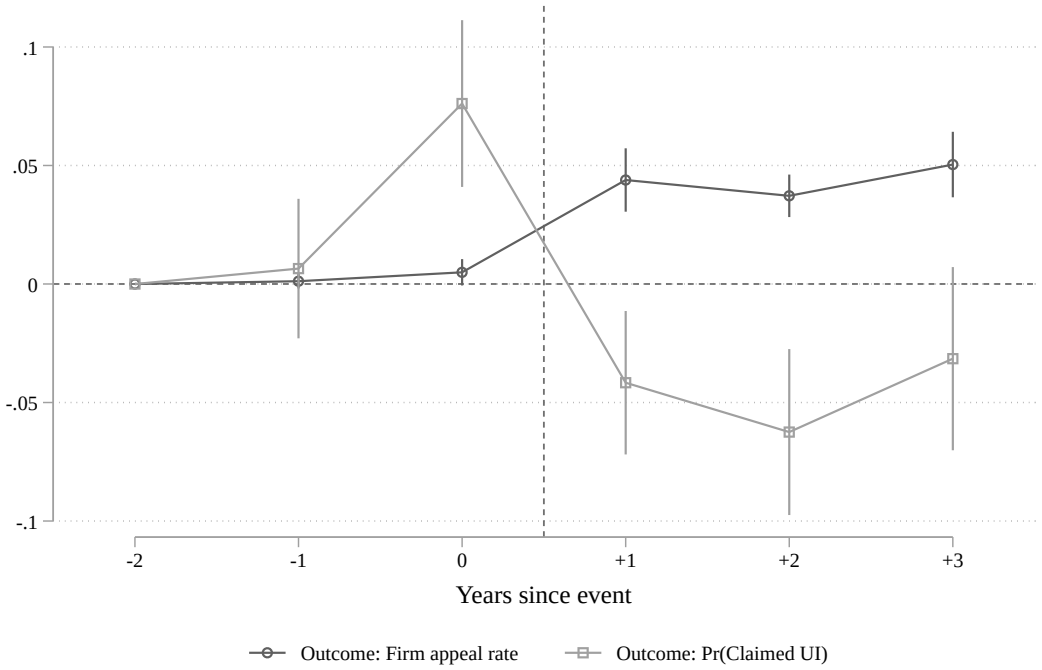
Notes: The top panel of the figure shows a scatterplot of estimated employer effects on claims against workers' base-period hourly wages. The plots are based on the sample summarized in column 4 of Table 1. The bottom panel shows a scatterplot of estimated employer appeal effects against worker-level base-period hourly earnings. The employer effects on claims and appeals are estimated using equation (1) and have been demeaned and rescaled by the average value of the relevant outcomes. The number of points in the scatterplots are based on the cubed root of the sample size.

Figure 5: Employer effects on claims and appeals, by industry sector



Notes: The figure plots the sector averages of employer effects in claims against the sector averages of employer effects on appeals. The size of each dot is proportional to the number of separators in that sector, defined according to Table 1, column 4.

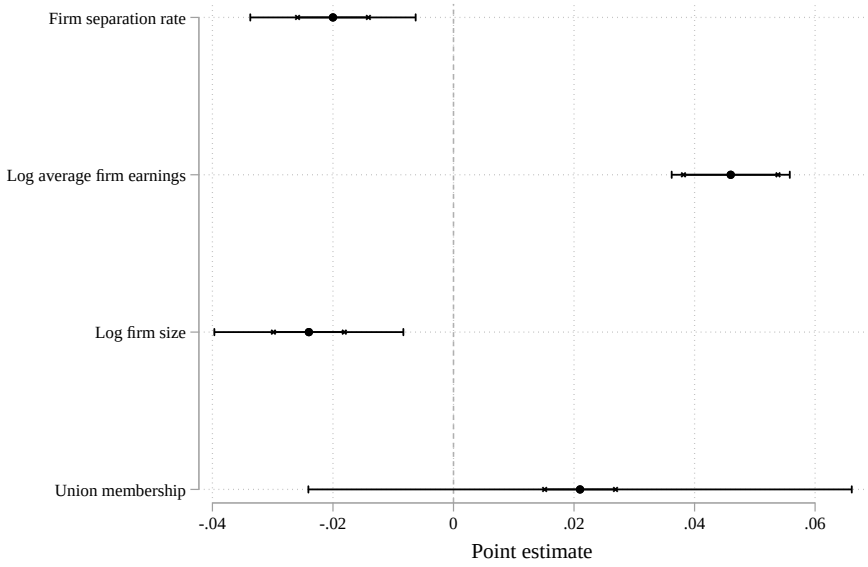
Figure 6: Workers' claiming following a persistent change in employer appeals



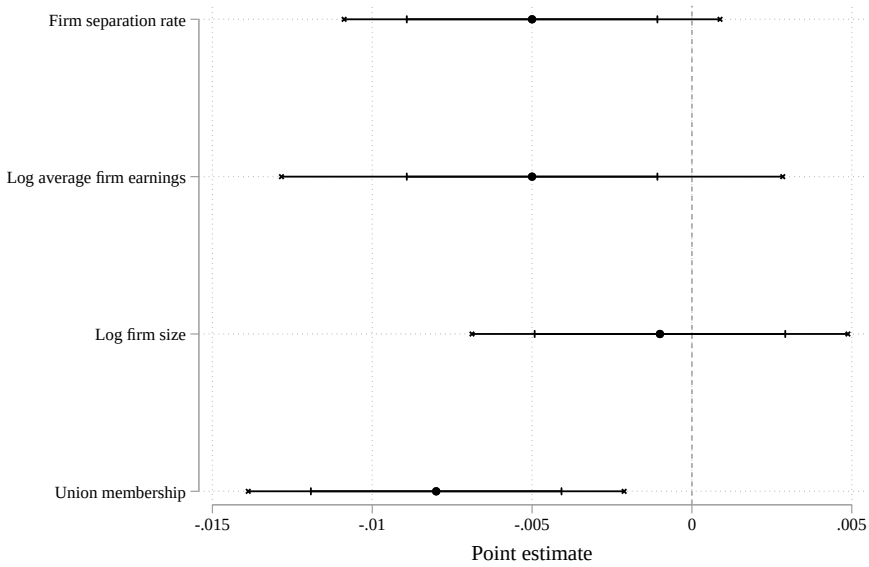
Notes: The figure shows mean differences in annual employer appeal rates (circles) and claim probability (squares) between employers that experience an above-median change in their employer appeal rate in year $t = 0$ ("treatment") versus employers that experience a below-median change in their shrunk employer appeal rate in $t = 0$ ("controls"). The median employer appeal change is computed over the difference between the average employer appeal rate in year $t+2$ and $t+1$ and the average employer appeal rate in year t and $t-1$. To make the change persistent, both the above- or below-median change must be followed by an absolute proportional change between the employer appeal rate in $t + 2$ and $t + 1$ that is less or equal to 10 percent and an absolute proportional change between $t - 1$ and $t - 2$ that is less or equal to 5 percent. The calculation is done separately for each calendar year-of-event and the year-of-event panels are then stacked. The employers in the resulting sample have to be present in six years (two before the event and three after the event) resulting in 1,968 distinct employers of which 820 experience the change. The estimates are obtained by plotting the coefficients on the treatment by time-to-event interaction terms obtained from a difference-in-differences model controlling for calendar year-of-event effects and weighted by the number of employer separators. Year $t - 2$ is the omitted time category. The associated 95-percent confidence intervals (bars) are based on standard errors clustered at the employer level.

