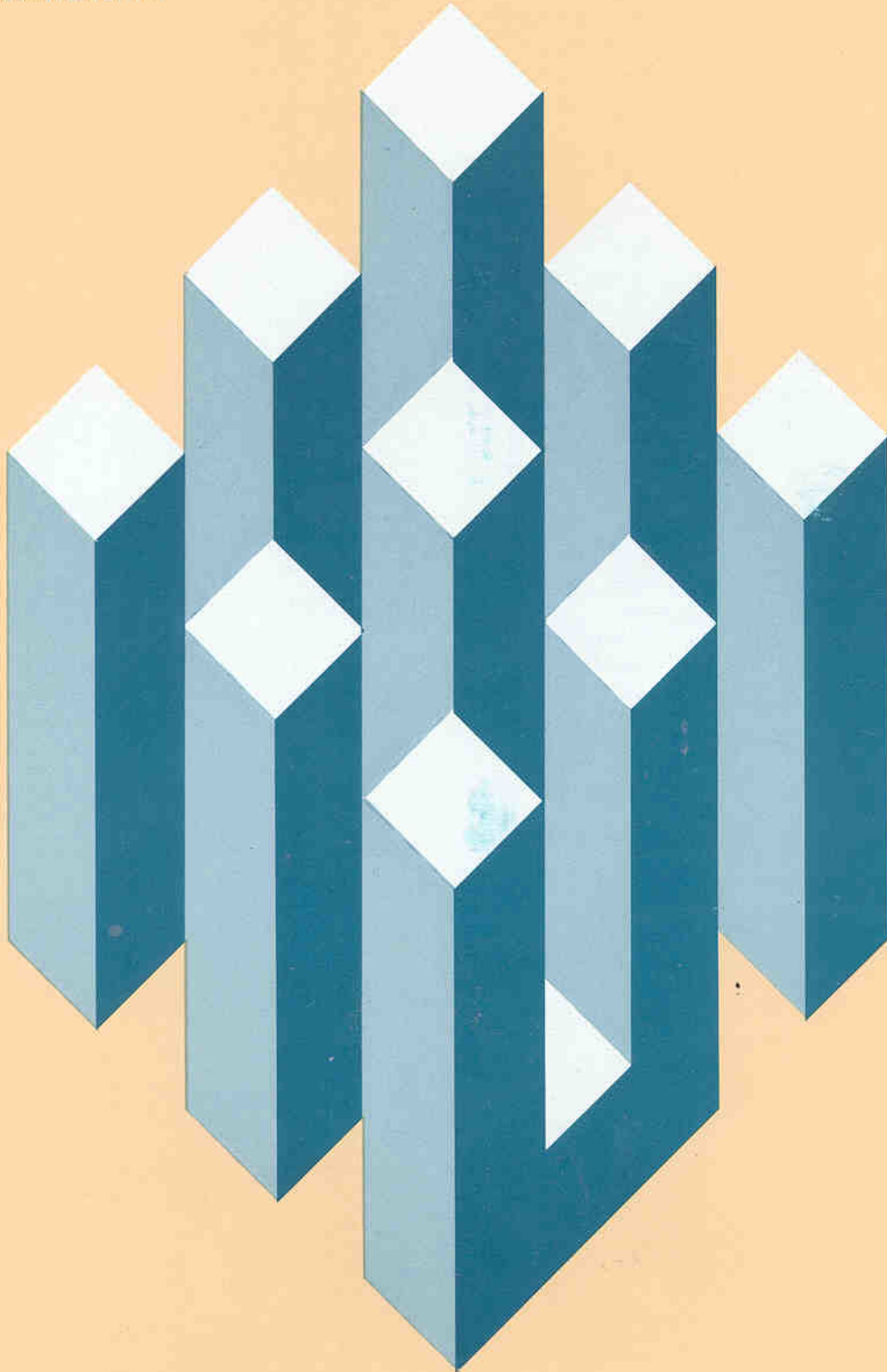


Unemployment Insurance and Employer Layoffs



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U.S. Department of Labor
Employment and Training Administration
Unemployment Insurance Service



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Robert B. Reich, Secretary

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**Unemployment Insurance
and Employer Layoffs**

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- The administrative convenience of using a lag quarter entails a "cost" in the form of a subsidy for employers who make early layoffs of new workers. This subsidy tends to destabilize rather than stabilize employment. Thus, policymakers have to decide whether to reduce this "free" layoff subsidy by charging the last employer for its layoffs, subject to some minimum employment period.
- There never before has been any estimate of the quantitative importance of the free layoffs we identify. We estimate that 11 percent of firms with layoffs made only free layoffs. Further, 27 percent of all layoffs during the 4-5 quarter period were free to the layoff firm.
- The use of free layoffs varies substantially among different types of firms, from only 13 percent of all layoffs by the largest firms to 39 percent of all layoffs by construction firms.
- Our empirical estimates show that UI "activity" is distributed much differently than employment among different types of firms. For example, one of every two UI paid layoffs and three of every five free layoffs were made by maximum-tax firms, even though they employed fewer than one of every five workers in Illinois.
- Our estimates show that construction firms account for 29 percent of all UI layoffs, 42 percent of the free layoffs and 20 percent of the total weeks of UI benefits paid, even though construction firms account for only 7 percent of all UI reported employment. In sharp contrast, retail trade accounts for less than one-tenth of total and free layoffs and only one-ninth of total weeks of benefits paid, compared to nearly one-fourth of total employment.

EXECUTIVE SUMMARY

The major contribution of this study is to construct and analyze what is, to our knowledge, the first data set with detailed information for matched firm-worker records. Extraordinary efforts of the Illinois Department of Employment Security were required to search millions of firm and worker records to create this unique data set. The resulting data allow us to analyze several important issues, particularly several aspects of firm layoff behavior, never before investigated. Given the complexity and variety of issues in the study, we highlight only selected findings below.

- The data set contains 84,000 matched firm-worker records for 611 Illinois UI covered employers as of 1987. After sample weights are applied, these firms are representative of the Illinois population from which they were drawn in terms of tax rate, industry and firm size.
- There is substantial variability in the tax rates of the individual firms in the same industry and same firm-size categories. Clearly, the mean or median tax rate for any particular category conceals substantial variability in the tax rates of firms in that category.
- Seventeen percent of all firms are at the maximum tax rate. But the percentage of firms at the maximum tax rate varies from only 7 percent of the finance/insurance/real estate firms to 37 percent of those in construction and 35 percent of those in transportation/communication/public utilities.

- Thirty-eight percent of all firms are at the minimum tax rate, but this percentage varies from only 1 percent of the largest firms to 51 percent of the smallest firms and 68 percent of finance/insurance/real estate firms.
- One striking difference in the tax distributions for employment and firms is that only 13 percent of all employment but 38 percent of all firms are in the lowest tax rate category. Two particularly large differences in these percentages in the lowest tax category are for construction (only 3% of employment but 20% of firms) and finance/insurance/real estate (only 13% of employment but 68% of firms).
- Very large differences in the percentages of employment and firms at the maximum tax rate are found in construction (64% of employment but only 37% of firms) and transportation/communications/public utilities (16% of employment but 35% of firms).
- Several types of firm layoff measures never before analyzed are defined. We define a firm-worker "window" for each employee on the 1987 employment roster of each sample firm by identifying the calendar quarter during 1987 when each employee initially appears on the employment roster of any sample firm. Then, any UI-reported layoffs for that individual during that quarter and the following four calendar quarters are identified, and we determine whether each layoff is due to the firm on the firm-worker record. In this way, we construct UI-reported separation and layoff measures for each firm, based on individualized 4-5 quarter windows for each sampled employee. This captures seasonal influences and defines layoff risks over an approximately equal 4-5 quarter period for every employee.

- The propensity of firms to make any UI layoffs during the period varies substantially around the mean of 32 percent for all firms, from only 15-17 percent of the smallest firms and minimum-tax firms to 62 percent of manufacturing firms and 95 percent of the largest employers.
- The overall UI layoff rate is defined as the total UI layoffs a group of firms made over the period divided by the total 1987 employment for that group of firms. This overall firm layoff rate is an estimated 7 percent, but it varies substantially for different types of firms.
- The total UI paid layoff rates for firms in the seven major industry groups vary from as little as 2 percent for retail trade firms and 3 percent for finance/insurance/real estate firms to as much as 29 percent for construction firms.
- The total UI layoff rate varies from 2-3 percent for firms in the three lowest tax categories up to 20 percent for firms in the maximum tax category.
- The "new" layoff subsidy we ~~emphasize~~ results from the way states charge employers for the UI benefits a worker receives during a "benefit year." The employer charging provisions used by over 40 states typically assign layoff costs to an employer depending on the "base-period" wages paid by the firm to the worker during the first four of the last five completed calendar quarters prior to the benefit year. This means that an implicit layoff subsidy is created by using the lag quarter in most states, since employers who lay off workers during the first two calendar quarters after a worker's hire date do not receive layoff charges as a base-period employer of such workers.

- The early layoff subsidy created by the use of the lag quarter tends to destabilize employment by increasing layoff probabilities for workers during their first few months with a new firm. (Interestingly, the lag quarter and the incentives created by its use do not apply to Illinois employers because of a law change that became effective July 1, 1989, but they still do apply to most other U.S. employers.)
- There never before has been any estimate of the quantitative importance of the "early" layoffs that occur before layoff firms incur any layoff liability. Our estimates show that free layoffs frequently are used and that their use varies substantially among different types of firms. For example, the percentage of layoff firms that made only free layoffs varies from only 1 percent of the layoff firms in the two largest firm-size categories up to 30 percent of the layoff firms in the minimum-tax category.
- Viewed differently, our estimates reveal that 27 percent of all (UI chargeable) layoffs for a 4-5 quarter period were free layoffs to the firms initiating the layoffs. But this percentage of layoffs that are free varies from only 13 percent for the largest firms to 39 percent for construction firms. In short, the overall magnitude of this early layoff subsidy and its substantially different use by different types of firms clearly establishes that this previously unrecognized UI subsidy is an important one that requires further analysis.
- The obvious policy question raised by our free-layoff findings is whether states need to reconsider base-period definitions that include a lag quarter. The administrative convenience of using a lag quarter entails a "cost." This cost is that the UI subsidy provided by the lag quarter creates an incentive for employers to make early layoffs of new workers. That is, this subsidy tends to destabilize rather than stabilize employment. Thus, policymakers have to weigh the effects of this free layoff subsidy against the

administrative convenience of the lag quarter. The obvious way to reduce this early layoff subsidy is to charge the last employer for its layoffs, subject to some minimum employment period.

- Our empirical estimates show that UI "activity" is distributed much differently than employment among different types of firms. For example, we find that one out of every two UI paid layoffs and three of every five free layoffs during the 4-5 quarter period were made by maximum-tax firms, even though they employed fewer than one of every five workers in Illinois.
- We also find that particular types of firms account for much different shares of UI activity and employment. For example, construction accounts for 29 percent of total layoffs, 42 percent of the free layoffs and 20 percent of the total weeks of UI benefits paid, even though construction firms account for only 7 percent of all UI reported employment. In sharp contrast, retail trade accounts for less than one-tenth of total and free layoffs and only one-ninth of total weeks of benefits paid, compared to nearly one-fourth of total employment.
- The above findings and others in the report clearly establish the importance of obtaining the type of matched firm-worker data we analyze. Given the structure of state UI files, obtaining such data requires innovative programming. But our analysis indicates that many labor market issues, including the effects of the UI program on employment and unemployment, cannot be fully investigated or understood without such data. Thus, we hope the States and the U.S. Department of Labor will cooperate in developing these important new data sets.

I. INTRODUCTION AND SELECTED HIGHLIGHTS

The Unemployment insurance (UI) system finances benefits to unemployed workers by taxing employer payrolls in all states and employee earnings in a few states. Benefit payments to unemployed workers reduce their costs of unemployment, and these UI incentives on employment, unemployment and reemployment have been analyzed extensively. The UI financing mechanism also affects firm hire and layoff decisions. Some of these impacts also have been extensively analyzed, particularly including the effects of firm experience rating on both temporary and total layoff unemployment. However, a major limitation of prior analyses of firm behavior is their reliance on either data for individual workers or aggregated data for state-industry categories.

The major contribution of this study is to construct and analyze what is, to our knowledge, the first micro data set with detailed information for matched firm-worker records. This allows us to examine several important issues about firm behavior never before analyzed, and to confront several issues that have not arisen in past research. Given the complexity and variety of issues analyzed in the study, we do not attempt to summarize the entire study. We instead highlight selected findings to overview the study.

Constructing the Data Set: "Matched" Firm-Worker Records

Our unique data set is based on a systematic sample that contains 611 UI covered employers as of 1987 in the state of Illinois. After sample weights are applied, these firms are representative of the Illinois population from which they were drawn in terms of tax rate, industry and firm size. Our primary interest is in the layoff behavior of these firms, so a subset of the individual workers employed by these firms was identified for our analysis. These sampling procedures reduced the number of "matched" firm-worker records from about 1.5 million to a more manageable number of 84,000. The Illinois Department of Employment Security then used a complex computerized

search process to identify all UI reported layoff activity for these workers during our analysis period. Because we obtain results for only a sample of the entire population of these matched firm-worker records, we use appropriate sample weights to allow our sample results to correctly reflect population values.

Defining Layoff Measures for Individual Firm-Worker Data

Our unique data set makes it possible to define several types of firm layoff measures never before analyzed. To capture possible seasonal variation in layoff rates, we define a firm-worker "window" for each employee on the 1987 employment roster of each sample firm. This window begins in the calendar quarter of 1987 when the employee first appears on the employment roster of any sample firm, and it includes that quarter and the four subsequent ones. Any UI reported layoff for the individual during this period is found, and we determine whether the layoff employer for each layoff is one of the sample firms. In this way, we construct UI-reported separation and layoff measures for each firm, based on individualized 4-5 quarter firm-worker windows for each sampled employee. This approach captures seasonal influences and defines layoff risks over an approximately equal 4-5 quarter period for every employee.

Two perspectives on firm layoff behavior during the layoff window are: firm "layoff incidence" or "layoff propensity," defined as the proportion of a given set of firms to make at least one layoff during our 4-5 quarter layoff window; and firm "layoff rates," defined as total layoffs during the 4-5 quarter layoff window as a proportion of the total number of workers employed during 1987. Additional layoff measures can be calculated. These include: layoff rates for workers experiencing multiple separations; the average duration per UI paid layoff; the total UI

layoff weeks per employed worker and whether the first UI paid layoffs for particular workers were "free" or chargeable to the layoff firm.

A New UI Subsidy for Firm Layoffs

The implicit assumption in most prior work is that the "last" employer is charged for layoffs it initiates. In fact, state rules do not charge the layoff firm for its layoffs in many instances, and this creates a subsidy that has not been recognized in prior research because firm data have not been analyzed. Also notice that State procedures for allocating the layoff charges to specific employers for "chargeable" layoffs is a separate issue from the general experience rating and noncharging issues investigated in prior studies.

The employer charging provisions used by most states assign layoff costs to an employer depending on the "base-period" wages paid by the firm to the worker prior to layoff. A worker's base period typically is defined as the first four of the last five completed calendar quarters prior to the start of the worker's "benefit year." This definition, including a "lag quarter" between the base period and the benefit year, was used by Illinois and approximately 43 other states during 1987. An implicit layoff subsidy is created by this use of the lag quarter since employers who lay off workers during their first two calendar quarters with the firm do not receive layoff charges as a base-period employer of such workers. In effect, this UI subsidy makes "early" layoffs of new workers free to the layoff firm, and this tends to increase both temporary and permanent layoff probabilities for workers during their first few months with a new firm. Thus, this UI subsidy actually tends to destabilize rather than stabilize employment, and it reinforces other incentives firms (and employees) already have to quickly determine whether workers are likely to be good candidates for continued employment. (Interestingly, the lag quarter and the incentives created by

its use do not apply to Illinois employers because of a law change that became effective July 1, 1989, but they still do apply to most other U.S. employers.)

Empirical UI Tax Distributions for Matched Firm-Worker Records

An important feature of the matched firm-worker data analyzed in this paper is that the actual tax distribution across both firms and workers can be viewed. The firm distribution is the relevant one for the layoff decisions of individual employers, but the employment distribution more closely approximates the tax distributions prior studies have attempted to proxy with state-industry assignment procedures. We find substantial variability in the tax rates of individual firms in the same industry and same firm-size categories. For example, 17 percent of all firms are at the maximum tax rate, but this percentage varies from only 7 percent of finance/insurance/real estate firms to 37 percent of construction firms. Interestingly, most firms in the "high-tax" construction industry still are at rates below the maximum, and 20 percent of the firms in this industry actually are at the minimum tax rate.

We also calculate tax distributions for employment and compare them with those for firms. The most striking difference revealed by these comparisons is that only 13 percent of all employment but 38 percent of all firms are in the minimum tax category. Two particularly large differences in these percentages of employment and firms at the minimum tax rate are for construction (3% of employment but 20% of firms) and finance/insurance/real estate (13% of employment but 68% of firms). At the maximum tax rate, very large differences in the percentages of employment and firms are found in construction (64% of employment but 37% of firms).

Three main conclusions may be drawn from the above comparisons and others we report. First, the firm and employment tax distributions are quite different. Second, the mean or median

tax rate for any particular category conceals substantial variability in the tax rate for the firms or employees in that category. Third, the commonly used assumption in past work that the mean or median tax rate for a state-industry category applies to all firms in an industry (and that there is more variability among industries than among the firms within an industry) is strongly contrary to these firm specific data. In short, a host of aggregation issues and many untested (and extremely strong) assumptions are required in studies that use worker data sets to analyze firm behavior, and such studies are likely to result in erroneous conclusions about firm behavior.

Empirical Results: General Layoff Measures

Various layoff measures are defined and estimated for the population of all firms. This section focuses on selected layoff highlights.

Firm Layoff Proportions. Just under one-third of all firms placed at least one employee on a UI paid layoff during the 4-5 quarter period analyzed, but the layoff propensity of different types of firms varies substantially. For example, only 15 percent of minimum-tax firms, 17 percent of the smallest firms and 21 percent of retail trade firms made any layoffs. In contrast, nearly half of the firms in the two highest tax categories, 62 percent of manufacturing firms and 95 percent of the firms with over 1,000 workers made at least one layoff during the period. A perhaps surprising finding is that, despite their reputation as extremely high turnover firms, the percentage of construction firms making any layoffs during the period analyzed (32%) is the same as the percentage for all firms in the population and only about half that for manufacturing firms.

Firm Layoff Rates. The total UI layoff rate, defined as workers on UI paid layoffs during the 4-5 quarter period divided by total 1987 employment, is 7 percent for the population of employers during this period, but this rate varies substantially for different types of firms. For

example, total UI paid layoff rates for firms by industry vary from 2 percent for retail trade firms to as much as 29 percent for construction firms. As another example, the total UI layoff rate rises from 2-3 percent for firms in the three lowest tax categories to 20 percent for firms in the maximum tax category. This latter finding is particularly striking for two reasons. First, this rate is four times the layoff rate for firms in any other tax category. Second, over one-half of all maximum-tax firms made no layoffs during this period. Yet UI paid layoffs for the entire set of maximum-tax firms still amounted to one-fifth of the workers employed by all maximum-tax firms.

Average Duration of Firm Layoffs. The average duration of all UI layoffs during the 4-5 quarter period analyzed is 10.5 weeks, but there is considerable variability for different types of firms. These layoff durations range from 7.6 weeks for construction firms to about 17 weeks for minimum-tax firms, the smallest firms and finance/insurance/real estate firms.

Average Layoff Weeks Per Employee. Another way to measure layoff "risk" for a group of workers is to calculate the average weeks on layoff per person employed during 1987. This risk is a relatively low 0.69 weeks for the "average" employee of all firms in the population. However, this overall unemployment risk is much higher for the average construction worker (2.19 weeks of unemployment per employee) than for other occupational categories. The other category with a much higher than average unemployment risk is maximum-tax firms (1.87 weeks). At the other extreme, the smallest overall risk estimated is 0.07 weeks of unemployment per employee in firms that employ between 11 and 50 workers.

Empirical Results: Free vs. Charged Layoffs

Our data allow us to determine whether the free layoffs (those that result in no current charge to the layoff employer) resulting from the lag quarter are quantitatively important. We do

this by using the "first-paid" layoffs of any worker (rather than total layoffs for the worker) to determine whether these first layoffs involve any charge to the layoff firm.

Proportion of Layoff Firms with Only Free Layoffs. The percentage of layoff firms making only free layoffs varies substantially among different types of firms, from only 1 percent of the largest firms to 30 percent of minimum-tax firms. These results illustrate that the lag quarter creates substantial disparity in whether particular types of firms are charged for any of the layoffs they make.

Free vs. Charged Layoffs. We find that 73 percent of the (first UI) layoffs that firms make entail any (direct) charge to the layoff employer. In other words, 27 percent of all (first) UI layoffs are "completely" subsidized for the layoff firm. Although the importance of these free layoffs has not been recognized in prior studies, these results strongly suggest that such layoffs are quantitatively important.

Viewing the variability of free layoffs among different types of firms, the percentage of all layoffs that are free is lowest for the largest firms (13%) and the finance/insurance/real estate industrial group (15%). At the other extreme, the percentage of all layoffs that are free to the layoff firm is as high as 38 percent for the next-to-largest firms (251-1,000 employees) and 39 percent for construction firms. In other words, nearly two out of every 5 layoffs made by these latter firms entail no charge to the layoff employer. This variation in the use of free layoffs among different types of firms shows that the free layoff subsidy created by using the lag quarter creates important (implicit) cross-subsidies among firms that have not been analyzed in prior studies.

Summary Measures of UI Layoff Activity

We use the distribution of total employees as a "benchmark" in comparing the distributions of total layoffs, free layoffs and total weeks of UI benefits paid. If all employees were subject to exactly the same layoff risk there would be no differences between these UI "activity" distributions and the employment distribution.

All of the UI activity distributions differ markedly from the distribution of total employment for firms with the same characteristics. These distributions reveal that, although only 18 percent of all employment is accounted for by maximum tax firms, these firms account for 52 percent of total UI paid layoffs, 60 percent of free layoffs, and 45 percent of total UI weeks paid. That is, one out of every two UI paid layoffs and three out of every five free layoffs during the period were made by maximum-tax firms, even though they employed fewer than one of every five workers in Illinois.

The industry results also reveal some substantial differences between the employment and layoff distributions for different industries. In particular, these results show that construction firms account for a much larger share of UI layoffs and benefits paid than of employment, whereas the opposite is the case for retail trade and services. For example, construction firms account for 29 percent of total layoffs, 42 percent of the free layoffs and 20 percent of the total weeks of UI benefits paid, even though they account for only 7 percent of all UI reported employment. In sharp contrast, retail trade accounts for only 7-9 percent of total and free layoffs, and 11 percent of total weeks of UI benefits paid, compared to its 23 percent share of employment.

II. POTENTIAL DATA SOURCES FOR TESTING UI LAYOFF INCENTIVES

The theoretical foundations for analyzing UI effects on firm decisions are developed in Baily (1977), Feldstein (1976) and Brechling (1977). The Baily and Feldstein implicit contract models show that temporary layoffs and recalls are features of optimal contracts that account for the UI tax subsidy to workers on layoff. Brechling views temporary layoffs within a profit maximizing model in which UI tax parameters affect optimal firm layoff rates. Burdett and Hool (1983) integrate the Baily and Feldstein models by allowing changes to affect either worker utility or firm profits, with bargaining used to determine an infinite number of optimal contracts. The dynamic relationships involved in UI tax rates and layoffs are more explicitly developed in two 1984 papers. Haltiwanger (1984) provides a dynamic basis for distinguishing between temporary and permanent layoffs, while Wolcowitz (1984) develops a model that explicitly incorporates the dynamics between UI tax rates and temporary layoffs.

Ideal information for analyzing UI incentive effects would include longitudinal data on employment, hours, earnings, layoffs and rehires of individual firms and workers. Unfortunately, the data previously available for analyzing these issues is far short of this ideal. Given data limitations, the more complex theoretical refinements noted above are not incorporated in empirical studies. In fact, substantial effort is required to either modify available data sets or construct new ones to obtain empirical proxies of fairly simple theoretical constructs. The main data sets previously used in empirical studies are briefly summarized below.

CPS Data for Individual Workers

The most common approach to estimating UI effects on firm layoff decisions is to utilize CPS data for individual workers (Feldstein 1978, Saffer 1983, Topel 1983, Topel 1984a, Topel

1984b, and Topel 1985). But at least three problems arise in using CPS data to analyze firm layoff behavior. First, UI status and entitlements are unknown in CPS data, so these studies use state UI parameters and individual worker earnings to estimate UI eligibility status and benefit amounts for individual workers. Obviously, such an assignment procedure introduces errors in both UI status and benefit amounts for individual workers. We are aware of no estimates of the extent of these errors or their effects on prior analyses.

The second problem with CPS data is that tax rates and individual firm UI tax subsidies, such as those defined by Feldstein (1976 and 1978), are unknown because there is no firm-specific information on the prior employers of CPS sample members. Accordingly, CPS studies use aggregate state averages to assign assumed UI tax rates and subsidies for the firms assumed to have employed the individual workers observed. Thus, these studies rely on UI tax variations among state-industry categories, not the actual tax variation among individual firms. Obviously, extremely strong assumptions are involved in estimating values for the relevant UI parameters for either individual workers or individual firms in CPS data. Whether these assumptions have created any spurious results is not tested in existing literature because of the lack of firm-level data.

A third problem in using CPS data to analyze the layoff decisions of firms is that a random sample of individual workers is not based on the correct population, which is firms rather than workers. In attempting to analyze firm layoff behavior, the random samples of individual workers included in CPS data create an inherent selectivity bias for the types of firms "attached" to the unemployed workers included in these samples. In particular, larger and higher turnover firms are more likely represented than smaller and lower turnover firms by the unemployed workers included in such samples. This occurs because the probability that any particular firm "appears" in CPS data

(attached to an unemployed worker) depends on the number of workers laid off by that firm. Clearly, larger and higher turnover firms are more likely to make layoffs than smaller and lower turnover firms. Consequently, larger and higher turnover firms are relatively overrepresented in CPS unemployment data, compared to smaller and lower turnover firms. We are aware of no analysis of this selectivity bias, but the above considerations suggest it may be quite severe.

Aggregate State Data

A second approach in the literature is to rely on aggregate data for several states to estimate the effects on firm behavior of variations in UI features across states (Brechling 1980, Brechling 1981, Halpin 1979, Saffer 1980, Saffer 1982, and Brown 1986). Some main features of experience rating that vary across states include: minimum and maximum tax rates; the slope of the tax schedule between the minimum and maximum rates; which particular tax schedule applies out of the array of schedules relevant in most states in any year; and the lag between increased layoffs and increased tax collections. Variations in these experience rating features, as well as variations in UI benefit levels and replacement rates for workers, provide leverage to estimate the importance of UI (firm) incentives in explaining unemployment or layoffs in these studies. Many aggregation issues obviously arise in attempting to deduce firm-specific effects from such aggregate analyses. Whether aggregation impacts produce spurious results cannot be determined in these analyses because firm-level data are not analyzed.

Longitudinal Worker (CWBH) Data

A third approach is to use Continuous Wage and Benefit History (CWBH) data to analyze firm decisions. The CWBH is the only (major) longitudinal data base routinely produced for the UI system, but it is available for only a few states. The CWBH tapes include data on the (UI-

covered) earnings and (UI-compensated) unemployment for random samples of individual workers in the participating states. In addition, these individual worker records include information on the tax rate and number of persons on the quarterly payrolls of the employing firms. Thus, worker records can be used to generate a time series of observations for firms that appear in the sample through time. The advantage this data set is that it includes longitudinal data for individual worker observations and some (limited) information on the individual employers of these workers. Anderson's (1990) analysis of UI taxes as a linear adjustment cost for firms is an example of using CWBH data to examine firm behavior. These data also can be used to analyze UI layoff rates for individual workers, but CWBH data provide information only on UI covered workers.

An inherent difficulty in utilizing CWBH data to analyze firm behavior, including temporary layoff decisions, is similar to the third problem noted above for CPS data--a random sample of workers does not reflect the correct population of firms. Moreover, the inherent selection bias for the types of firms observed in the data is magnified through time because larger employers and those that continue in business for longer periods are more likely to appear in the sample (attached to individual worker records) quarter after quarter than are smaller employers and those that discontinue operations.¹ Thus, taking advantage of the longitudinal strength of CWBH data to analyze firm issues that involve dynamic behavior necessarily confronts a substantial selectivity problem. Unfortunately, there apparently is no "master file" of the potential universe of UI employers represented by the firms that appear in the CWBH sample.

Individual Firm Data

A fourth data source is firm data on employment, layoff and rehire activity that can be developed from UI administrative records. Unfortunately, no state currently has such data in a

readily accessible format because it involves merging data from both worker and firm data bases, which apparently are separately maintained in all states. For analyzing UI incentive effects on firm employment and layoff patterns, such data obviously are preferable to the three data sources discussed above. But substantial programming complexity is involved in extracting the required data, and we know of no other study that analyzes such data. To our knowledge, this unique data set for Illinois is the only comprehensive set of matched firm-worker data ever constructed from a large, systematic sample of UI administrative records. We describe these data in detail below.

III. DATA ANALYZED

Our unique data set is based on a sample of individual firms, rather than individual workers or aggregate state data. Before describing the specific features of the data set, two of its limitations should be noted. First, the data are for only one state for one specific time period—UI covered employers who filed 1987 UI wage reports with the state of Illinois. Other states may have substantially different UI systems, and 1987 was a period of relatively low unemployment. Thus, it is not possible to analyze the importance of variation in UI parameters among states, or the importance of cyclical patterns. Second, the data set includes only reporting, UI-covered, experience rated employers.² The restriction to UI-covered employers probably is a very minor one because nearly all employment satisfied the UI coverage definition by 1987.³ Apart from some minor exclusions, most (for profit) nonagricultural employment is included because coverage for most employers was defined as one employee with either 20 weeks of work during the year or with wages totalling \$1,500 in any calendar quarter. However, the UI tax provisions themselves do provide an incentive for employers to conceal their identities and to underreport covered employees,

as documented by Burgess and St. Louis (1990) in an analysis of the same data utilized in this paper. There are no reliable estimates of the extent to which employers who meet the UI coverage definition do not reveal their identity for UI reporting purposes, and these nonreporting employers are not included in these data.⁴ Despite these limitations, the unique data set described below is a remarkably rich one for analyzing firm behavior.