Figure 7: Employer-level correlates of employer effects on claims and appeals

(a) Correlates of employer effects on claims

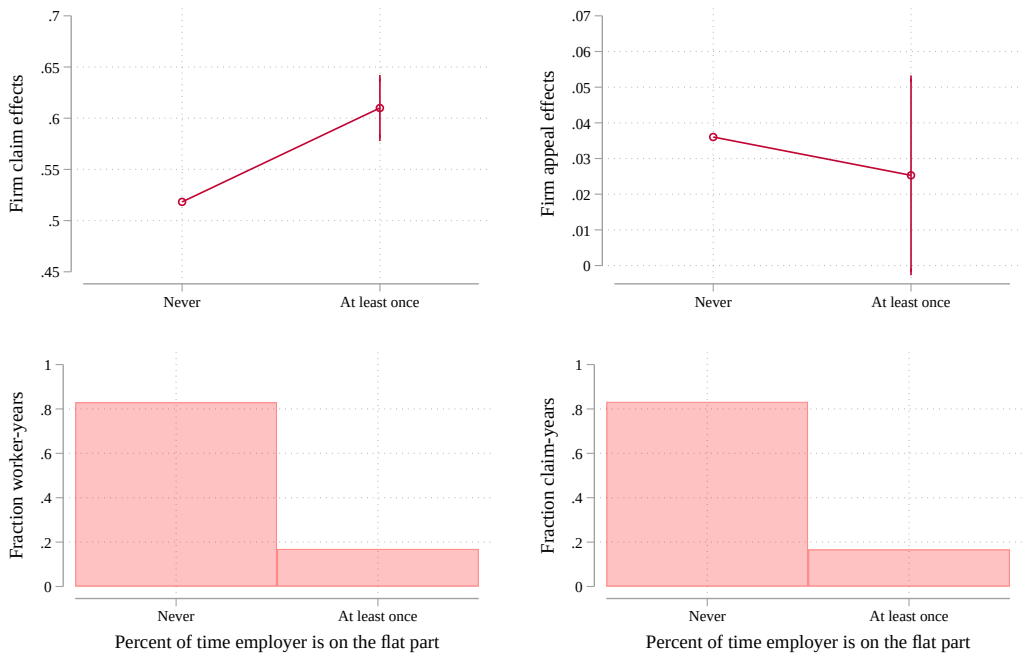


(b) Correlates of employer effects on appeals



Notes: The top panel shows coefficients (dots) and associated 95-percent confidence intervals (CI) (bars) from separate univariate regressions of estimated employer effect on claims on various correlates. Each correlate has been transformed into a z-score, allowing the coefficients to be interpreted as changes in the outcome resulting from one standard deviation change in the correlate. The bottom panel shows the corresponding coefficients and confidence intervals from univariate regressions of employer appeal effects on correlates. The horizontal range bars are CIs based on KSS-corrected standard errors ($\times$-markers) or based on CIs clustered by employer or, in the case on sector union membership rate, by sector (the $|$-markers). The employer separation rate is computed using the separation defined in Table 1, column 3. Unionization is calculated as a sector average using Washington State full-time workers in the 2005-2013 CPS Monthly Outgoing Rotation Groups.

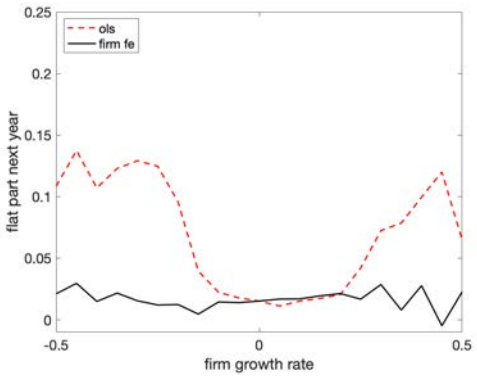
Figure 8: Linking experience rating to average employer claim and appeal effects



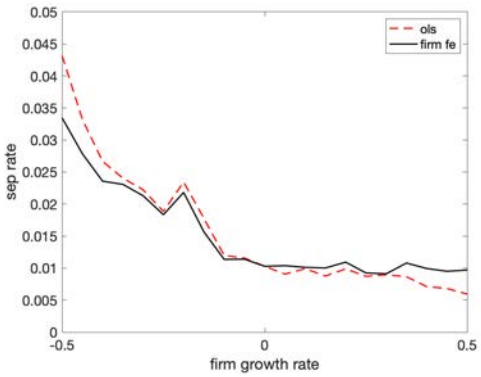
Notes: The top two panels shows coefficients (circles) and associated 95-percent confidence intervals (CI) (bars) from separate univariate regressions of estimated employer effects on an indicator for whether the employer is ever observed on the flat part of the benefit ratio formula as opposed to never observed on the flat part. The coefficients have been scaled to sample averages. The CIs are based on KSS-corrected standard errors. The bottom two panels show the fraction of observations ever or never observed on the flat part.