Sampling Procedures

The details of the sampling plan used to select the firms in this data set are contained in the Appendix. Briefly, samples were drawn from three separate files of Illinois employers for the 1987 tax year.⁵ The main sample was selected from the file of "regularly" reporting (insured) employers as of the third calendar quarter of 1987, and this main employer file was sorted by industry, 1987 tax rate and number of employees reported by the firm for the third quarter of 1987. Then, a systematic sample of firms was selected, with the sample probability proportional (up to a probability of 1.0) to the number of employees reported by each firm for the third quarter of 1987. As a result of the sampling procedure, large firms are overrepresented and small firms are underrepresented in the sample. However, each firm has a weight that we use in the analysis to reflect its appropriate weight in the population (given by the inverse of its sample weight). Because the employer file was sorted by tax rate, industry and firm size prior to sampling, the firms selected are, after applying appropriate weights, representative of the Illinois population from which they were drawn.

For this study, we begin with the firms for which complete information is available. Because the interest in this study is firm layoff behavior, it is necessary to match individual employee records to each firm through a complex, computerized search procedure.⁶ Accordingly,

it was important to narrow the search space, and this was done through random sampling to reduce both the number of firms and the number of employees included in the search.⁷ First, the number of firms was reduced from 876 to 611 by sampling the (relatively large number of) firms with 1987.3 employment of 100 to 1,999 workers. Second, all employees of firms with fewer than 60 workers during 1987.3 were included in the search process, and relatively large random samples of the employees of firms with 60 or more employees during 1987.3 were included. These sampling procedures reduced the number of matched firm-worker records for the final search process from about 1.5 million to 84,000. For this final sample of matched firm-worker records, a computerized search was used to identify the frequency, duration, last employer and chargeable employers for any UI-reported layoffs for a period of approximately two years, beginning in 1987.

Sample Characteristics

The procedure discussed above and described in detail in the Appendix for narrowing the search space for individual firm-worker records resulted in a total of 611 firms and 84,000 firm-worker records to be searched for UI activity for our analysis. Some characteristics of the 611 firms are reported in Appendix Table 4. These sample characteristics are of limited interest because the sample must be weighted to accurately reflect the population of interest. Yet a few striking facts about this sample may be noted because of their implications for this or other studies. First, mean annual earnings reported for the workers employed by these firms are relatively low. For example, mean annual earnings per worker were below \$5,000 for about 23 percent of these firms and below \$10,000 for about 46 percent of these sample firms. In contrast, only about 15 percent of the sample firms had a workforce with mean earnings of \$25,000 or more.⁸ Second, mean base-period wages—the annual earnings from all firms during the base period, which are used by

unemployed workers to qualify for benefits—are less than half as much for workers on layoff as for all workers employed by these firms during 1987 (\$6,185 vs. \$14,158).⁹ Third, the mean size difference between firms that made any layoffs and the sample as a whole are of some interest in light of the firm-size selectivity bias discussed above for CPS and CWBH studies that are based on samples of individual workers rather than firms. Appendix Table 4 reveals that sample firms with at least one layoff employed many more workers than the average sample firm (1,507 vs. 997 workers), and firms with at least one repeat layoff for the same worker during a one-year period employ even more workers (2,270). For our study, these size differences imply that the raw sample data are of little interest because the sample weights vary directly with firm size. Thus, appropriate sample weights are used to correctly estimate population values for all text tables in the paper.

IV. BACKGROUND ON UI TAX PROVISIONS

Employers in all states are subject to a payroll tax that funds UI benefit payments to unemployed workers. A portion of the potential tax in each state is fixed, regardless of the firm's past layoff history, and the remainder is related to that layoff history. The latter portion of the tax is "experience rated" in the sense that higher firm layoff rates (or higher total UI benefit payments to the firm's employees) result in higher tax rates on the firm's future employment. Thus, increased UI-compensable layoffs (or benefit payments) typically translate into increased tax rates, at least between the minimum and maximum rates on the tax schedule. But many firms do not bear the full costs of their layoffs. In particular, the tax payments made by maximum tax firms typically do not cover the UI benefit payments made to their employees. In contrast, tax rates may not be affected by marginal layoffs for some minimum tax firms because they already pay considerably

more in taxes than the cost of their layoffs. Consequently, some firms at the maximum (minimum) tax rate have such high (low) layoff rates that the UI tax cost of a marginal layoff is zero. In addition, even experience-rated firms with tax rates between the minimum and maximum rates may not pay the full cost of their layoffs. To investigate the extent of this subsidy, Feldstein (1978) measures the difference between the present value of UI benefits received by a firm's employees and the present value of the tax payments resulting from those layoffs. Note that this subsidy is positive for maximum tax firms but negative for minimum tax firms in the example we use above.

Feldstein (1978) and Topel (1983 and 1985) also show that generally weak experience rating and positive UI subsidies may contribute to a significant proportion of temporary layoffs, at least among prime-age workers.

General Employer Noncharging

Noncharged benefits to particular employers were identified as a feature that weakens experience rating in the UI system by Becker (1972). The importance of noncharging has been analyzed more recently by Vroman (1989).¹⁰ Such noncharging involves benefit payments to workers who are unemployed for reasons "outside the control" of particular employers. For example, workers in some states may receive benefits after voluntary quits, discharges for misconduct, or quits because of "compelling" personal reasons. A substantial proportion of all benefit payments in some states may involve noncharging, which reduces experience rating. Although such noncharging may be common, it is not accounted for adequately in prior studies that rely on CPS data for individual workers or aggregate data for states.

Base-Period and Benefit-Year Definitions

Most analyses of experience rating effects include only states with reserve-ratio or benefit-ratio tax systems.¹¹ The tax provisions emphasized in these analyses include the level of the taxable wage base, minimum tax rates, maximum tax rates, the slope of the (rated) tax schedule and the effects of applying different tax schedules over the cycle. These tax provisions are emphasized both because of data constraints and because these tax features and the overall UI tax subsidy provide such obvious layoff incentives. However, an important UI tax feature ignored in prior studies is how states determine whether an employer is charged for any particular layoff. The implicit assumption in nearly all prior work is that the "last" employer is charged for its layoffs. In fact, determining which firm is charged for any particular layoff is much more complicated, and state charging provisions implicitly provide important subsidies and incentives that apparently have not been analyzed. Also, the procedures utilized for allocating the layoff charges to specific employers is an independent issue from the general noncharging summarized in the prior section, as the typical layoff charged to a specific employer is a layoff for lack of work.

The main layoff subsidies and incentives created by the employer charge procedures (ECPs) analyzed in this paper result from the way states charge employers for the UI benefits a worker receives during a "benefit year," which is a worker-specific year that begins when the worker files an initial (valid) claim for unemployment benefits. The usual state ECP assigns layoff costs to an employer depending on the "base-period" wages paid by the firm to the worker prior to that layoff. A worker's "base period" typically is defined as the first four of the last five completed calendar quarters prior to the start of the "benefit year."¹² This base-period definition, including a "lag" quarter between the base period and the benefit year, was used by Illinois and approximately 43

other UI jurisdictions during 1987. In contrast, the base period was defined as a one-year period "immediately preceding" the worker's benefit year in only 9 UI jurisdictions. This means that the use of the lag quarter by most UI jurisdictions creates a (probably unintended) early layoff subsidy, since employers who lay off workers during their first two calendar quarters of employment with the firm are not accountable for layoff charges as a base-period employer. Interestingly, even though this subsidy applies to most U.S. employment, Illinois changed its law effective July 1, 1989 (immediately following the end of the period analyzed in this paper). Thus, the lag quarter and the incentives created by its use do not apply to Illinois employers starting July 1, 1989. But the layoff subsidy and incentives created by the lag quarter still apply to most other U.S. employers.

Earnings during the base period determine a worker's eligibility in terms of both the weekly benefit amount and potential benefit duration for the benefit year. If the worker's prior earnings history meets certain minimums and the worker is found eligible for benefits, the benefit year for the worker typically begins at the claim date for the first UI claim and continues for 12 months. The worker's benefit eligibility depends on his/her UI-covered earnings with all employers during the base period, subject to various maximum earnings constraints that qualify workers for maximum UI benefits in different states. Once a worker's benefit year begins, only that worker's base-period employers can be charged for any benefits paid to the worker during the benefit year.

V. STATE RULES FOR CHARGING LAYOFF COSTS TO EMPLOYERS

Table 1 details the various ECP procedures used by the States. Our interest is to determine what layoff incentives are created by these procedures. The most important fact for our analysis is that the last employer can be charged for a (chargeable) layoff only when it also is a base-period

employer of the worker. Thus, the potential UI subsidy to layoff firms varies for their workers, depending on whether the firm is a base period employer for a worker subject to layoff. The fact that only base-period employers can be charged for a worker's layoff means that the way states define the base period helps determine how likely it is the worker's layoff employer actually is charged for the layoff. The importance of these ECP distinctions declines after a worker is employed by a firm for at least two quarters.

Determining whether the layoff employer is charged for a particular layoff depends on a combination of factors. First, the probability the layoff employer is considered as a base-period employer depends on the length of the lag between the benefit year and the base period used to establish claimant eligibility. For relatively new hires, this probability is higher in the nine states in which the base period includes employment "immediately preceding" the benefit year than in the remaining states.¹³ Second, even when the layoff employer meets the definition of a base-period employer, it may not be charged the entire layoff cost, if there are other base-period employers for the worker. When multiple employers comprise a worker's base period, the layoff cost usually is shared in some way among these multiple employers. In fact, the layoff employer is charged the entire layoff cost for workers with multiple base-period employers only in the six relatively small states listed in category 1 in Table 1. Next most likely to result in full charges to the layoff employer of workers with multiple base-period employers are firms in states that charge base-period employers in inverse order of base-period employment (category 2 in Table 1). But the 16 states in ECP categories 1 and 2—the states in which the likelihood is highest that the most recent base-period employer is charged all or most layoff costs for workers with multiple base-period employers—account for a small proportion of total U.S. employment.

Most states assign layoff costs for workers with multiple base-period employers in proportion to the wages paid to such workers while they were base-period employees (category 3 in Table 1).¹⁴ Thus, the layoff employers of such workers incur only some proportion rather than all of the charges for laying off these workers. Moreover, the 30 proportional ECP states that use this procedure account for the majority of total U.S. employment. The four states in ECP category 4 in Table 1 also use the base-period earnings of UI recipients to determine employer charges, but these states assign all charges to the base-period employer who accounts for the largest portion of the worker's total base-period earnings. The charge procedures used by the 34 states in ECP categories 3 and 4 are such that the layoff employer of a worker with multiple base period employers receives most or all of the charges for a layoff only if that employer also accounts for most or all of the worker's base-period earnings.

State ECPs create potentially important UI tax incentives, but determining the specific incentives created by the types of charging provisions summarized in Table 1 requires a more detailed analysis of the specific provisions in a particular state. We undertake that analysis for Illinois in the next three sections.

Firm Experience Factors

Two general factors typically determine a firm's "experience factor" and its resulting tax rate in Illinois and most other states. The first of these is the amount of UI benefits ("benefit wages" in Illinois) collected by the base-period employees of the firm. The more UI benefits collected by the firm's workers, the worse the firm's "experience," other things equal, and the higher its future tax rate up to the maximum. The second element that determines a firm's experience factor is the amount of taxable wages paid to its employees. The larger the firm's taxable wage base, the better

its experience, other things equal. Experience factors typically are calculated as the ratio of benefit payments to taxable wages. Although the general impacts of changes in either element are apparent from the above summary, the precise incentive effects depend on the specific features of a particular system.

The Illinois ECP rule for employers who paid (covered) wages to a worker during the base period are given in the following rules for each worker who subsequently collects UI benefits based on those base-period wages:

$$(1) \quad BW = \begin{cases} (BPW/26)D & \text{if } BPW < \$6,000, \text{ and} \\ (\$6,000/26)D & \text{if } BPW \geq \$6,000, \end{cases}$$

where: BPW = base-period wages;

 BW = benefit wages; and

 D = weeks of benefits paid to the worker.

ECP rule (1) determines how benefit wages are allocated among employers for charging the (chargeable) benefits paid to each UI recipient, except in fairly unusual circumstances involving employees who voluntarily leave an employer.¹⁵ Rule (1) implies that employers have no potential (current) liability for any new employee laid off during the first two calendar quarters of employment, because new hires cannot become base-period workers with a new employer during either the first or second calendar quarters of employment.¹⁶ The potential liability for layoffs of a new hire in the third calendar quarter of employment rises with the duration of that worker's employment with the firm in his/her first calendar quarter.

Another interesting feature of rule (1) is that workers who accept a job during a benefit year already in progress may be laid off by the new employer without any charge to that employer's

account (as long as the layoff employer is not a base-period employer for that worker).¹⁷ Since such workers have no base period wages with such subsequent employers, their layoffs during their ongoing benefit years have no impact on their layoff employers' experience factors because they have values of 0 for BW in (1). The above discussion of the UI subsidy of early layoffs relates specifically to current UI charges for the current layoffs firms make. The reason for this emphasis is that any firm incurs a potential future charge by employing any worker because current earnings may be used by the worker as earnings to qualify for benefits paid in some subsequent period. However, early layoffs still reduce the firm's future potential UI liability, which increases directly with current earnings.

The Illinois ECP in rule (1) and similar rules in most other states create a layoff subsidy by making early layoffs of new workers free to the layoff firm. This incentive applies even if the firm views such workers as permanent employees, but is stronger if the firm views the worker as a temporary employee at the time of hire or after observing the individual's performance. In such cases, the lag quarter provision in rule (1) allows the firm to terminate its employment relationship without incurring any current UI charges for the layoff. Obviously, this incentive should tend to increase both temporary and permanent layoff probabilities for workers during their first two calendar quarters with a new firm, a probability which already would be relatively high because worker-firm sorting and firm screening of new employees tend to occur relatively early in new employment relationships. This means that the UI incentive for early layoffs reinforces other incentives firms (and employees) already have to quickly determine whether workers are likely to be good candidates for continued employment.

The second factor that determines an individual firm's experience factor is the taxable wages paid to all workers, not just those who receive UI benefits. The Illinois benefit-wage tax system uses the ratio of BW from (1) to the firm's taxable wages to determine a firm's experience factor as follows:

$$(2) \quad BWR = \frac{\sum_{i=1}^m BW_i}{\sum_{j=1}^n TXWG_j}, \text{ where the new terms are defined as:}$$

BWR = the firm's benefit-wage ratio;

$$TXWG_j = \begin{cases} TOTWG_j, & \text{if } TOTWG_j < \$8,500; \text{ and} \\ \$8,500 & \text{if } TOTWG_j \geq \$8,500. \end{cases}$$

TOTWG_j = the firm's total UI covered wages for the jth worker.

The rules in (2) ignore time subscripts for simplicity, since three years typically is the period used for both the numerator and denominator. But there is not complete overlap in the sets of workers included in the numerator and the denominator. BW_i is summed over all (former and current) workers who had base-period earnings with the firm and collected (chargeable) UI benefits during a three-year period. TXWG_j is summed over all (former and current) employees who received taxable wages from the firm during the three-year period. But the base period precedes the benefit year for each worker, as explained above. This means that the calendar quarters of wages that enter (1) as BPW for particular workers precede the calendar quarters of wages that enter (2) as TXWG.¹⁸ Given the lags involved, BW could depend on wages paid to some workers for up to about two years prior to the first quarter of TXWG included in (2).¹⁹

A particularly interesting feature of the tax provisions in equation (2) is that only the last three years are used for determining BWR values in Illinois, whereas reserve-ratio systems in other

states often determine the benefits paid for the numerator of a firm's experience factor by accounting for all benefits ever paid to a firm's base-period workers. In fact, approximately 32 states used the firm's portion of all benefits ever paid to a firm's workers in calculating firm experience factors during 1987 (National Foundation for Unemployment Compensation, 1987, 13-14). Because only the last three years of benefit wages are used in computing the Illinois BWR experience factor in equation (2), marginal changes in established firms' layoff experience (for chargeable layoffs) tend to have much larger impacts on experience factors, and hence, tax rates in Illinois than in most reserve-ratio states. This means that even firms at the maximum tax rate are potentially subject to experience rating incentives in Illinois, depending on the responsiveness of optimal layoff rates to UI tax rate changes.

It is useful to summarize the incentives created by the employer charging provisions in rules (1) and (2) before further investigating how state charging provisions may affect employer incentives. First, there is no charge to the layoff firm for (chargeable) layoffs of employees who have no base-period wages with the firm. Second, once a worker begins a benefit year, any layoff employer (that was not also a base-period employer) escapes any layoff charge for the duration of that benefit year. Third (with very limited exceptions involving former employees who voluntarily leave a firm), all base-period employers are charged when their former employees are on (chargeable) layoffs, whether they initiate those layoffs or some other firm does. This implies that the layoff firms' charge for a layoff may represent only a fraction of the UI benefits received by high turnover workers who have several base-period employers. Fourth, layoff costs in rule (1) increase directly with prior worker earnings up to the maximum weekly constraint of \$231 ($\$6,000/26$) or, alternatively, up to \$6,000 for base period wages, but base period wages above

\$6,000 have no effect on layoff costs. Fifth, layoff costs in rule (1) increase monotonically for the first 26 layoff weeks for any worker who has any base period wages with the firm.²⁰

The above summary indicates that the charging practices states use to assign UI layoff costs to firms contain several important layoff incentives for employers. Although nearly all prior research implicitly assumes that ECP provisions assign layoff costs to layoff firms, the above discussion indicates there actually are many possibilities for employers to avoid the costs of (chargeable) layoffs they make, even though those layoffs may be charged to other employers. In cases where layoff employers have no potential liability for their current layoff charges, focusing on employer experience rating to explain employer layoff behavior ignores the importance of ECP incentives.²¹

Worker Earnings and Layoff Incentives

Rule (2) also creates incentives that depend on the total wage payments to and benefit claims by a firm's workers. The layoff cost to a firm for any worker varies inversely with the taxable wages paid to that worker up to a maximum of \$8,500. Taxable wages above this constraint have no effect on the firm's UI layoff cost in rule (2). Also, notice that the taxable wage constraint of \$8,500 exceeds the benefit-wage constraint of \$6,000 (in rule (1)). Yet the earnings for a given worker on layoff may appear as both benefit wages and taxable wages for that worker in determining the worker's impact on the firm's benefit wage ratio defined in (2). Specifically, a worker's earnings enter the firm's benefit wage ratio given in (2) for an individual worker (defined as BWR_w) as follows:

- (3a) $BWR_w = 1$ if $BPW = TOTWG \leq \$6,000$;
- (3b) $.706 < BWR_w < 1$ if $\$6,000 < BPW = TOTWG < \$8,500$; and
- (3c) $BWR_w = .706$ if $BPW = TOTWG \geq \$8,500$.

The rules in (3) provide an interesting pattern of layoff incentives, especially for those who are permanent employees. The least expensive layoffs are workers who earn at least \$8,500 per year because their layoffs create BWR_w values of .706. In contrast, the most expensive BWR_w impact is for those whose annual earnings are \$6,000 or less because their layoffs result in BWR_w values of 1.0. Workers with annual earnings of \$6,001-\$8,499 represent intermediate BWR_w impacts.

The Firm's Tax Rate, UI Tax Bill and Layoff Incentives

The employer charge practices summarized above determine a firm's experience factor. The experience factor then is used to determine the UI tax rate that applies to the firm's current payroll. The rules that convert the firm's experience factor into a tax rate and how that tax rate is applied to the firm's payroll are important because the resulting UI costs influence a firm's layoff costs.

The firm experience factor in (2) above is calculated for each Illinois firm as of June 30 each year based on the preceding three years. This BWR value is used to determine each firm's experience-rated tax rate for the following calendar year according to the following rule:²²

$$(4) \quad t_f = \begin{cases} t_{\min} & \text{if } (BWR)(SE) < t_{\min}; \\ (BWR)(SE) & \text{if } t_{\min} \leq (BWR)(SE) \leq t_{\max}; \text{ and} \\ t_{\max} & \text{if } (BWR)(SE) > t_{\max} \end{cases}$$

where: t_f = individual firm experience-rated tax;

SE = state experience factor (as a proportion of 1);²³

t_{\min} = the minimum tax rate; and

t_{\max} = the maximum tax rate.

For 1987, $SE = 1.23$, $t_{\min} = 0.2\%$ and $t_{\max} = 6.7\%$ in Illinois. Because of trust fund solvency problems during the 1970s, Illinois and many other states imposed solvency related surtaxes and/or federal penalty taxes during the 1980s. The total effective tax rate (t_f) for Illinois firms during 1987 included a solvency tax of 0.6 percent for all firms, so t_e was defined as:

$$(5) \quad t_e = t_f + 0.6\%.$$

Accordingly, t_e varied from 0.8 percent to 7.3 percent for Illinois firms during 1987.²⁴ Thus, UI tax costs can represent a substantial business cost for particular firms, even though several other fringe benefits may be more costly for "average" firms. But the wide range of rates means that differences in layoff actions between otherwise comparable firms can result in major differences in variable business costs, by affecting the taxable wage base this period and tax rates in future periods.

The tax rate defined in (5) was used to determine the taxes due for any firm (TX) during 1987 according to the following rule:

$$(6) \quad TX = t_e \sum_{k=1}^n TXWG_k,$$

where k indexes the number of covered workers during 1987.

As noted in (2) above, TXWG is defined as total (covered) earnings for a worker up to a maximum of \$8,500. Thus, current-year UI tax savings can be achieved only by reducing $\sum TXWG$, since t_e is fixed for a calendar year. There is no current tax savings in laying off workers after their annual earnings reach \$8,500, so this UI tax feature creates clear incentives for layoffs prior to reaching this threshold and for substituting hours for workers.²⁵

VI. EMPIRICAL TAX DISTRIBUTIONS FOR FIRMS AND EMPLOYEES

Prior studies typically use aggregate data for state-industry categories in determining the mean tax rates to assign to workers who fall in those categories. Thus, an important feature of the matched firm-worker data analyzed in this paper is that the actual tax distribution can be viewed in either of two ways—across firms or across the workers employed by those firms. It is important to emphasize that these distributions necessarily will differ if firms differ in terms of their employment size and their UI tax rates. The firm distribution is relevant for the layoff decisions of individual employers, but the employment distribution more closely approximates the tax distributions prior studies have attempted to proxy with state-industry assignment procedures. As a result, each distribution as well as differences between them are of interest, particularly since matched firm-worker data have not been available to compare these different distributions in prior studies.

The Distribution of Tax Rates for Firms

The total row for the firm tax distribution in Table 2 indicates that just over half of all firms have 1987 tax rates below 3.5 percent, and the remainder have rates of 3.5-7.3 percent. Interestingly, nearly four of every ten Illinois firms are at the minimum tax rate of 0.8 percent, compared to 17 percent at the 1987 maximum tax rate of 7.3 percent. The firm tax distributions for the industry and firm-size categories reported in Table 2 reveal substantial variability in the tax rates for individual firms in nearly all of these categories.

The industry distributions clearly illustrate why using industry mean or median tax rates is a very poor description of the actual tax variability found for the firms in an industry. For example, according to prior research, construction is a high turnover industry that has a high proportion of

maximum tax firms (and firms with negative reserve balances in reserve-ratio states). The estimates in Table 2 do show that more construction firms are at the maximum tax rate (37%) than is the case for any other industry. Nonetheless, most construction firms still are at rates below the maximum, and 20 percent of them are at the minimum tax rate. Considerable variation in the tax rates of the firms in other industries also is shown by the estimates reported in Table 2.

The distributions in Table 2 also reveal substantial tax rate variability for firms of different sizes. For example, the percentage of firms in the lowest tax category is 38 percent for all firms, but this percentage falls sharply as firm size increases, from 51 percent of the smallest firms to under 10 percent of those employing more than 50 workers and to only 1 percent of those employing more than 1,000 workers. Notice that the smallest firms, which include many minimum-tax firms are likely to be especially underrepresented in the random samples of unemployed workers often analyzed in prior studies.

Comparing the Distributions of Tax Rates for Workers and Firms

The UI tax distribution applicable to employees is reported in Table 3. These estimates show that 13 percent of all 1987 workers were employed by minimum-tax firms. In contrast, 18 percent of these workers were employed by maximum-tax firms. But the percentage of employment in any tax category varies considerably around the overall average reported for all employees in the first row of Table 3. For example, the percentage of employment in the minimum tax category varies from only 2 percent for the largest firms and 3 percent for construction firms to 41 percent for the smallest firms. In contrast, the percentage of employment in maximum-tax firms varies from only 5 percent for finance/insurance/real estate to 64 percent for construction.

Differing characteristics among firms (such as firm size) lead to the different tax distributions for firms in Table 2 than for employment in Table 3. For example, 38 percent of all firms are at the minimum tax rate, but these firms tend to be smaller than the typical firm and thus account for only 13 percent of all employment at the minimum tax rate in Table 3. Viewing industry differences, a much smaller percentage of employment than of firms in each industry category is found at the minimum tax rate. Two particularly large differences in these percentages of employment and firms at the minimum tax rate are for construction (only 3% of employment but 20% of firms) and finance/insurance/real estate (only 13% of employment but 68% of firms). At the maximum tax rate, very large differences in the percentages of employment and firms are found in construction (64% of employment but only 37% of firms) and transportation/communications/public utilities (only 16% of employment but 35% of firms). There also are some fairly large differences between the percentages of firms and employees found in the tax brackets between the minimum and the maximum in Tables 2 and 3.

Previous studies have utilized state-industry averages to ascribe UI tax rates implicitly faced by the layoff employer of an individual claimant. These "individual specific" tax rates attempt, in aggregate, to approximate the employee tax rate distribution in Table 3. Unfortunately, because the only variation in rates used in these prior efforts was for differences in state or industry averages—which Table 2 shows to be an incorrect representation of the true UI tax rate distribution—the previous studies have improperly approximated both the employee and employer distributions. Further, the distributions in Table 2 and 3 represent tax rates for all firms, including those that made no layoffs during the period. In contrast, prior efforts have based their imputed tax distributions

on ascribed tax rates for only those firms that had some layoff activity (and thus had one or more workers enter the sample base).

Although previous work has misestimated the employee tax distribution in Table 3, the appropriate tax distribution for firm layoff decisions is not the employee distribution (even if the "correct" employee distribution in Table 3 were used). Instead, the correct distribution for analyzing firm layoff decisions is the firm tax distribution we report in Table 2, but such a distribution has not been used in prior studies of firm layoffs. As noted above, the distributions for all firms and all employees (row 1 in each table) are substantially different, both in aggregate and accounting for firm characteristics. Thus prior efforts to approximate the employee distribution would yield incorrect estimates of the appropriate firm distribution, even if the employee distribution were correctly estimated.

Two main conclusions may be drawn from the comparisons discussed above. First, the dispersion of tax rates within the various categories reported in Tables 2 and 3 shows that the mean or median tax rate for any particular category conceals substantial variability in the actual tax rates for the firms or employees in that category. Second, the firm and employment tax distributions reported in Tables 2 and 3 are quite different. Thus, prior efforts that ascribe state-industry averages to individual workers: do not incorporate the industry specific variations that exist; do not approximate the correct distribution since they are based on employees rather than firms; and do not use the appropriate population since only firms with layoffs have individuals in the samples used. Consequently, prior work has based conclusions about the impact of UI tax incentives on firm behavior on misestimated tax distributions. These results clearly show that, contrary to the

consensus in prior research, the variation in UI tax rates for firms within an industry is greater than the variation in mean or median tax rates among industries.

VII. LAYOFF MEASURES: DEFINITIONS

Layoff rates are defined in most prior cross-sectional studies as the number of workers in an industry on layoff divided by the total number of employees in that industry for the same time period. We calculate some layoff rates similar to those in prior literature, in addition to several new layoff measures that can be calculated with our unique data set. In developing these firm layoff measures, we encounter several issues not dealt with in prior work because we follow our sample through time, rather than identifying layoffs only at a point in time (recall the detailed description of the data in Section III). The major issues involved in identifying the layoff measures subsequently analyzed are discussed briefly below, and our empirical estimates are presented in section VIII.

Employment Base for Layoff Measures

The employment base to use for calculating layoff rates could be defined in several ways. As noted earlier, the population is all (in-state, covered and reporting) Illinois employers as of 1987.3, and the sample strictly represents only that population for that quarter. Thus, one way to define the employment base is as reported employment for 1987.3. However, to reflect seasonal variation, which affects both the employment mix and total number of workers employed by firms over the course of a year, we use the total number of (different) persons employed by these firms during 1987 (denoted as EMP) as the employment base for calculating our layoff rates.²⁶

UI-Reported Layoffs

Firm layoffs are identified in our data whenever individual employees file claims for UI benefits. That is, firm layoffs (or separations) are identified from records of individual worker claims for UI benefits. We can distinguish claims that are disallowed (such as when a worker who voluntarily quits erroneously applies for UI benefits) from those that are certified, where a UI certified claim may include some combination of a waiting week and paid weeks. However, workers who are terminated or quit but never file UI claims cannot be identified in our data. Since all separations such as these latter ones are excluded from our measures, total separation rates that include worker separations that do not result in claims for UI benefits are underestimated in our data.²⁷

Layoff Time Period

The length of the longitudinal tracking period for identifying individual worker layoffs can be as short as one week or as long as 3 years in our data. This issue has not arisen in previous cross-sectional studies that define layoff rates for some (short) fixed time period, but it is an important one for our definitions. Clearly, seasonal variation in layoff rates is very likely for many types of firms, so it is desirable to define the layoff period to include at least one year. An even longer layoff period would be important in analyzing many dynamic issues. But the practical constraints of our sampling methodology realistically preclude us from (accurately) measuring firm layoff behavior for a prolonged period. The reason is that all (covered) workers reported by the firm for any portion of calendar year 1987 are known for our sample firms, but we have no information on the identities of workers added after 1987. Thus, given the importance of tracking

layoff patterns through time and the constraints of our data, we select a period of approximately one year for defining firm layoff behavior.