Figure 9: Employer growth rate and UI outcomes

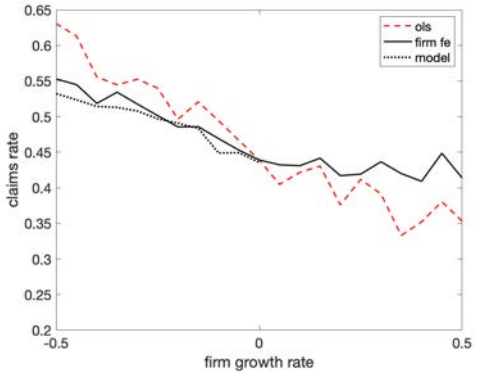
(a) Employer on flat part next year



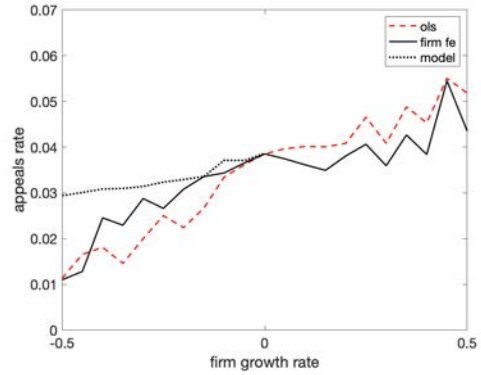
(b) Separation rate



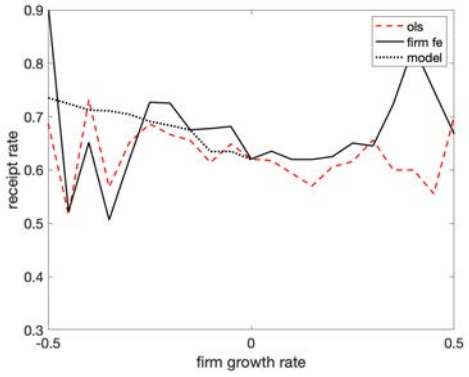
(c) UI claim rate



(d) Appeal rate



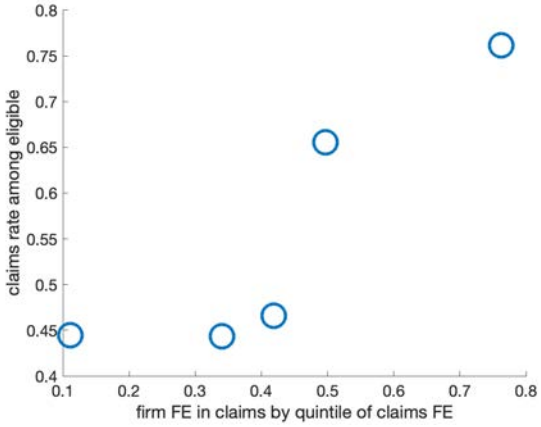
(e) Receipt rate (conditional on appeal)



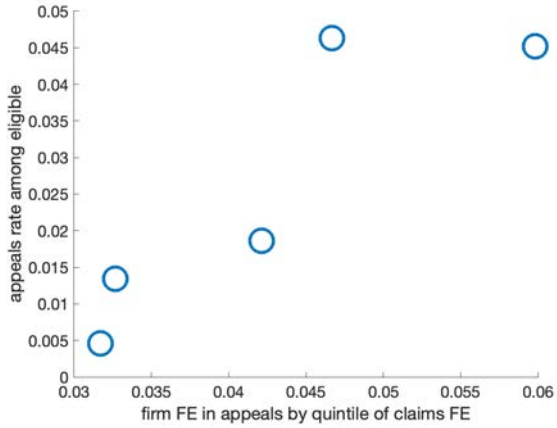
Notes: The outcome "employer on flat part next year" is the probability that the employer is observed on the flat part the experience rating schedule in the following year. The analysis sample consists of separations in Table 1, column 4. The employer growth rate is defined as the difference in total annual employer hours and is grouped using forty 5 percentage-point bins. Each panel plots the coefficients resulting from a regression of the variable listed on the vertical axis against the growth-rate bin dummies. The dashed lines (OLS) show coefficients without controlling for employer effects. The solid lines show coefficients from a regression controlling for employer effects. The dotted lines show numerical results from the theoretical framework. See Table A1 for the regression coefficients.

Figure 10: Validation of employer effects and wage gradients

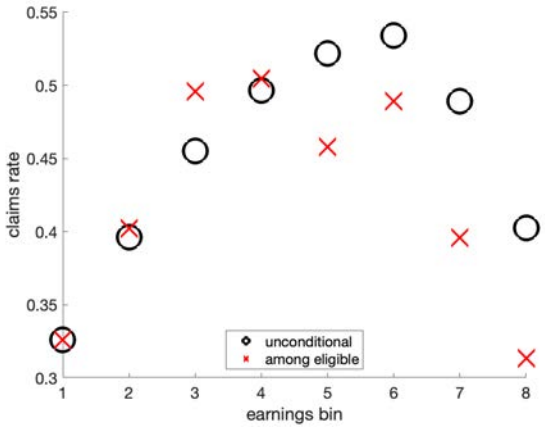
(a) Validation of employer effects on claiming



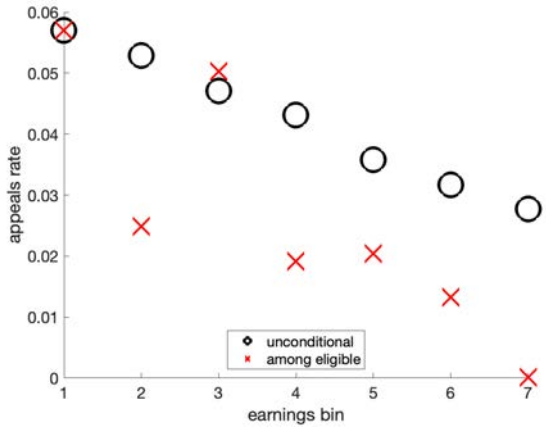
(b) Validation of employer effects on appeals



(c) Validation of the claiming/wage gradient



(d) Validation of the appeal/wage gradient



Notes: Panel (a) shows a positive relationship between estimated employer effects on claiming and claim rates among monetarily and separation eligible workers. Panel (b) shows a positive relationship of estimated employer appeal effects against appeal rates among monetarily and separation eligible workers. The monetarily and separation eligible workers are derived from the model in section 5).

Panel (c) compares the claim rates of monetarily and separation eligible workers (derived from the model) and monetarily-eligible separators (based on the sample summarized in Figure 2, panel (a) and Table 1, column 4). Panel (d) compares the appeal rates of monetarily and separation eligible claimants (derived from the model) and monetarily eligible claimants (based on the sample summarized in Figure 2, panel (c) and and Table 1, column 1). In panels (c) and (d), the left-most points are normalized to be equal. The number of points in panels (c) and (d) are chosen to maximize the number of points where the model provides non-negative estimates of the claim and appeal rate.

Online Appendix

A Other results

Table A1: UI outcomes and employer growth rate

Outcome variable	Pr(Flat part in $t+1$)		Pr(Separation)			Pr(Claimed UI)			Pr(Claim appealed)			Pr(Receipt | Appeal)	
Model	OLS	Firm FE	OLS	Firm FE	Worker & Firm FE	OLS	Firm FE	Worker & Firm FE	OLS	Firm FE	Worker & Firm FE	OLS	Firm FE
5 p.p. firm-growth bins*													
-0.5	0.109	0.031	0.043	0.033	0.054	0.631	0.550	0.555	0.011	0.011	0.016	0.688	0.880
-0.45	0.137	0.039	0.033	0.027	0.030	0.613	0.542	0.540	0.017	0.013	0.036	0.516	0.494
-0.4	0.107	0.024	0.027	0.023	0.030	0.556	0.516	0.565	0.018	0.025	0.017	0.732	0.624
-0.35	0.123	0.031	0.024	0.023	0.025	0.545	0.532	0.521	0.015	0.023	-0.009	0.568	0.479
-0.3	0.129	0.025	0.022	0.021	0.022	0.553	0.515	0.537	0.020	0.029	0.055	0.652	0.592
-0.25	0.125	0.021	0.019	0.018	0.019	0.540	0.499	0.554	0.025	0.027	0.014	0.687	0.699
-0.2	0.096	0.022	0.023	0.021	0.021	0.497	0.483	0.530	0.022	0.031	0.011	0.667	0.697
-0.15	0.040	0.014	0.018	0.015	0.017	0.521	0.483	0.527	0.027	0.034	0.020	0.655	0.647
-0.1	0.022	0.024	0.012	0.011	0.011	0.494	0.466	0.492	0.033	0.035	0.031	0.614	0.650
-0.05	0.018	0.023	0.012	0.011	0.011	0.467	0.450	0.454	0.036	0.037	0.031	0.649	0.654
0 (-4.99% to 0%)	0.015	0.025	0.010	0.010	0.010	0.439	0.436	0.456	0.039	0.039	0.032	0.621	0.593
Observations	244,697	244,697	488,703	488,703	55,838	488,703	488,703	55,838	218,534	218,534	13,097	7,738	7,738