Choosing an arbitrary and fixed period of one year for all employees in a firm does not seem appropriate because we can relate layoffs only to the number of different persons employed by the firm during 1987, not to the annual number of "employment positions" in the firm.²⁸ Thus, if the same one-year period were used for all employees, employees added to the firm at different times during any arbitrarily fixed year would be subject to different layoff risks. Our solution to defining an appropriate time period for observing firm layoff behavior is to define a firm-worker "window" for each employee on the 1987 employment roster of the firms in our sample. We first identify the calendar quarter during 1987 when each employee first appears on the employment roster of any firm in the sample. Second, any UI-reported layoffs for that individual during that quarter and the following four calendar quarters are determined for each of these firm-worker records.²⁹ Third, we determine whether the layoff employer for each layoff was the firm on the firm-worker record. If so, the layoff is counted as a layoff for that firm. In this way, we construct UI-reported separation and layoff measures for each firm, based on individualized 4-5 quarter firm-worker windows for every sampled 1987 employee of the firm. This approach makes it possible to capture seasonal influences and to define layoff risks for all employees over an approximately equal number of quarters.

Types of Layoff Measures

Two perspectives for analyzing firm layoff behavior are: 1) the propensity of firms to make at least one layoff during the 4-5 quarter layoff window; and 2) the overall layoff rate for the firm, defined as its total number of layoffs during the 4-5 quarter layoff window divided by its total

number of 1987 employees.³⁰ We refer to the first as firm "layoff incidence" or "layoff propensity" and the second as firm "layoff rates." Because the data set includes matched worker-firm records, we also know the "outcome" of layoffs for workers. In particular, we have information on the following worker impacts for each layoff: whether it was the first or subsequent layoff by that firm for any worker; whether the worker received UI benefits for the layoff or filed a claim but did not receive benefits because the UI agency ruled the worker ineligible for benefits; and the total UI weeks as well as benefits paid to the worker. For each firm, we can determine: total UI claims by its workers and the number of these that resulted in UI benefit payments; total weeks claimed and paid as a result of the firm's separations; whether a firm's layoffs involve any "repeat layoffs" for the same worker during the 4-5 quarter window analyzed; whether the first UI paid layoffs for particular workers were "free" or chargeable to the layoff firm; the average duration per UI paid layoff; and the average UI layoff weeks per employed worker.

We also take advantage of our matched worker-firm records to distinguish three types of firms. First, we calculate all of our layoff measures for the entire population of firms, referred to as "all" firms. But we also distinguish the following two subsets of all firms based on their layoff behavior: those that make at least one UI paid layoff during the 4-5 quarter window, denoted as "some-layoff" or "SL" firms in the subsequent tables and discussion; and the subset of some-layoff firms that place at least one worker on two or more UI paid layoffs during the 4-5 quarter window, denoted as "repeat-layoff" or "RL" firms.

VIII. LAYOFF MEASURES: EMPIRICAL RESULTS

The layoff measures we construct are defined and estimated for the population of all firms in Table 4. It is important to emphasize that these and all other layoff estimates we construct are weighted to correctly reflect population values.³¹ We organize the discussion by devoting separate subsections to the following measures for the 4-5 quarters over which we analyze firm layoff behavior: 1) the proportion of all firms that made any layoffs for which workers claimed benefits and either received benefits or were denied benefits because they did not meet all eligibility requirements; 2) layoff rates for all firms for the various types of layoffs we define; 3) layoff rates for the subsets of all firms that made some layoffs ("some-layoff" or SL firms) and those that made repeat layoffs for at least one worker ("repeat-layoff" or RL firms); 4) average duration per layoff for various types of layoffs; 5) average layoff weeks per employed worker for various types of layoffs for all firms and some-layoff firms; and 6) all of the above measures for firms categorized by UI tax rate, industry and firm size. Substantial detail is provided in the accompanying tables that contain these estimates. However, the text discussion is quite brief and focuses only on selected highlights.

Firm Layoff Propensities: Proportion of All Firms with at Least One UI Layoff

The estimated firm layoff propensities estimated in 1a) - 1e) of Table 4 show the proportion of the total population of employers with at least one of the indicated separations or layoffs during the 4-5 quarter window analyzed. The estimate in 1a) shows that just under one-third of all firms placed at least one employee on a layoff that resulted in the payment of UI benefits during this 4-5 quarter period. The estimate in 1b) shows that only about 7 percent of all firms meet the definition

of a "repeat-layoff" firm by placing at least one worker on more than one UI-paid layoff during the same 4-5 quarter period.

The estimate in 1c) of Table 4 reveals that 13 percent of all firms were the last employers for one or more workers who filed UI claims for benefits that were not paid. That is, these firms had workers who filed for but were denied benefits because they did not meet all eligibility requirements. This estimate is of some interest because it raises questions about the assumption used in prior analyses of CPS data that layoffs of workers who appear to have enough earnings to qualify for benefits also meet other UI eligibility requirements and thereby receive UI benefits.³²

The difference between the estimates in 1e) and 1a) of Table 4 (29% vs. 32%) for all firms indicates that about 3 percent of all firms or about one-tenth of the last employers of workers receiving UI benefits avoided any (immediate) UI charges for any of their layoffs. These firms avoided all charges for their current layoffs because they were not base-period employers for any of the workers they placed on layoff.³³

Layoff Rates: All Firms

Estimated UI layoff (and separation) rates for all firms are reported in 2a) - 2h) of Table 4. Note that these and the other layoff rates calculated in this study are "employment weighted" rates, defined as the total layoffs for any group of firms divided by total employment for that group of firms (not defined as the average of the layoff rates for the individual firms in the group). We discuss the layoff rates for all firms in this section and those for some-layoff and repeat layoff firms in the next section. The estimate in 2a) reveals that 5 percent of the total employees of all firms were placed on a first UI paid layoff during the 4-5 quarter window analyzed, whereas that in 2b) shows that 2 percent of the total workers employed by these firms experienced multiple UI paid

layoffs during the same period. This means that the total UI paid layoff rate (item 2c. in Table 4), which includes first as well as subsequent UI paid layoffs for the same worker, amounts to 7 percent. This latter estimate can be considered the "total" UI compensated unemployment rate for this population of Illinois firms during the 4-5 quarters analyzed. It is interesting to compare this total UI paid layoff rate of 7 percent in 2c) to the total UI claim rate of 8 percent in 2f). This latter rate is higher because it includes firm separations for which workers claimed but were denied UI benefits for failing to meet all eligibility conditions. Thus, prior CPS based layoff estimates tend to inflate the actual rate of UI-paid layoffs.³⁴

The matched firm-worker records we analyze make it possible to calculate the "repeat layoff risk" during the 4-5 quarter window for individual workers who are placed on a first UI paid layoff during the period. This estimate in 2d) reveals that the repeat layoff probability with the same firm for the average worker placed on a first UI layoff is nearly one in three (31%). This relatively low repeat layoff probability may raise questions about the presumption in prior work that UI primarily subsidizes repetitive (temporary) layoffs of a firm's permanent workers. Yet the extent of repeat layoff activity clearly would be somewhat larger for a longer layoff window than the 4-5 quarter period we analyze.

The final two layoff estimates for all firms reported in 2g) and 2h) in Table 4 distinguish the subset of first paid layoffs that are at least partially chargeable to the layoff firm. For this to occur, the layoff firm also must be a base-period employer of the worker placed on layoff.³⁵ These estimates are reported because the 1987 tax provisions in Illinois (and most other states) include a lag quarter, and this means that employers cannot be charged for early layoffs of new employees, as explained in Section V.³⁶ Interestingly, Illinois changed its law effective July, 1989

to make it much more likely that layoff employers are chargeable for the layoffs they make by typically assigning layoff costs to the last employer of at least 30 days. But such changes have not been made in the most states. Thus, these results are particularly relevant to the UI system as a whole but may be less relevant for the current Illinois system because the new Illinois law greatly increases the probability that the layoff employer is charged for its layoffs.

The layoff rate (for first paid layoffs) chargeable to the layoff firm of 4 percent (item 2g. in Table 4) is smaller than the (first paid) layoff rate of 5 percent (item 2a.) for these same firms. Because matched firm-worker records have not been available before, it previously was not possible to determine the quantitative importance of these "free" layoffs. A convenient way to compare these two layoff rates is simply to construct the proportion of all first paid layoffs that entailed at least some charge to the layoff firm. This proportion is reported as item 2h) and reveals that only 73 percent of the (first) UI compensated layoffs firms made during this 4-5 quarter period entailed any possibility of a (direct) charge to the layoff employer. In other words, 27 percent of these layoffs were "completely" subsidized for the layoff firm in the sense that such layoffs could not result in any charge to the layoff firm. We refer to such layoffs as "free" layoffs. It is interesting to note that "free" layoffs usually occur because the workers involved in such layoffs have tenure of less than six months with a firm. Although the importance of these free layoffs has not been recognized in prior studies, these results strongly suggest that such layoffs may be quantitatively important. It is important to emphasize that these free layoffs are available to all employers, regardless of the tax rate or UI tax subsidy otherwise calculated in prior literature. That is, firms that meet the definition of (fully) experience-rated firms in prior studies still could escape any direct

layoff charges through the free layoff subsidy created by using a lag quarter in base-period definitions.

Layoff Rates: Some-Layoff and Repeat-Layoff Firms

Layoff rates for some-layoff firms are reported as items 2a)-2h) in the second column of Table 4. The layoff rates for some-layoff firms obviously are higher than those for all firms, simply because the former are defined as the subset of all firms that made at least one UI layoff during the 4-5 quarter period analyzed. For example, the total UI layoff rate in 2c) is 9 percent for some-layoff firms, compared to 7 percent for all firms. Layoff rates for some-layoff firms comparable to the others discussed above for all firms also are reported in Table 4, but these results are not discussed further.

Layoff rates for "repeat-layoff" firms—defined as those that place at least one worker on a UI paid layoff more than once during the 4-5 quarter window analyzed—are reported in the third column of Table 4. The layoff rates for these firms obviously are expected to be higher than those for either some-layoff or all firms, simply because repeat-layoff firms made at least one repeat UI layoff for the same worker. In fact, the total UI layoff rate in item 2c) of Table 4 for repeat-layoff firms is more than double that for some-layoff firms (19% vs. 9%) and nearly triple that for all firms (19% vs. 7%). The other layoff rates for repeat-layoff firms are not discussed here, except to again note the importance of free layoffs for these firms. Repeat-layoff firms have a (first) paid layoff rate of 13 percent, but the chargeable portion of this layoff rate is only 9 percent (see items 2a. and 2g.). Thus, about one-third of all layoffs made by repeat-layoff firms were free to the layoff firm (see item 2h.).

Average Duration of Layoffs Made During 4-5 Quarter Window

Illinois tax provisions and those in most other states make little or no distinction between "equivalent" changes in layoff frequency and mean layoff duration, at least over some duration range, in calculating the effect of total layoff weeks on a firm's tax rate. In any case, firm data have not been available in prior studies so we construct layoff duration measures for firms with layoffs and report them as item 3. for some-layoff and repeat-layoff firm in Table 4.³⁷ For example, average duration for all UI paid layoffs that occurred during the 4-5 quarter period for the population of Illinois firms is an estimated 11.7 weeks for first UI layoffs and 10.5 weeks for total UI layoffs (see items 3a. and 3c. for all firms). Another interesting finding is that repeat-layoff firms have shorter mean layoffs than some-layoff firms for both first and total layoffs (8.8 vs. 11.7 weeks for first layoffs and 8.1 vs. 10.5 weeks for total layoffs in items 3a. and 3c.).

Average Layoff Weeks Per Employee

Another way to measure layoff "risk" for a group of workers is to calculate the average weeks on layoff per person employed during 1987. This measure combines the layoff frequency and duration measures discussed above to determine the number of weeks of UI compensated unemployment experienced by the "average" worker. Estimates of this layoff risk for three different layoff measures are reported as items 4a)-4c) in Table 4. The most comprehensive of these measures (4c.) gives the total weeks of UI compensated unemployment per employee for layoffs during the 4-5 quarter window analyzed, and that measure is the only one we discuss here.

The estimates in 4c) reveal that expected layoff weeks as a result of all UI layoffs during the 4-5 quarter period are 0.7 weeks for the "average" worker. The layoff risk for workers in firms that had any layoffs obviously is higher than the risk for workers in the entire population of firms,

simply because the latter includes many firms that placed no workers on layoff during the period analyzed. Layoff weeks per employee for this period average 1.0 weeks in some-layoff firms and 1.6 weeks in repeat-layoff firms. Consequently, expected layoff weeks are more than double in repeat-layoff firms than in Illinois employers as a whole (1.6 vs. 0.7 weeks).

Layoff Measures for Selected Firm Characteristics

The above results clearly indicate that large differences are likely for the layoff measures estimated for different types of firms. To further illustrate differences among firms, some layoff results for all firms and some-layoff firms categorized by tax rate, industry and firm size are reported in this section. The discussion below focuses mainly on selected results for all firms, but the interested reader will find substantially more detail in the tables for all firms as well as some-layoff firms.

Tax Rate. Results for six UI tax categories, including the minimum and maximum rates, are reported in Table 5. Just under one-third of all firms made any UI compensated layoffs during the 4-5 quarter period analyzed (item 1a). This percentage varies considerably by tax rate, with only 15 percent of firms at the minimum tax rate and from 37-49 percent of the firms in the other tax categories making at least one layoff. It also is interesting to note that slightly more than half of all maximum tax firms made no UI layoffs during the 4-5 quarter period analyzed.

The variation in layoff rates among (all) firms in the different tax categories (item 2. of Table 5) is much larger than the variation in the proportion of firms making layoffs discussed above. For example, the total UI layoff rate for the 4-5 quarter period analyzed (reported as item 2c. in Table 5) is 7 percent for the population of all firms, but it varies from 2-3 percent for firms in the three lowest tax categories up to 20 percent for firms in the maximum tax category. This

latter finding is particularly striking in light of the fact discussed above that over half of all maximum-tax firms made no layoffs during this period. Yet UI paid layoffs during this 4-5 quarter period for the entire set of maximum tax firms still amounted to one-fifth of the workers employed by all of them.³⁸

The average duration per layoff estimates in item 4. of Table 5 reveal a perhaps surprising pattern. The average duration of all UI paid layoffs made by all firms during this 4-5 quarter period is 10.5 weeks (see item 4c. in Table 5). But the shortest average layoff duration of 9.2 weeks is for firms at the maximum tax rate and the longest average duration of 17.1 weeks is for firms in the lowest tax category. That is, firms with relatively high layoff propensities (in the maximum tax category) tend to have shorter than average duration layoffs, whereas firms with relatively low layoff propensities (in the lowest tax category) tend to have longer than average layoff durations.

Estimates of the unemployment risk per employee—defined as total UI paid layoff weeks per employee resulting from layoffs during the 4-5 quarter period—is reported in item 5c) of Table 5. This overall unemployment risk for an "average" worker combines the layoff rate and spell duration measures discussed above, and confirms that this overall risk is far greater in maximum-tax firms than other firms. This unemployment risk per employee averages 0.7 weeks for all employees in the population, but it varies from only 0.3-0.4 weeks for employees of firms in the three lowest tax categories up to 1.9 weeks for employees of maximum-tax firms.

Industry. The layoff estimates for firms in major industry groupings are reported in Table 6. Considerable variation in the percentage of firms making layoffs during the 4-5 quarter period is found for the seven major industry groups (see item 1a. in Table 6).³⁹ This varies from under 30 percent for three industries (transportation/communication/public utilities, retail trade and

finance/insurance/real estate) to 62 percent for manufacturing firms. A perhaps surprising finding is that, despite their reputation as extremely high turnover firms, the percentage of construction firms making any layoffs (32%) is the same as the percentage for all firms in the population and only about half that for manufacturing firms.

The total UI paid layoff rates for firms in the seven major industry groups is reported as item 2c) in Table 6. The lowest firm layoff rates are for retail trade (2%) and finance/insurance/real estate (3%), and these rates are only a fraction of the layoff rate of 29 percent for construction firms. This construction firm layoff rate also is far higher than the average for all firms (7%) or the rate of 9 percent for manufacturing firms, which have the next highest layoff rate.

The average duration for total UI paid layoffs in item 4c) of Table 6 varies considerably among the industry groupings. Construction firms have the shortest average duration layoffs (7.6 weeks), although they have much higher layoff rates than any other industry. In contrast, employees of the two industries with the lowest layoff rates—retail trade and finance/insurance/real estate—have the longest average layoff durations (14.7 and 17.4 weeks, respectively). Put differently, the relatively large number of construction workers placed on layoff experience relatively short spells, compared with the relatively long spells experienced by the relatively small number of retail trade and finance/insurance/real estate workers placed on layoff.

The unemployment risk per worker—defined as total UI paid layoff weeks per employee resulting from layoffs during the 4-5 quarter period—is reported as item 5c). Recall that this measure reflects overall unemployment risk for the average worker by combining the layoff rate and layoff duration measures discussed above. The results in 5c) of Table 6 reveal that this overall unemployment risk is much higher for average construction workers (2.2 weeks of unemployment

per employee) than for the average worker in all firms (0.7 weeks) or the average worker in the major industry with the next highest risk (0.8 weeks in manufacturing).

Firm Size. The layoff measures for firm size—defined by the number of different UI covered workers reported by each firm for 1987—are reported in Table 7. The likelihood that at least one worker is placed on a UI paid layoff during the 4-5 quarter period clearly should tend to increase directly with the number of workers employed, and this is the pattern found for all firms in item 1a). Whereas only 17 percent of the firms with 10 or fewer employees made any layoffs during this 4-5 quarter period, 41 percent in the 11-50 employee size category and 95 percent with over 1,000 employees placed at least one worker on layoff during this period.

The total UI paid layoff rates for firms of different sizes are reported as item 2c). In contrast with the variation just noted for firm layoff propensities, these layoff rates vary much less for firms of different sizes. For example, the smallest layoff rate (5% for the largest and the smallest firms) is only 3 percentage points lower than the largest layoff rate (8% for firms with 251-1,000 employees).

The average duration for total UI paid layoffs during the 4-5 quarter period varies considerably with firm size (see item 4c. in Table 7). The main pattern is that employees of the smallest firms have much longer average layoffs (17.0 weeks) than either the average for all workers (10.5 weeks) or the average for any other size group, the largest of which is 11 weeks.

The overall unemployment risk measure for the average employee is reported for all firms as item 5c). The most striking of these results is that this risk amounts to less than 0.1 weeks of annual unemployment for employees of firms in the 11-50 worker size group, compared to an average risk of 0.7 weeks for all employees. Moreover, the firm size categories (except the 11-50

worker size group) show relatively little variation around the average risk of 0.7 weeks for all firms.⁴⁰

IX. FREE VS. CHARGED LAYOFFS

The results in the prior section establish the importance of the "free" layoffs firms make by laying off workers who have no base period wages with the firm.⁴¹ We analyze these free layoffs in further detail in this section since the use of such layoffs by firms has not been analyzed in prior studies. We restrict our analysis to first-paid UI layoffs in worker benefit years, and focus on three related layoff measures that we report in Table 8: total first-paid UI layoffs ("1 PD"), the subset of these layoffs charged to the layoff employer ("CHG 1 PD") and the complementary subset of layoffs not charged to the employer ("NO CHG").

The first column of Table 8 repeats the information reported in Tables 5-7 on the proportion of all firms that made any UI paid layoffs during the 4-5 quarter period analyzed. These firm layoff propensities provide a benchmark for assessing the information in the second column on the proportion of these layoff firms that made only free layoffs during the same period. These estimates reveal that the percentage of layoff firms making only free layoffs varies substantially among different types of firms. At one extreme, very few of the layoff firms in the following categories made only free layoffs during the 4-5 quarters analyzed: only 2 percent of the layoff firms in the 0.81-1.99% and maximum tax categories; only 3-4 percent of the layoff firms in transportation/communications/public utilities and wholesale trade; and only 1 percent of the layoff firms in the two largest size categories (251 or more employees). In sharp contrast, much larger percentages of the layoff firms in some categories escaped charges for all the layoffs they made

during the 4-5 quarter period analyzed: 30 percent of the firms making layoffs in the minimum tax category, 22 percent of services firms and 20 percent of the layoff firms with 10 or fewer employees. Overall, these results clearly show that the effect of the lag quarter is to create substantial disparity in whether particular types of firms are charged for any of the layoffs they make.

Layoff rates for all firms also are reported in Table 8. First, note that the only new layoff measure is the "free" layoff rate (denoted as NO CHG/EMP in Table 8). This rate measures the rate of "free" layoffs firms make because they were not base-period employers of the separated workers.⁴² In evaluating these "free" layoff results, it is important to emphasize that, depending on long-run equilibrium layoff rates and hiring/layoff patterns in particular firms and industries, some firms that benefit from "free" current layoffs of their own workers may pay for the layoffs of workers by other firms in current or future periods.⁴³ However, it is extremely unlikely that these cross-firm subsidies cancel out, even in long-run equilibrium, both because firm hire/retention/layoff rates obviously differ within and between industries and because workers have considerable inter-firm and inter-industry mobility.

The (first) UI paid layoff rates in column 3 of Table 8 are repeated from Tables 5-7 to provide a benchmark for assessing the charged and free layoff rates reported. Several interesting patterns appear in these estimates, but only a few are emphasized here. First, notice that there is substantial variation in these layoff rates among firm categories. For example, layoff rates of only 2 percent are found for firms in the two lowest tax categories and retail trade firms. At the other extreme, very high layoff rates are found for maximum-tax firms (14%) and construction firms (19%). The free layoff rates for the 4-5 quarter period reported in the fourth column also exhibit

substantial variability among different types of firms. The most striking of these results are the extremely high free layoff rates found for maximum-tax and construction firms (4% and 8%, respectively), compared to free layoff rates of 0-2% for all other firm categories. In fact, these free layoff rates for maximum-tax and construction firms actually are higher than the total layoff rates recorded for several firm categories in Table 8.

The last column in Table 8 reports free layoffs as a proportion of total layoffs for all firms. This proportion provides a convenient basis for detecting variations in the extent to which different types of firms use free layoffs to escape any charges for the layoffs they make. At one extreme, the percentage of all layoffs that are free to the layoff firm is only 13 percent for the largest firms and 15-16 percent for the smallest firms, finance/insurance/real estate firms and firms in the 3.50-4.99% tax category. At the other extreme, the percentage of all layoffs that are free to the layoff firm is as large as 39 percent for construction firms.⁴⁴ In other words, nearly two out of every five layoffs made by construction firms entail no charge to the layoff employer. These results illustrate that the free layoff subsidy created by lag quarter provisions differentially affect firms, creating implicit cross-subsidies among firms that have not been analyzed in prior studies.

X. TOTAL LAYOFFS, TOTAL WEEKS OF UI BENEFITS AND FREE LAYOFFS

Substantial variation is apparent in the layoff measures among firms with different characteristics in Tables 5-8 and discussed in some detail in sections VIII. and IX. The potential policy importance of this variation may be better illustrated by constructing summary measures that capture some basic UI impacts of this variation. The summary measures we construct answer the following basic questions. First, how are total UI layoffs (regardless of duration) during the 4-5

quarter period distributed among firms with different characteristics? Second, how are total weeks of UI benefits paid as a result of these layoffs distributed among the workers laid off by firms with different characteristics? Third, for the subset of first paid UI layoffs during the 4-5 quarter period, how are total and free layoffs distributed among firms with different characteristics? The summary measures that answer these questions are reported in Table 9 for firms categorized by tax rate, industry and firm size. We use the distribution of total employees as a "benchmark" for comparing these distributions of total layoffs, free layoffs and total weeks of UI benefits paid.

The distributions of total layoffs, free layoffs and total weeks of UI benefits paid in Table 9 all differ markedly from the distribution of employment for the same characteristics. First, consider the distributions for firms in different UI tax categories. These distributions reveal that only 18 percent of all employment is accounted for by maximum tax firms. Yet these maximum-tax firms account for 52 percent of total UI paid layoffs, 60 percent of all free layoffs and 45 percent of total UI weeks paid resulting from layoffs during the 4-5 quarter period analyzed. Put differently, one out of every two UI paid layoffs, nearly one out of every two weeks of UI benefits paid and three out of every five free layoffs were made by maximum-tax firms, but they employed fewer than one-fifth of all workers in Illinois.

The estimates for the major industry groups in Table 9 also reveal some substantial differences between the employment and UI activity distributions. In particular, these results show that construction firms (and to a lesser extent, manufacturing firms) account for a much larger share of UI layoffs and benefits paid than of employment, whereas just the opposite is the case for retail trade and services. For example, construction firms accounts for 29 percent of total layoffs, 42 percent of all free layoffs and 20 percent of the total weeks of UI benefits paid, even though they

account for only 7 percent of all UI reported employment. Thus, construction accounts for a far larger proportion of total layoffs and an even larger proportion of free layoffs than of employment. In sharp contrast, retail trade accounts for a relatively small percentage of total and free layoffs, as well as total weeks of UI benefits paid, compared to its share of employment (7-9% of layoffs and 11% of total weeks of benefits paid, compared to 23% of employment).

The UI activity and employment distributions for firms in different size categories in Table 9 do not reveal the types of striking differences discussed above for the tax and industry categories. Nonetheless, the largest firms do have a somewhat smaller percentage of both total layoffs and total weeks of UI benefits than of total employment (9-10% vs. 13%). But, the main firm size pattern of interest is for free vs. total layoffs for the two largest size categories. Firms of more than 1,000 employees have a very small proportion of all free layoffs (4%), compared to their share of total layoffs (9%) or total employment (13%). In contrast, firms in the next largest size category of 251-1,000 employees have a much larger share of free layoffs (31%) than of either total layoffs (22%) or total employment (19%).

XI. CONCLUSIONS

Prior studies have emphasized that the UI system is far less than fully experience rated because of rules that allow firms to escape charges for the layoffs they make. A major reason for this incomplete experience rating is the upper bound on UI tax rates that makes it possible for many high-turnover firms to make layoffs without incurring any additional charges, once they are at the maximum tax rate. A second major reason for incomplete experience rating is that many layoffs are not charged to the layoff firm but instead to a common pool because of "noncharging"

provisions that allow benefit payments to workers unemployed for reasons "outside of the control" of the last employer. But there is yet another UI subsidy not recognized in prior studies that allows "fully" experience-rated employers to escape charges for certain layoffs, even though those layoffs are charged to other employers.

The "new" layoff subsidy we emphasize results from the way states charge employers for the UI benefits a worker receives during a "benefit year." The employer charging provisions used by most states assign layoff costs to an employer depending on the "base-period" wages paid by the firm to the worker prior to that layoff. A worker's "base period" typically is defined as the first four of the last five completed calendar quarters prior to the start of the "benefit year." This base-period definition, including a "lag quarter" between the base period and the benefit year, is used by more than 40 states. This means that an implicit layoff subsidy is created by using the lag quarter in most states, since employers who lay off workers during the first two calendar quarters with the firm do not receive layoff charges as a base-period employer of such workers. This charging procedure provides an implicit subsidy to firms by making "early" layoffs of new workers free to the layoff firm. Obviously, this incentive should tend to increase both temporary and permanent layoff probabilities for workers during their first few months with a new firm. Thus, this UI subsidy actually tends to destabilize rather than stabilize employment. This UI incentive for early layoffs also reinforces other incentives firms (and employees) already have to quickly determine whether workers are likely to be good candidates for continued employment.

There never before has been any estimate of the quantitative importance of the "early" layoffs that occur before layoff firms incur any layoff liability. Our estimates show that free layoffs frequently are used and that their use varies substantially among different types of firms. For

example, the percentage of layoff firms that made only free layoffs varies from only 1 percent of the layoff firms in the two largest firm-size categories up to 30 percent of the layoff firms in the minimum-tax category. Viewed differently, our estimates reveal that 27 percent of all (UI chargeable) layoffs for a 4-5 quarter period were free layoffs to the layoff firms. This percentage of layoffs that are free varies from only 13 percent for the largest firms to as much as 39 percent for construction firms. In short, the overall magnitude of this early layoff subsidy and its substantially different use by different types of firms clearly establishes that this previously unrecognized UI subsidy is an important one that requires further analysis.

The obvious policy question raised by our free layoff findings is whether states need to reconsider their base-period definitions that include a lag quarter. The administrative convenience of using a lag quarter entails a "cost." This cost is that the UI subsidy provided by the lag quarter creates an incentive for employers to make early layoffs of new workers, which tends to destabilize employment. Thus, policymakers must weigh the effects of this incentive against the administrative convenience of the lag quarter. The obvious way to reduce this early layoff subsidy is to charge the last employer for its layoffs, subject to some minimum employment period.

Our findings clearly establish the importance of obtaining the type of matched firm-worker data we analyze. Many major features of the labor market and the effects of the UI program on it cannot be investigated or understood without such data. Thus, we hope that the States and the U.S. Department of Labor will cooperate to develop these important new data sets.

Numerous extensions of this analysis are need, even apart from the important need of obtaining more data sets of the type analyzed in this study. These include accounting for the following aspects of firm layoff decisions: UI reported separations; the UI-paid layoffs included

in reported separations; the extent to which firms are charged for the layoffs they make; rehire probabilities for workers on layoff; temporary vs. permanent layoffs; the potential impact of a marginal layoff on the firm's future tax rate; the fact that past layoff behavior determines current UI tax rates; and whether employer underreporting of employment systematically affects reported vs. actual layoff rate patterns. Obviously, these issues alone comprise a large research agenda that involves some complex theoretical and empirical issues. Fortunately, the data base analyzed makes it possible to pursue many of these issues, some of which presently are under investigation.