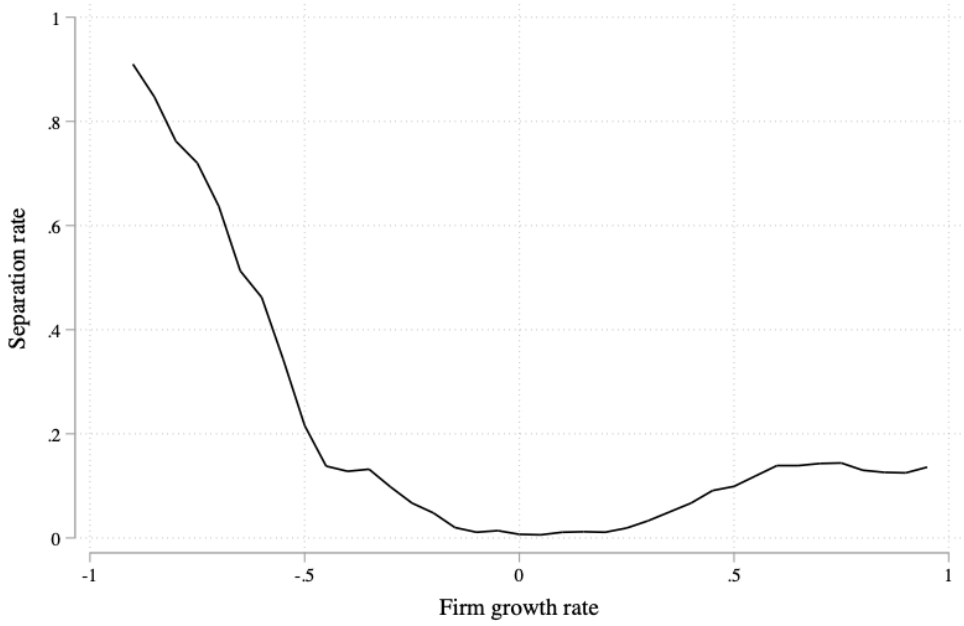
Notes: The analysis sample is based on column Table 1, column 4. The outcome Pr(Flat part in $t+1$) is defined as the probability that the firm is on the flat part of the experience-rating schedule next year. To compute the separation rate, we use firm size in the denominator. Each outcome variable is regressed on 40 dummies indicating 5 percentage-point quarter-to-quarter changes in firm growth, defined as percentage change in total annual hours at the firm. For each outcome variable, the first column presents estimates obtained without controlling for firm fixed effects (OLS). The second column presents estimates (scaled by the sample average) obtained after controlling for firm fixed effects (Firm FE). For all outcomes (other than Pr(flat part in $t+1$) and Pr(Receipt | Appeal) for which there is not enough variation) the table also shows estimates controlling for firm and worker effects (Worker & Firm FE), scaled by the sample average. The table only presents coefficients from -50 percent to 0 percent growth.

Table A2: Moments used to estimate the model

Moment	Value	Source
Sep_0	0.012	Figure 9
Sep_{-15}	0.026	Figure 9
$Claim_0$	0.419	Figure 9
$Claim_{-15}$	0.514	Figure 9
$Pr(appeal)_0$	0.051	Figure 9
$Pr(appeal)_{-15}$	0.034	Figure 9
$Pr(rec)_0$	0.619	Figure 9
$Pr(rec)_{-15}$	0.702	Figure 9
$Pr(Ineligible\|claim)$	0.127	BAM

Notes: The values used to estimate the model are based on coefficients reported in Table A1; see estimates for -0.15 and 0 growth rates. Because the constant in the fixed effect regressions is not identified, we renormalize the values so that in the fixed effect regression the values match OLS estimates at 0.

Figure A1: Quarter-to-quarter separation rate as a function of employer-growth rate, any separation



Notes: The line shows the quarter-to-quarter separation rate based on work hours with primary employer. The numerator is the number of separations defined as observations where a worker has a different primary employer in quarter $t+1$ than in t or has no hours in $t+1$. The denominator is the total number of observations with positive hours in t. employer growth rate is defined as the year-to-year change in total employer hours. The sample includes all worker-quarter observations of primary employment in the Washington administrative wage records, 2001–2014.

B Shrinking employer-level rates

First, we define notation. Let there be N_j separators from employer j and C_j workers who claim UI (here, C_j is a level, whereas elsewhere it is a rate). Then a natural estimate of the claim rate is $\hat{c}_j = \frac{C_j}{N_j}$. This estimate will be over-dispersed. We assume that the true claim rate follows a beta distribution: $c \sim \mathcal{B}(\alpha, \beta)$. Then, the probability of the observed data given c follows a binomial distribution (i.e, $Pr(C_j|c, N_j) = \binom{N_j}{C_j} c^{C_j}(1-c)^{N_j - C_j}$). Because we are ultimately interested in making statements about the labor market as perceived by workers, we weight observations by the number of separators, $\omega_j = \frac{N_j}{\sum_j N_j}$. Letting $\theta = \{\alpha, \beta\}$ denote our parameter vector, and $\mathcal{O}$ denote the matrix of data (the j^{th} row is (N_j, C_j)), we are interested in the following maximization problem:

$$\begin{aligned} \max_{\theta} \mathbb{P}\{\mathcal{O}|\theta\} &= \max_{\theta} \Pi_j \omega_j \mathbb{P}\{\mathcal{O}_j|\theta\} \\ &= \max_{\theta} \Pi_j \omega_j \bigg(\int_{c=0}^{1} \mathbb{P}\{\mathcal{O}_j|c\} \times \mathbb{P}\{c|\theta\} dc \bigg), \end{aligned} \tag{A1}$$

where $\mathbb{P}\{c|\theta\}$ is the probability density function (PDF) of the beta distribution and $\mathbb{P}\{\mathcal{O}_j|c\}$ is the probability mass function (PMF) of the binomial distribution. Casting the problem in this way takes small samples into account: even if a employer has a true claim rate that is in the interior of the support, say, 0.2, there is some probability (given by the binomial probability mass function) that we instead observe a claim rate of 0 or 1. More generally, the binomial PMF captures the over-dispersion that we expect given that we do not observe infinite samples for each employer. We numerically maximize this expression.[44]

This maximization problem gives us estimates of the beta distribution parameters $\hat{\theta} = \{\hat{\alpha}, \hat{\beta}\}$. We then use these parameters to compute the posterior mean of the employer-level claim rate, which takes into account the sample size:

$$\hat{c}_j^{EB} = \frac{C_j + \hat{\alpha}}{N_j + \hat{\alpha} + \hat{\beta}}, \tag{A2}$$

where the super-script indicates empirical Bayes.