ENDNOTES

1. Presumably, this is a large part of the explanation for the fact that Anderson (1990, Table 1) reports that only 8,278 retail trade firms in her analysis had wage records for all quarters analyzed, even though 817,330 retail trade firms had wage records in at least one of the quarters during the period. Because she analyzes dynamic adjustments, she uses only the 8,278 firm subsample in her analysis.
2. "Reimbursable employers" are excluded from the data set. Reimbursable employers primarily include government agencies and some nonprofit organizations that are "self-insured" in that they are charged the full benefits their workers receive while on layoff.
3. The most important exclusions from the coverage definition were for self-employment, newspaper carriers, and real-estate and insurance agents paid by commission. See the National Foundation for Unemployment Compensation (1987, pp. 5-12) for definitions of employers, employment and UI-covered wages.
4. Burgess and St. Louis (1990, Table 4) found that the employer sample analyzed in this paper underreported covered employees by about 9 percent for 1987. No estimates are provided in that study (and no reliable estimates are available in any other study) for the extent to which employers successfully conceal their identity from UI tax authorities. Clearly, the probability of successful concealment is higher for smaller and newer firms than for larger and older firms.
5. The first two files were for delinquent reporters and firms that reported zero employees for the third calendar quarter of 1987, and these files included relatively few firms. Systematic samples of these delinquent reporters and zero reporters were separately drawn to ensure their representation in the study, as explained in the Appendix.
6. The complexity arises because individual worker and firm records are compared over a relatively long period, and the records for firms and workers are contained in separate files. We especially thank IDES for the large effort required to search its files (which contain millions of records) to obtain the data we analyze.
7. Given the large number of individual records contained in Illinois files for the period searched, it was necessary to reduce the search space by sampling both firms and, for larger firms, individual workers. See the Appendix for details.
8. However, Burgess and St. Louis (1990, Table 4) estimate that employers underreport total wages by an average of more than 6 percent for the sample as a whole.
9. This strongly suggests that employers may respond to tax incentives (analyzed subsequently) that encourage early layoffs of new hires. We return to these issues with some detailed analysis in a subsequent section.

10. Vroman (1989, 37-43) provides a good summary of noncharging and ineffective charges, which are charges to maximum-tax employers with benefit outlays that exceed tax collections.
11. Under the reserve ratio system, a firm's "experience" typically is determined by calculating the benefits paid to a firm's former employees as a ratio of the taxes paid by the firm for all employees. The larger the ratio, the worse the firm's experience and the higher its tax rate up to the maximum. The benefit payments included in this ratio usually cover a fairly long period, up to the length of time the firm has been in business.
12. The text definition of the base period is the typical one. However, several states have variations in this general definition. See National Foundation for Unemployment Compensation (1987: 35-37) for details.
13. These nine states are Hawaii, Massachusetts, Michigan, Minnesota, New York, Ohio, Rhode Island, Vermont and Wisconsin. The phrase "immediately preceding" actually means a lag of two weeks in some of these states. See National Foundation for Unemployment Compensation (1987: 35-37).
14. In Illinois, employer charges depend on "benefit wages" paid, not benefits paid. The specific Illinois provisions are discussed subsequently in the text.
15. Given the right combination of circumstances, UI benefits for workers who voluntarily leave an employer may not be charged to that employer, even when the employer is a base-period employer. The circumstances involved in these cases of voluntary leaving are quite complex. See section 1501f. of the Illinois Unemployment Insurance Act (1988) for details.
16. The base period is defined as the first 4 of the last 5 completed calendar quarters at the time a benefit year is established.
17. In terms of Feldstein's (1978) subsidy definition, these are zero-cost layoffs.
18. In most states, a reserve-ratio tax system is used. In those states, the denominator in equation (2) typically is calculated in essentially the same way as explained in the text, except that the constraint for TXWG varies considerably among the states (although a three-year period for calculating TXWG is very common). In contrast, reserve-ratio states do not use BW in the numerator. Instead, they use UI benefits received by a firm's workers, subject to a variety of different constraints. Nonetheless, both benefit entitlements and benefits paid are strongly correlated with BW in most states. Accordingly, the Illinois version of the benefit-wage system is very similar to reserve-ratio systems.
19. For illustrative purposes, assume the three year period involved for a particular firm is 1987-1989 inclusive. This means that TXWG in (2) will be taken from the 12 calendar quarters starting in 1987.1. The BW values will be determined from the BPW values for all workers paid benefits during this same period. But these BPW quarters will be for earlier calendar quarters. For example, the base period would include wages from all of calendar year 1985,

including 1985.1, for a worker collecting benefits in the last quarter of his benefit year during 1987.1. We thank Paul Rafac of IDES for clarifying the time periods involved in these calculations.

20. In some benefit-wage systems, layoff duration is unrelated to employer charges, but layoff duration is directly related to employer charges in Illinois.
21. The wages currently paid to an employee with no BPW with the layoff firm do become potential BW for future but not for current layoffs.
22. In all states, some period of time (typically 1-3 years) is required for an employer to become experience rated. During the period when employers are acquiring "experience" to qualify for an experience-rated tax, they are assigned new employer rates according to a wide variety of techniques. Usually, these rates are higher than they would be for a "comparable" employer who is experience rated. The rationale for the higher rate is that there is a higher "risk" of unemployment associated with new firms as a whole. In Illinois, at least 3 years of UI liability was required for a firm to have an experience rated tax during 1987. The years of UI tax liability used to calculate the BWR for such firms were: 1) the last year for firms with three years of experience; 2) the last two years for firms with four years of experience; and 3) the last three years for firms with five or more years of experience.
23. The state experience factor depends on two basic components. The first is the relationship between trust-fund revenue outflows (benefits paid) and inflows (taxes collected) for approximately the three-year period used to calculate firm experience factors. The second factor is the overall balance in the trust fund. The SE factor in Illinois of 1.23 for 1987 is extremely high by historical standards. This factor usually has been closer to 1.0 for Illinois employers.
24. Exceptions include various predetermined rates for new employers and a maximum rate of 4.5 percent for "small" employers; small employers are defined as those with quarterly payrolls of \$50,000 or less.
25. Most prior analyses have ignored this tax feature, but it is explicitly modeled by Brechling (1977). In Brechling's model, the optimal layoff rate equates the marginal tax savings for a layoff during the current period with the marginal cost due to the increased tax rate from that layoff in the next period. Interestingly, this current tax savings from low-wage vs. high-wage layoffs conflicts with the future tax rate incentive in rule (3), since laying off workers with BPW values of at least \$8,500 have the least impact on individual firm experience factors in rule (3). That is, optimal layoff decisions must balance these opposite incentives for low-wage vs. high-wage layoffs.
26. Note that EMP captures seasonal employment over a calendar year with a particular firm. Also, because covered employers who reported no employees during 1987.3 still were sampled, we also represent seasonal employers with shut-down periods during the third

quarter. However, some firms in business during the first two quarters of 1987 may have ceased operations before the third quarter, and these firms are not included in the sample. Also, new firms that first entered business in the fourth quarter of 1987 are not included in the sample. Thus, the sample strictly represents only the population of covered employers in business (with or without any workers) during 1987.3.

27. Our layoff measures also may underestimate true UI layoff rates if any separated workers were not correctly matched in their layoff firm, due either to the inability to match the social security number or an incorrect firm identification number for the layoff firm. The extent to which our UI separation rates understate total firm separation rates because of this factor and those noted in the text is unknown. However, extraordinary measures were taken by IDES to avoid any mismatches, including an intensive manual effort to add correct firm identifiers to worker claims with missing or incorrect firm identifiers in routine IDES data files. Thus, our opinion is that very few layoffs were missed in the matching procedure.
28. The total number of different persons employed by sample firms during 1987 is not the same as the number of "employment positions" in these firms, defined as the total number of different worker "slots" that require staffing during a year. We have no solid basis for determining the number of employee positions. We do know the number of persons employed each quarter during 1987, and that number is less than or equal to the number of different persons employed by the firm for the entire year. However, the number of employment positions could be either smaller or larger than the firm's number of quarterly employees.
29. The firm data are quarterly so the closest approximation to a one-year period for tracking layoffs is either the four calendar quarters that include the quarter when 1987 employment with the firm commenced or that quarter plus the following four quarters. Because we do not know how long individuals worked for these firms during any calendar quarter, we opt for the five quarter definition to ensure at least one year is included for all workers. As a result, our windows comprise at least 4 and up to 5 calendar quarters of employment with the firm, depending on when employment actually commenced during the initial quarter.
30. For groups of firms, layoff rates are based on ratios of the number of affected workers to total number of employees in 1987 for the entire set of firms. They are not simply averages of the individual firm layoff values.
31. As explained in Section III, a systematic sample of firms provides the original data base for this study, and that sample has substantially different sampling weights for firms depending on employment reported by the firm for 1987.3. Also, to reduce the search space for this analysis, only a sample of the employees for larger firms were checked for layoffs. The result is that the unweighted layoff measures for the sample differ substantially from the weighted layoff measures for the population. Thus, only the weighted measures for the population are reported.

32. Related to this point, the estimate in 1d) of Table 4 is only slightly higher than the estimate in 1a), indicating that most invalid claims for benefits involve separation employers who also are separation employers for some workers who file valid UI claims that are paid.
33. Other firms had some "free" layoffs, but firms that had both free and charged layoffs are not captured here. Only the 3 percent of firms that made only "free" layoffs are identified.
34. The 1987 Illinois UI compensated layoff rate for all firms increases from 7 to 8 percent when invalid claims that are filed but not paid are added to UI claims that are paid. Moreover, this likely is a conservative estimate of the extent to which UI-paid layoffs are overestimated in CPS data because the estimates here reflect only "formal" claims for benefits filed by workers. Excluded are some separations (e.g., voluntary quits and short spells) where workers never file claims.
35. Complex programming is involved in obtaining the data required to calculate the various layoff measures reported in Table 4. It is possible to calculate the chargeable portion of TOT PD, as well as 1 PD layoffs. But these additional estimates are not available for this study.
36. Firms also can make "free" (current) layoffs when: the involved layoff worker already has a benefit year in progress prior to the current layoff; and the current layoff employer is not a base period employer of the worker for that benefit year. In such cases, a free layoff could involve a worker employed by a firm for more than six months.
37. Although, Brechling (1977) explicitly models this aspect of firm behavior, both Brechling (1981) and Topel (1984a) analyze duration data for individual workers, not firms.
38. Note that, for maximum tax firms, the layoff rate for different employees (item 2a. in Table 5) is "only" 14 percent, but repeat layoffs for the same workers raise the TOT PD layoff rate in item 2c. to 20 percent.
39. The residual "other" category is reported in Table 6, but it is not discussed in the text.
40. As expected, a quite different pattern is found for the some-layoff subset of firms (see item 6c. in Table 7). For that subset of firms, considerable variation is found in this overall unemployment risk measure, and it varies inversely with firm size.
41. As explained in note 36, some of the "free" layoffs analyzed may occur because layoff workers already have a UI benefit year in progress when placed on layoffs by the current firm. We cannot distinguish such layoffs (for workers with more than six months of tenure with the current firm) from the more typical free layoffs that involve workers with less than six months of tenure.
42. Given this definition of the "free" layoff rate, it plus the charged (CHG 1 PD) rate equals the total UI paid (1 PD) layoff rate for any firm or category in Table 8.

43. This occurs when a firm is a base period employer of workers laid off by other firms and thus incurs layoff charges when these workers receive UI benefits.
44. Construction firms often are assumed to rotate the same workers among themselves. If so, then construction firms may simply swap free and charged layoffs with each other. But note that the incentive for free layoffs is unlikely to "wash out" even in such cases because: firm hire/retention/layoff patterns differ in construction as well as in other industries; firm births and deaths make any long-run wash-out of the free layoff subsidy highly unlikely; and workers migrate into and out of construction, increasing the possibility that some firms gain and some lose from the free layoff incentive.

Table 1
1987 Employer Charge Provisions

Employer Charge Provisions ^a	States
1) Most Recent Base Period Employer	6: Kentucky, Maine, New Hampshire, South Carolina, Vermont, Virginia
2) Inverse Order of Base Period Employment ^b	10: Colorado, Indiana, Iowa, Massachusetts, Michigan, Nebraska, New York, Ohio, South Dakota, Wisconsin
3) Proportional to Wages Paid by Base Period Employers	30: Alabama, Arizona, Arkansas, California, Connecticut, Delaware, District of Columbia, Florida, Georgia, Hawaii, Illinois ^c , Kansas, Louisiana, Minnesota, Mississippi, Missouri, New Jersey, New Mexico, North Carolina, North Dakota, Oklahoma, Oregon, Pennsylvania, Rhode Island, Tennessee, Texas, Utah, Washington, West Virginia, Wyoming
4) Largest Amount of Base Period Wages ^d	4: Idaho, Maryland, Montana, Nevada

Source: National Foundation for Unemployment Compensation (1987, 21-23).

^a Employer charge provisions (ECP) actually include additional complexities in many states. For example, there may be limits on individual employer charges, or a different system may be used in special circumstances. However, the indicated ECP is the main procedure used in each state.

^b Most of these states relate charges in various ways to the wages or proportion of wages paid by base period employers.

^c Illinois is included in the proportional charge category because that procedure is the closest approximation to its practice, which is precisely defined in the text. Also, Illinois changed its law to make charges to the most recent base period employer who provided at least 30 days work in July, 1989 (just after the completion of the period analyzed in this paper).

^d The largest amount of wages is defined as at least 75 percent of total base period wages in Maryland and Nevada. If no employer provided at least 75 percent of total wages, proportional charging is used.

Table 2

Population Distribution of UI Reporting Firms by 1987 UI Tax Rate^a

	Estimated Total Number of Firms in Population	1987 UI Tax Rate ^b					
		0.8%	.81-1.99%	2.00-3.49%	3.5-4.99%	5.0-7.29%	7.3%
Total	172,825	0.38	0.07	0.08	0.21	0.10	0.17
Industry:							
1) Construction	22,090	0.20	0.03	0.01	0.19	0.20	0.37
2) Manufacturing	12,647	0.15	0.10	0.13	0.26	0.12	0.25
3) Trans./Commun./Pub. Util.	10,499	0.24	0.04	0.05	0.21	0.11	0.35
4) Wholesale Trade	21,537	0.22	0.06	0.16	0.40	0.04	0.12
5) Retail Trade	32,314	0.37	0.07	0.07	0.21	0.13	0.15
6) Fin./Ins./Real Estate	11,943	0.68	0.08	0.07	0.08	0.02	0.07
7) Services	55,522	0.50	0.09	0.07	0.18	0.06	0.10
8) Other	6,273	0.53	0.02	0.11	0.01	0.18	0.16
Firm Size (# Annual Workers for 1987):							
1) 1-10	91,497	0.51	0.04	0.03	0.16	0.10	0.17
2) 11-50	58,985	0.28	0.08	0.11	0.29	0.07	0.18
3) 51-250	19,627	0.08	0.18	0.21	0.23	0.14	0.17
4) 251-1,000	2,545	0.05	0.12	0.25	0.18	0.17	0.22
5) 1,001+	171	0.01	0.34	0.26	0.22	0.06	0.11

^a Where w_i = the weight for the i^{th} firm, as described in the Appendix, the total number of firms in each cell is estimated by inflating the sample by w_i . Cell sizes in the unweighted data are fairly small for some of the individual categories in this table. Estimates for such cells should be considered suggestive of the tax rate distribution rather than very precise point estimates.