Table A3 shows the parameter estimates. The variance of a beta distribution is given by $\frac{\alpha\beta}{(\alpha+\beta)^2(\alpha+\beta+1)}$. Thus, the implied variance of the employer claiming rates is 0.0361, which is larger than what we estimate for the employer effects (in Table 4), of 0.022. The implied variance of the appeal rates is 0.0006 which is slightly smaller than what we estimate for the employer effects on appeals (in Table 4), of 0.0008.

[44] We approximate the integral with 99 points, which in Monte Carlo experiments was sufficient for stability.

Table A3: Distribution of shrunken and raw employer-level UI claim rates, appeal rates, and receipt rates

Variable	Mean	Variance	Worker-quarters	Estimate of α	Estimate of β
Firm UI claim rate	0.458	0.099	841,530		
Shrunk firm UI claim rate	0.460	0.045	841,530	2.572	3.257
Firm appeal rate	0.039	0.014	732,133		
Shrunk firm appeal rate	0.042	0.000	732,133	3.489	72.186
Firm-level receipt rate, cond. on appeal	0.583	0.161	266,272		
Corrected firm-level receipt rate, cond. on appeal	0.620	0.004	266,272	7.464	4.373

Notes: The correction applies the posterior estimates based a two-parameter (α,β) beta distribution fitted by maximum likelihood.

C Elasticities in Anderson and Meyer (2000)

Table 4 of reports the mean of monthly claims in Washington State from 1972-1984 of 0.0304. The quarterly separation issue denials/quarterly claims in the same period and state is 0.0521.

We use these levels to convert the estimates in Table 5 and Table 6 of implied elasticities of claims with respect to separation issue denials, which is the closest conceptually to a measure of claims with respect to appeals (Table 5 compares to all other states and DC; table 6 compares to Oregon and Idaho). Each of these tables has 3 columns corresponding to no controls, state times log US unemployment rate, and state times log state unemployment rate.

	(1)	(2)	(3)
Table 5 (50 states, DC)	-0.277	-0.279	-0.183
Table 6 (Oregon and Idaho)	-0.149	-0.237	-0.128
Controls	None	State $\times$ ln(US UR)	State $\times$ ln (state UR)

D Omitted proofs

Result 1

Proof. For a worker with eligibility status e, the employer payoff function is:

$$-p_{e,j}r_e\tau - p_{e,j}(1-r_e)\times 0 - (1-p_{e,j})\tau - \eta_j p_{e,j}^{\zeta}. \tag{A3}$$

Taking the first order condition with respect to $p_{e,j}$ we get:

$$(1-r_e)\tau = \eta_j\zeta p_{e,j}^{\zeta-1} \tag{A4}$$

$$\frac{(1-r_e)\tau}{\eta_j\zeta} = p_{e,j}^{\zeta-1} \tag{A5}$$

$$\left(\frac{(1-r_e)\tau}{\eta_j\zeta}\right)^{\frac{1}{\zeta-1}} = p_{e,j}^{*}. \tag{A6}$$

The restriction that $\zeta > 1$ ensures that the second order condition holds. □

Result 2

Proof. A worker of eligibility type e who draws χ and separates from a employer of type j has the following payoff from applying:

$$p_{e,j}^{*}r_e u(b) + p_{e,j}^{*}(1-r_e)u(d) + (1-p_{e,j}^{*})u(b) - \chi. \tag{A7}$$

The first term captures the event that the worker claims, the employer appeals, and the worker ends up collecting. The second term captures the event of the employer appealing and the worker not collecting. The third term captures the employer not appealing. The final term records the cost to the worker of applying.

The payoff from not applying is $u(d)$. Therefore, the cutoff type for applying for eligibility type e at employer j is given by:

$$p_{e,j}^{*}r_e u(b) + p_{e,j}^{*}(1-r_e)u(d) + (1-p_{e,j}^{*})u(b) - \chi_{e,j}^{*} = u(d) \tag{A8}$$

$$(1-(1-r_e)p_{e,j}^{*})(u(b)-u(d)) = \chi_{e,j}^{*}. \tag{A9}$$

□

Result 3

Consider an employer's decision to layoff workers. Because δ share of workers separate in the absence of an employer level shock, if a employer enters the period with $E_{j,-1}$ workers, then it has only $(1-\delta)E_{j,-1}$ to decide whether or not to lay a worker off. The expected cost of laying off an eligible worker is:

$$C_{1,j}\tau[p_{1,j}^{*}r_1 + (1-p_{1,j}^{*})] = C_{1,j}\tau[1-(1-r_1)p_{1,j}^{*}]. \tag{A10}$$

This equation says: there is some probability $C_{1,j}$ that an eligible worker applies, the worker collects either if the employer appeals and the worker collects anyway, or if the employer does not appeal, and finally the employer pays τ if the worker applies and collects. Hence, the shadow cost of the marginal worker is not w, but is instead $w - C_{1,j}\tau[p^*_{1,j}r_1 + (1 - p^*_{1,j})]$ because by retaining the worker the employer does not pay the implicit firing cost.

Hence, there are three regions of optimal decisions.

If z_j is such that

$$\left(\frac{\alpha z_j}{w}\right)^{\frac{1}{1-\alpha}} > (1-\delta)E_{j,t-1}$$

then the employer hires and $E^*_{j,t} = \left(\frac{\alpha z_j}{w}\right)^{\frac{1}{1-\alpha}}$.

If z_j is such that

$$\left(\frac{\alpha z_j}{w - C_{1,j}\tau[p^*_{1,j}r_1 + (1-p^*_{1,j})]}\right)^{\frac{1}{1-\alpha}} > (1-\delta)E_{j,t-1} > \left(\frac{\alpha z_j}{w}\right)^{\frac{1}{1-\alpha}}$$

then the employer neither hires nor fires and $E^*_{j,t} = (1-\delta)E_{j,t-1}$.

If z_j is such that

$$(1-\delta)E_{j,t-1} > \left(\frac{\alpha z_j}{w - C_{1,j}\tau[p^*_{1,j}r_1 + (1-p^*_{1,j})]}\right)^{\frac{1}{1-\alpha}} > \left(\frac{\alpha z_j}{w}\right)^{\frac{1}{1-\alpha}}$$

then the employer lays workers off and $E^*_{j,t} = \left(\frac{\alpha z_j}{w - C_{1,j}\tau[p^*_{1,j}r_1 + (1-p^*_{1,j})]}\right)^{\frac{1}{1-\alpha}}$.

Define the layoff rate

$$l(z_t, \eta_j) = \max\{1 + \delta - \frac{E(z_t, \eta_j)}{E_{j,-i}}, 0\}.$$

This says that the employer only lays workers off if it wants to contract by more than δ percent.

Result 4

Part 1. For the first part:

$$p^*_{e,j} = \left(\frac{(1-r_e)\tau}{\eta_j \zeta}\right)^{\frac{1}{\zeta-1}} \tag{A11}$$

$$\frac{\partial p^*_{e,j}}{\partial \tau}\frac{\tau}{p^*_{e,j}} = \frac{1}{\zeta - 1} > 0. \tag{A12}$$

Part 2. For the second part:

$$\chi^*_{e,j} = (1 - (1 - r_e)p^*_{e,j})(u(b) - u(d)) \tag{A13}$$

$$\frac{\partial \chi^*_{e,j}}{\partial \tau} = -(1 - r_e)(u(b) - u(d))\frac{\partial p^*_{e,j}}{\partial \tau} < 0, \tag{A14}$$

since $(1 - r_e)(u(b) - u(d)) > 0$ and $\frac{\partial p^*_{e,j}}{\partial \tau} > 0$.

Since $C_{e,j} = \mathcal{P}_e(\chi^*_{e,j})$, decreasing the cutoff type that applies decreases the application rate.

Part 3. For the third part:

$$\frac{\partial C_{1,j}\tau[1 - p^*_{1,j}(1 - r_1)]}{\partial \tau} = \underbrace{C_{1,j}[1 - p^*_{1,j}(1 - r_1)]}_{>0} + \underbrace{\frac{C_{1,j}}{\partial \tau}\tau[1 - p^*_{1,j}(1 - r_1)]}_{<0} + \underbrace{C_{1,j}\tau[1 - \frac{\partial p^*_{1,j}}{\partial \tau}(1 - r_1)]}_{<0}. \tag{A15}$$

In elasticities:

$$\frac{\partial C_{1,j}\tau[1 - p^*_{1,j}(1 - r_1)]}{\partial \tau}\frac{\tau}{C_{1,j}\tau[1 - p^*_{1,j}(1 - r_1)]} = \underbrace{1}_{>0} + \underbrace{\frac{\partial C_{1,j}}{\partial \tau}\frac{\tau}{C_{1,j}}}_{<0} + \underbrace{\frac{\partial [1 - p^*_{1,j}(1 - r_1)]}{\partial \tau}\frac{\tau}{[1 - p^*_{1,j}(1 - r_1)]}}_{<0}. \tag{A16}$$

The first term is the direct effect, and the second and third terms are the indirect effects (the application rate, and the probability of receiving UI conditional on applying and being eligible). There is nothing in the theory that restricts the magnitudes of the indirect effects and thus the overall sign is ambiguous.

E Details on estimating the model

E.1 Employer-averaged parameters for eligible workers

At employer growth rate $g = 0$ the claim rate can be expressed as a simple weighted average of the claim rate of eligible workers (C_1) and of ineligible workers (C_0), weighted by $\sigma = \Pr(e = 1)$, the share of eligible workers. At $g < 0$, we assume that all separators are eligible and so the claim rate can be expressed as a weighted average of claim rates of the "excess" separators (all eligible) at point g and of the remaining share of ineligible separators. Specifically:

$$cl_0 = \sigma C_1 + (1-\sigma)C_0 \tag{A17}$$

$$cl_g = \frac{sep_g - sep_0}{sep_g} C_1 + \frac{sep_0}{sep_g} cl_0. \tag{A18}$$

This gives rise to one equation in one unknown. Hence:

$$C_1 = \frac{sep_g}{sep_g - sep_0} \left(cl_g - \frac{sep_0}{sep_g} cl_0 \right). \tag{A19}$$

Similarly, for the probability of appeal at 0 and at g gives rise to one equation in one unknown:

$$pa_0 = p_0 \frac{(1-\sigma)C_0}{(1-\sigma)C_0 + \sigma C_1} + p_1 \frac{\sigma C_1}{(1-\sigma)C_0 + \sigma C_1} \tag{A20}$$

$$pa_0 = p_0 \frac{(1-\sigma)C_0}{cl_0} + p_1 \frac{\sigma C_1}{cl_0} \tag{A21}$$

$$pa_g = pa_0 \frac{sep_0 cl_0}{sep_g cl_g} + \frac{sep_g cl_g - sep_0 cl_0}{sep_g cl_g} p_1 \tag{A22}$$

$$p_1 = (pa_g - pa_0 \frac{sep_0 cl_0}{sep_g cl_g}) \frac{sep_g cl_g}{sep_g cl_g - sep_0 cl_0}. \tag{A23}$$

Finally, for the probability of receiving UI conditional on applying and facing an appeal:

$$rec_0 = \frac{p_0(1-\sigma)C_0}{p_0(1-\sigma)C_0 + p_1 \sigma C_1} r_0 + r_1 \frac{p_1 \sigma C_1}{p_0(1-\sigma)C_0 + p_1 \sigma C_1} \tag{A24}$$

$$rec_g = \frac{sep_0 cl_0 pa_0}{sep_g cl_g pa_g} rec_0 + \frac{sep_g cl_g pa_g - sep_0 cl_0 pa_0}{sep_g cl_g pa_g} r_1 \tag{A25}$$

$$r_1 = \frac{sep_g cl_g pa_g}{sep_g cl_g pa_g - sep_0 cl_0 pa_0} (rec_g - \frac{sep_0 cl_0 pa_0}{sep_g cl_g pa_g} rec_0). \tag{A26}$$

E.2 Employer-averaged parameters for the ineligible

To compute the parameters related to the ineligible population, we use the additional moment from the BAM data that the share of ineligible workers among dollars paid out is 12.7 percent, which we assume refers to employers with zero growth rate, $g = 0$. We further assume that the dollars paid out to the eligible and ineligible are identical.

The mass of ineligible workers who collect is given by:

$$(1-\sigma)C_0 p_0 r_0 + (1-\sigma)C_0(1-p_0) = (1-\sigma)C_0(1-(p_0(1-r_0))). \tag{A27}$$

The first term says that a worker applies, faces an appeal, and collects. The second terms says that a worker applies and does not face an appeal (and so collects). Analogous expressions apply to the eligible. Hence, the share of ineligible workers among those who collect UI is given by:

$$inelig_0 = \frac{(1-\sigma)C_0(1-(p_0(1-r_0)))}{(1-\sigma)C_0(1-(p_0(1-r_0))) + \sigma C_1(1-p_1+p_1 r_1)}. \tag{A28}$$

We now have four equations ((A17), (A20), (A24), and (A28)) in four unknowns (σ, C_0, p_0 and r_0). We first rearrange (A17), (A20), and (A24):

$$C_0 = \frac{cl_0 - \sigma C_1}{1-\sigma} \tag{A29}$$

$$p_0 = \frac{pa_0 - p_1 \frac{\sigma C_1}{(1-\sigma)C_0+\sigma C_1}}{\frac{(1-\sigma)C_0}{(1-\sigma)C_0+\sigma C_1}} = \frac{pa_0((1-\sigma)C_0+\sigma C_1) - p_1\sigma C_1}{(1-\sigma)C_0} \tag{A30}$$

$$r_0 = \frac{rec_0 - r_1 \frac{p_1\sigma C_1}{p_0(1-\sigma)C_0+p_1\sigma C_1}}{\frac{p_0(1-\sigma)C_0}{p_0(1-\sigma)C_0+p_1\sigma C_1}} = \frac{rec_0(p_0(1-\sigma)C_0+p_1\sigma C_1) - r_1 p_1\sigma C_1}{p_0(1-\sigma)C_0}. \tag{A31}$$

We combine equation (A30) and (A31) to write:

$$p_0(1-r_0) = \frac{pa_0((1-\sigma)C_0+\sigma C_1) - p_1\sigma C_1}{(1-\sigma)C_0}\left(1 - \frac{rec_0(p_0(1-\sigma)C_0+p_1\sigma C_1) - r_1 p_1\sigma C_1}{p_0(1-\sigma)C_0}\right) \tag{A32}$$

$$= \frac{pa_0((1-\sigma)C_0+\sigma C_1) - p_1\sigma C_1}{(1-\sigma)C_0}\left(\frac{(1-rec_0)p_0(1-\sigma)C_0 - (rec_0-r_1)p_1\sigma C_1}{p_0(1-\sigma)C_0}\right) \tag{A33}$$

$$= \frac{pa_0((1-\sigma)C_0+\sigma C_1) - p_1\sigma C_1}{(1-\sigma)C_0}\left(\frac{(1-rec_0)(1-\sigma)C_0 - (rec_0-r_1)\frac{p_1(1-\sigma)C_0}{pa_0((1-\sigma)C_0+\sigma C_1)-p_1\sigma C_1}\sigma C_1}{(1-\sigma)C_0}\right) \tag{A34}$$

$$= \frac{pa_0((1-\sigma)C_0+\sigma C_1) - p_1\sigma C_1}{(1-\sigma)C_0}\left(\frac{(1-rec_0) - (rec_0-r_1)\frac{p_1}{pa_0((1-\sigma)C_0+\sigma C_1)-p_1\sigma C_1}\sigma C_1}{1}\right). \tag{A35}$$

Now we substitute in for (A29):

$$p_0(1-r_0) = \frac{pa_0cl_0 - p_1\sigma C_1}{cl_0 - \sigma C_1}\left(\frac{(1-rec_0) - (rec_0 - r_1)\frac{p_1}{pa_0cl_0 - p_1\sigma C_1}\sigma C_1}{1}\right) \tag{A36}$$

$$= \frac{(1-rec_0)(pa_0cl_0 - p_1\sigma C_1) - (rec_0 - r_1)p_1\sigma C_1}{cl_0 - \sigma C_1} \tag{A37}$$

$$= \frac{(1-rec_0)pa_0cl_0 - (1-r_1)p_1\sigma C_1}{cl_0 - \sigma C_1} \tag{A38}$$

$$1 - p_0(1-r_0) = \frac{cl_0 - \sigma C_1 - (1-rec_0)pa_0cl_0 + (1-r_1)p_1\sigma C_1}{cl_0 - \sigma C_1}. \tag{A39}$$

Now substitute (A29) and (A39) into equation (A28) to have:

$$inelig_0 = \frac{cl_0 - \sigma C_1 - (1-rec_0)pa_0cl_0 + (1-r_1)p_1\sigma C_1}{cl_0 - \sigma C_1 - (1-rec_0)pa_0cl_0 + (1-r_1)p_1\sigma C_1 + \sigma C_1(1-p_1+p_1r_1)} \tag{A40}$$

$$= \frac{cl_0 - \sigma C_1 - (1-rec_0)pa_0cl_0 + (1-r_1)p_1\sigma C_1}{cl_0 - (1-rec_0)pa_0cl_0}. \tag{A41}$$

Now we simplify to solve for σ in closed form:

$$inelig_0\left(cl_0 - (1-rec_0)pa_0cl_0\right) = cl_0 - \sigma C_1 - (1-rec_0)pa_0cl_0 + (1-r_1)p_1\sigma C_1 \tag{A42}$$

$$\frac{(1-inelig_0)\left(cl_0 - (1-rec_0)pa_0cl_0\right)}{C_1(1-(1-r_1)p_1)} = \sigma. \tag{A43}$$

Given σ, we solve for $\{C_0, p_0, r_0\}$ using equations (A29)-(A31).

E.3 Elasticity of appeals with respect to experience rating

Suppose employer j has weight $\omega_{j,1}$ among eligible applicants, then:

$$p_1^* = \sum_j \omega_{1,j}\left(\frac{(1-r_1)\tau}{\eta_j\zeta}\right)^{\frac{1}{\zeta-1}}$$

$$= \left(\frac{(1-r_1)\tau}{\zeta}\right)^{\frac{1}{\zeta-1}}\sum_j \omega_{1,j}\left(\frac{1}{\eta_j}\right)^{\frac{1}{\zeta-1}}. \tag{A44}$$

Suppose employer j has weight $\omega_{j,0}j$ among ineligible applicants. Then for p_0:

$$p_0^* = \left(\frac{(1-r_0)\tau}{\zeta}\right)^{\frac{1}{\zeta-1}}\sum_j \omega_{0,j}\left(\frac{1}{\eta_j}\right)^{\frac{1}{\zeta-1}}. \tag{A45}$$

Note that $r_1 > r_0 \implies p_1 < p_0$. An eligible worker ($e = 1$) is more experience-rated than an ineligible worker ($e = 0$).

Finally, dividing the two p^*s and rearranging leads to,

$$\frac{\hat{p}_1}{\hat{p}_0} = \left(\frac{1-r_1}{1-r_0}\right)^{\frac{1}{\zeta-1}} \frac{\sum_j \omega_{j,1}\left(\frac{1}{\eta_j}\right)^{\frac{1}{\zeta-1}}}{\sum_j \omega_{0,j}\left(\frac{1}{\eta_j}\right)^{\frac{1}{\zeta-1}}} \tag{A46}$$

$$\frac{1}{\zeta-1} = \frac{\ln {}^{p_1}/_{p_0} - \ln\left(\frac{\sum_j \omega_{1,j}\left(\frac{1}{\eta_j}\right)^{\frac{1}{\zeta-1}}}{\sum_j \omega_{0,j}\left(\frac{1}{\eta_j}\right)^{\frac{1}{\zeta-1}}}\right)}{\ln {}^{1-r_1}/_{1-r_0}} \tag{A47}$$

$$\frac{1}{\zeta-1} \approx \frac{\ln {}^{p_1}/_{p_0}}{\ln {}^{1-r_1}/_{1-r_0}}, \tag{A48}$$

where this approximation is exact if $\sum_j \omega_{1,j}\left(\frac{1}{\eta_j}\right)^{\frac{1}{\zeta-1}} = \sum_j \omega_{0,1}\left(\frac{1}{\eta_j}\right)^{\frac{1}{\zeta-1}}$, which is true if the share of eligible and ineligible separators is the same at all employers ($\omega_{1,j} = \omega_{0,j}$). Thus, given $\{\hat{p}_1, \hat{p}_0, \hat{r}_1, \hat{r}_0\}$ we can get an estimate of ${}^{1}/_{\zeta-1}$.

E.4 Model fit

We fit the model using two points of employer growth: employer growth around 0, and a negative growth rate, $g = -0.15$. To assess the fit of the model, we ask how the model fits the data at growth rates that we did not use. To do so, we take as given the separation rates by employer growth rate, and then compute the resulting model predictions for the UI claim rate, appeal rate, and receipt rate.

$$cl_g = \frac{sep_g - sep_0}{sep_g} C_1 + \frac{sep_0}{sep_g}(\sigma C_1 + (1-\sigma)C_0). \tag{A49}$$

$$pa_g = pa_0 \frac{sep_0 cl_0}{sep_g cl_g} + \frac{sep_g cl_g - sep_0 cl_0}{sep_g cl_g} p_1. \tag{A50}$$

Finally, for the probability of receiving UI conditional on claiming and facing an appeal:

$$rec_g = \frac{sep_0 cl_0 pa_0}{sep_g cl_g pa_g} rec_0 + \frac{sep_g cl_g pa_g - sep_0 cl_0 pa_0}{sep_g cl_g pa_g} r_1. \tag{A51}$$

E.5 Details on counterfactuals

For a 10 percent decrease in experience rating, we use our estimates of ζ to compute the employer-specific changes in appeal probabilities.

We can write:

$$p_e^* = \sum_j \omega_{e,j} \left(\frac{(1-r_1)\tau}{\eta_j \zeta} \right)^{\frac{1}{\zeta-1}} = \left(\frac{(1-r_1)\tau}{\zeta} \right)^{\frac{1}{\zeta-1}} \sum_j \omega_{e,j} \left(\frac{1}{\eta_j} \right)^{\frac{1}{\zeta-1}}$$
$$= \tau^{\frac{1}{\zeta-1}} \left(\frac{(1-r_1)}{\zeta} \right)^{\frac{1}{\zeta-1}} \sum_j \omega_{e,j} \left(\frac{1}{\eta_j} \right)^{\frac{1}{\zeta-1}}. \tag{A52}$$

Then we replace τ with 0.9τ to solve for the counterfactual p_e^*.

To compute the change in application rates implied by the change in appeal probability, we use the cross-sectional elasticity of application rates to appeals.

F The role of employer claim rate in determining the benefit ratio

The model in section 4 predicts that there are two sources of variation in the benefit ratio facing an employer: the layoff rate and the claim rate, which in the model is a function of the appeal rate.

Result A1. *The benefit ratio at employer j is:*

$$br_j = b\frac{\frac{l(z_t,\eta_j)+\delta\sigma}{l(z_t,\eta_j)+\delta}C_{1,j}[p^*_{1,j}r_1 + (1-p^*_{1,j}] + \frac{\delta(1-\sigma)}{l(z_t,\eta_j)+\delta}C_{0,j}[p^*_{0,j}r_0 + (1-p^*_{0,j}]}{w},$$

where $l(z_t,\eta_j) \equiv abs\left(\max\{\delta+1-\frac{E(z_t,\eta_j)}{E_{j,-i}},0\}\right)$ is employer j's layoff rate. Hence, the employer's benefit ratio is increasing in the employer layoff rate and decreasing in the employer's probability of appeal.

Below, we show that variation in the employer take-up rate is as important in determining the employer's benefit ratio as the employer separation rate, where the latter has been typically viewed as the employer's decision variable when researchers have analyzed UI financing reforms.

Benefit ratio formula used by Washington State can be written as:

$$\text{Benefit ratio in year } t = \frac{\text{Sum of benefits charged over last four years}}{\text{Sum of taxable wages over last four years}}, \tag{A53}$$

where "taxable wages" is the base to which the tax rate is applied. We expand the right-hand side of equation for the benefit ratio of a employer j as follows:

$$\begin{aligned}\text{Benefit ratio} &= \frac{\text{Benefits charged}}{\text{Number of employees}} \Big/ \frac{\text{Taxable wages}}{\text{Number of employees}} \\ &= \underbrace{\frac{\text{Number of separators}}{\text{Number of employees}}}_{\text{separation rate}} \times \underbrace{\Pr(\text{claiming}|\text{separating})}_{\text{claim rate}} \\ &\times \underbrace{\underbrace{\Pr(\text{receiving}|\text{claiming})}_{\text{beneficiary rate}} \times \underbrace{\frac{\text{Mean benefit paid}}{\frac{\text{Taxable wages}}{\text{Number of employees}}}}_{\text{replacement rate}}}_{\text{realized replacement rate}}.\end{aligned} \tag{A54}$$

That is, we write the benefit ratio as the product of the separation rate, the claim rate, and the realized replacement rate. In practice, we first compute averages number of separators, take-up rate, beneficiary rate, and mean benefits paid in the last four years. We then divide the terms by the average number of an employer's employees in the last four years. We compute these benefit ratios for each employer observed in 2009.

Upon seeing equation (A54), a typical inclination would be to take logs and report a linear variance decomposition. In this context, however, this step is unappealing because the benefit ratio in levels — not logs — is the object of interest. Instead, we apply the following "nonlinear" decomposition. We compute "simulated" benefit ratios by in turn replacing the separation rate, the claim rate, and the realized replacement rate by their sample averages (as well as combinations of each of these three terms) and then recomputing

the variance of the benefit ratio. We then compute the variance of the observed benefit ratio as well as the variance of these "simulated" benefit ratios. By dividing the simulated variance by the observed variance, we obtain an estimate of the contribution of each term.

As an example, define the "claim-rate constant" benefit ratio as $\text{BR}(\overline{\text{claims}})$ and the true benefit ratio as BR. Then, $1 - \frac{\text{var}(\text{BR}(\overline{\text{claims}}))}{\text{var}(\text{BR})}$, represents the share of the variance explained by the claim rate. This calculation quantifies what share of the variance of the benefit ratio each component explains.

Table A4 shows the shares explained for all three individual terms and their combinations. Because this decomposition is nonlinear, the components do not sum to one. The results show that the claim rate explains slightly more of the variance in the benefit ratio than the separation rate (86 percent vs. 84 percent). Second, when combined with the realized replacement rate, the claim rate explains more of the variance than the separation rate.

Therefore, a key finding is that the claim rate is at least as important as the separation rate in explaining the variation in the benefit ratio across employers. This stands in contrast to most of the literature on experience rating, which typically assumes that the only decision variable of the employer is the separation rate (Brechling, 1981; Topel, 1983; Topel, 1984; and Ratner, 2013).[45] Our results highlight that the variation in take-up across employers is a quantitatively important margin determining the benefit ratio, and as a result, the experience-rated tax rate.

[45] Auray, Fuller, and Lkhagvasuren (2019) and Auray and Fuller (2020) are exceptions.

Table A4: Decomposition of the benefit ratio

Variance of benefit ratio	1.000
Variance components of benefit ratio explained by variation in:	
Separation rate	0.844
Claim rate	0.860
Realized replacement rate	0.622
Separation rate and claim rate	0.987
Sep. rate and realized replacement rate	0.885
Claim rate and realized replacement rate	0.973
Number of firms	5,327

Notes: A firm's benefit ratio is computed as the product of the four-year averages of the separation rates, claims rates, and realized replacement rates (as described in the text) for year 2009 (hence, values are based on four prior years' values 2005–2008). Each rates' share of variance is computed by replacing the firm's observed rate by the sample average. Therefore, each number in the table shows the share of the variance in the benefit ratio that would be reduced if the rate corresponding to a given bar was made equal across all firms.