^b Each row's tax rate distribution sums to 1.0.

Table 3
Population Distribution of UI Covered Employees by 1987 UI Tax Rate^a

	Estimated Total Number of Employees in Population	1987 UI Tax Rate ^b					
		0.8%	.81-1.99%	2.00-3.49%	3.5-4.99%	5.0-7.29%	7.3%
Total	5,568,811	0.13	0.15	0.20	0.22	0.12	0.18
Industry:							
1) Construction	417,088	0.03	0.07	0.02	0.08	0.16	0.64
2) Manufacturing	1,035,508	0.05	0.08	0.21	0.24	0.19	0.24
3) Trans./Commun./Pub. Util.	302,036	0.12	0.34	0.17	0.20	0.02	0.16
4) Wholesale Trade	451,610	0.06	0.08	0.18	0.41	0.09	0.18
5) Retail Trade	1,304,336	0.14	0.14	0.28	0.23	0.12	0.09
6) Fin./Ins./Real Estate	394,237	0.13	0.42	0.21	0.16	0.04	0.05
7) Services	1,463,641	0.21	0.17	0.16	0.22	0.10	0.14
8) Other	200,355	0.25	0.07	0.22	0.06	0.24	0.17
Firm Size (# Annual Workers for 1987):							
1) 1-10	404,891	0.41	0.06	0.04	0.16	0.13	0.21
2) 11-50	1,190,506	0.22	0.08	0.12	0.29	0.08	0.20
3) 51-250	2,200,558	0.10	0.17	0.20	0.23	0.13	0.17
4) 251-1,000	1,066,305	0.05	0.11	0.23	0.20	0.20	0.21
5) 1,001+	706,551	0.02	0.34	0.35	0.13	0.04	0.13

^a Where w_i = the firm weight for the i^{th} firm, as described in the Appendix, and $1/c_i$ = the employee sampling fraction used for the i^{th} firm, the total number of employees in each cell is estimated by inflating the sample number of employees by $w_i c_i$. Cell sizes in the unweighted data are fairly small for some of the individual categories in this table. Estimates for such cells should be considered suggestive of the tax rate distribution rather than very precise point estimates.

^b Each row's tax rate distribution sums to 1.

Table 4

Population Estimates of Layoff Measures^a

	All Firms	Some-Layoff (SL) Firms	Repeat Layoff (RL) Firms
1. Firm Layoff Incidence: Proportion of Firms with Layoffs During 4-5 Quarter Window			
a) 1 PD	0.32	-----	-----
b) 2 + PD	0.07	-----	-----
c) TOT NOT PD	0.13	-----	-----
d) TOT CLAIM	0.35	-----	-----
e) CHG 1 PD	0.29	-----	-----
2. Firm Layoff Rates for 4-5 Quarter Window^b			
a) 1 PD / EMP	0.05	0.07	0.13
b) 2 + PD / EMP	0.02	0.02	0.07
c) TOT PD / EMP = a) + b) ^c	0.07	0.09	0.19
d) 2 + PD / 1 PD = b) / a) ^c	0.31	0.31	0.54
e) TOT NOT PD / EMP	0.01	0.02	0.02
f) TOT CLAIM / EMP = c) + e) ^c	0.08	0.11	0.21
g) CHG 1 PD / EMP	0.04	0.05	0.09
h) CHG 1 PD / 1 PD = g) / a) ^c	0.73	0.73	0.69
3. Average Weeks of Duration for Layoffs Made During 4-5 Quarter Window^d			
a) 1 PD	11.67	11.67	8.79
b) 2 + PD	6.80	6.80	6.80
c) TOT PD	10.51	10.51	8.09
4. Total Layoff Weeks Per Employed Worker for Layoffs During 4-5 Quarter Window (= 2.x 3.)			
a) 1 PD	0.59	0.83	1.11
b) 2 + PD	0.11	0.15	0.46
c) TOT PD = a) + b) ^c	0.69	0.98	1.57

^a The acronyms used in this table are defined as follows:

- 1 PD:** The first "valid" UI layoffs by a firm during the 4-5 quarter window for any persons employed by the firm during 1987. These layoffs include any valid UI layoff that include any combination of a waiting week or paid weeks of benefits. In most cases, these layoffs include one or more weeks of UI benefit payments.
- 2 + PD:** All second or subsequent "valid" UI paid layoffs by a firm during the 4-5 quarter window for any persons employed by the firms during 1987. At least one week must separate the layoff spells.
- TOT PD:** Total "valid" UI layoffs by a firm during the 4-5 quarter window for any persons employed by the firm during 1987. By definition, TOT PD is the sum of 1 PD and 2 + PD.
- TOT NOT PD:** All UI claims filed during the 4-5 quarter window by any persons employed by the firm during 1987, where the claims are ruled invalid by the UI agency, and no benefits are paid.
- TOT CLAIM:** For layoff incidence = 1 for any firm that has at least one 1 PD or one TOT NOT PD layoff. For layoff rates, TOT CLAIM is the sum of TOT PD and TOT NOT PD.
- CHG 1 PD:** The subset of 1 PD for which the layoff firm also is a base-period employer and thus subject to potential charges for the layoff.
- EMP:** Total number of (different) reported employees for a firm during 1987.

Table 4 (continued)

Population Estimates of Layoff Measures^a

- ^b All layoff rates are "employment weighted" rates, defined as the total layoffs for any group of firms divided by total employment for that group of firms (not defined as the average of the layoff rates of the individual firms in the group).
- ^c All figures reported in this table have been rounded to two decimal places from raw data that include several more decimal places. As a result, using the rounded components that are either added or divided to obtain items 2c., 2d., 2f., 2h. and 4c. may not generate the figures reported for those items. However, all entries reported in the table are correct to two decimal places.
- ^d All average layoff duration measures are "group weighted" averages, defined as the total layoff weeks for any group of firms divided by the total number of layoffs for that group of firms (not defined as the average of the layoff durations for the individual firms in the group).

Table 5

Population Estimates of Layoff Incidence, Rates and Duration by 1987 UI Tax Rate

	Total	1987 UI Tax Rate					
		0.80%	0.81-1.99%	2.00-3.49%	3.50-4.99%	5.00-7.29%	7.30%
1. Firm Layoff Incidence for All Firms							
<u>(Proportion of All Firms with Layoffs):</u>							
a) 1 PD	0.32	0.15	0.44	0.39	0.37	0.48	0.49
b) 2 + PD	0.07	0.02	0.03	0.04	0.08	0.03	0.22
c) TOT NOT PD	0.13	0.02	0.21	0.25	0.13	0.25	0.20
d) TOT CLAIM	0.35	0.15	0.55	0.46	0.38	0.52	0.52
2. Layoff Rates, All Firms:^a							
a) 1 PD / EMP	0.05	0.02	0.02	0.03	0.04	0.05	0.14
b) 2 + PD / EMP	0.02	0.00	0.00	0.00	0.01	0.00	0.06
c) TOT PD / EMP = a) + b) ^b	0.07	0.02	0.02	0.03	0.05	0.05	0.20
d) 2 + PD / 1 PD = b) / a) ^b	0.31	0.12	0.05	0.19	0.36	0.05	0.43
e) TOT NOT PD / EMP	0.01	0.00	0.01	0.01	0.01	0.02	0.02
f) TOT CLAIM / EMP = c) + e) ^b	0.08	0.03	0.03	0.04	0.06	0.06	0.22
3. Layoff Rates, Some-Layoff (SL) Firms:^a							
a) 1 PD / EMP	0.07	0.05	0.03	0.03	0.05	0.06	0.17
b) 2 + PD / EMP	0.02	0.01	0.00	0.01	0.02	0.00	0.07
c) TOT PD / EMP = a) + b) ^b	0.09	0.06	0.03	0.04	0.07	0.06	0.24
d) 2+ PD / 1 PD = b) / a) ^b	0.31	0.11	0.05	0.19	0.36	0.05	0.43
e) TOT NOT PD / EMP	0.02	0.01	0.01	0.02	0.02	0.02	0.02
f) TOT CLAIM / EMP = c) + e) ^b	0.11	0.07	0.04	0.06	0.09	0.08	0.25
4. Average Weeks of Duration for Layoffs During 4-5 Quarter Window, Some-Layoff (SL) Firms:							
a) 1 PD	11.67	17.67	14.54	12.71	12.77	13.01	9.96
b) 2 + PD	6.80	12.11	7.57	6.56	3.59	9.45	7.44
c) TOT PD	10.51	17.10	14.22	11.75	10.36	12.83	9.20

Table 5 (continued)

Population Estimates of Layoff Incidence, Rates and Duration by 1987 UI Tax Rate

	Total	1987 UI Tax Rate					
		0.80%	0.81-1.99%	2.00-3.49%	3.50-4.99%	5.00-7.29%	7.30%
5. Total Layoff Weeks Per Employed Worker for Layoffs During 4-5 Quarter Window, All Firms:							
a) 1 PD	0.59	0.36	0.26	0.32	0.47	0.59	1.42
b) 2+ PD	0.11	0.03	0.01	0.03	0.05	0.02	0.45
c) TOT PD = a) + b) ^b	0.69	0.39	0.27	0.35	0.52	0.62	1.87
6. Total Layoff Weeks Per Employed Worker for Layoffs During 4-5 Quarter Window, Some-Layoff (SL) Firms:							
a) 1 PD	0.83	0.96	0.37	0.43	0.69	0.73	1.64
b) 2+ PD	0.15	0.08	0.01	0.04	0.07	0.03	0.52
c) TOT PD = a) + b) ^b	0.98	1.04	0.38	0.48	0.76	0.75	2.16

^a All layoff rates are "employment weighted" rates, defined as the total layoffs for any group of firms divided by total employment for that group of firms (not defined as the average of the layoff rates for the individual firms in the group).

^b All figures reported in this table have been rounded to two decimal places from raw data that include several more decimal places. As a result, using the rounded components that are either added or divided to obtain items 2c., 2d., 2f., 3c., 3d., 3f., 5c. and 6c. may not compute to the figures reported for those items. However, all rounded entries reported in the table are correct to two decimal places.

Table 6
Population Estimates of Layoff Incidence, Rates and Duration by Industry

	Industry								
	Total	Construction	Manufacturing	Trans./Commun./ Public Utilities	Wholesale Trade	Retail Trade	Finance/ Insurance/ Real Estate	Services	Other
1. Firm Layoff Incidence for All Firms (Proportion of All Firms with Layoffs):									
a) 1 PD	0.32	0.32	0.62	0.26	0.38	0.21	0.26	0.32	0.48
b) 2+ PD	0.07	0.12	0.14	0.06	0.10	0.01	0.00	0.05	0.31
c) TOT NOT PD	0.13	0.08	0.41	0.09	0.15	0.18	0.07	0.07	0.08
d) TOT CLAIM	0.35	0.32	0.69	0.28	0.44	0.26	0.26	0.32	0.49
2. Layoff Rates, All Firms:^a									
a) 1 PD / EMP	0.05	0.19	0.06	0.03	0.05	0.02	0.03	0.04	0.06
b) 2+ PD / EMP	0.02	0.09	0.02	0.02	0.01	0.00	0.00	0.01	0.02
c) TOT PD / EMP = a) + b) ^b	0.07	0.29	0.09	0.05	0.06	0.02	0.03	0.04	0.08
d) 2+ PD / 1 PD = b) / a) ^b	0.31	0.48	0.37	0.56	0.20	0.07	0.00	0.16	0.41
e) TOT NOT PD / EMP	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01
f) TOT CLAIM / EMP = c) + e) ^b	0.08	0.30	0.11	0.06	0.07	0.03	0.03	0.05	0.09
3. Layoff Rates, Some-Layoff (SL) Firms:^a									
a) 1 PD / EMP	0.07	0.22	0.07	0.04	0.07	0.03	0.04	0.06	0.07
b) 2+ PD / EMP	0.02	0.11	0.03	0.03	0.01	0.00	0.00	0.01	0.03
c) TOT PD / EMP = a) + b) ^b	0.09	0.33	0.10	0.07	0.08	0.04	0.04	0.07	0.10
d) 2+ PD / 1 PD = b) / a) ^b	0.31	0.48	0.37	0.56	0.20	0.07	0.00	0.15	0.41
e) TOT NOT PD / EMP	0.02	0.01	0.02	0.02	0.01	0.02	0.01	0.01	0.01
f) TOT CLAIM EMP = c) + e) ^b	0.11	0.34	0.12	0.09	0.09	0.05	0.04	0.08	0.11
4. Average Weeks of Duration for Layoffs During 4-5 Quarter Window, Some-Layoff (SL) Firms:									
a) 1 PD	11.67	7.91	11.33	13.54	12.30	15.25	17.43	14.36	11.74
b) 2+ PD	6.80	7.03	4.68	2.11	10.42	7.51	15.08	9.63	12.21
c) TOT PD	10.51	7.62	9.53	9.42	12.00	14.74	17.42	13.73	11.87

Table 6 (continued)
Population Estimates of Layoff Incidence, Rates and Duration by Industry

	Industry								
	Total	Construction	Manufacturing	Trans./Commun./ Public Utilities	Wholesale Trade	Retail Trade	Finance/ Insurance/ Real Estate	Services	Other
5. Total Layoff Weeks Per Employed Worker for Layoffs During 4-5 Quarter Window, All Firms:									
a) 1 PD	0.59	1.54	0.72	0.41	0.59	0.29	0.47	0.54	0.69
b) 2+ PD	0.11	0.65	0.11	0.04	0.10	0.01	0.00	0.06	0.30
c) TOT PD = a) + b) ^b	0.69	2.19	0.83	0.44	0.68	0.30	0.47	0.59	0.99
6. Total Layoff Weeks Per Employed Worker for Layoffs During 4-5 Quarter Window, Some-Layoff (SL) Firms:									
a) 1 PD	0.83	1.77	0.84	0.60	0.85	0.50	0.61	0.83	0.84
b) 2+ PD	0.15	0.75	0.13	0.05	0.14	0.02	0.00	0.09	0.36
c) TOT PD = a) + b) ^b	0.98	2.52	0.97	0.66	0.99	0.51	0.62	0.91	1.20

^a All layoff rates are "employment weighted" rates, defined as the total layoffs for any group of firms divided by total employment for that group of firms (not defined as the average of the layoff rates for the individual firms in the group).

^b All figures reported in this table have been rounded to two decimal places from raw data that include several more decimal places. As a result, using the rounded components that are either added or divided to obtain items 2c., 2d., 2f., 3c., 3d., 3f., 5c. and 6c. may not compute to the figures reported for those items. However, all rounded entries reported in the table are correct to two decimal places.

Table 7
Population Estimates of Layoff Incidence, Rates and Duration by Number of (Different) Workers Reported by Firm for UI Purposes for 1987

	Total	Number of Employees Reported for 1987				
		1-10	11-50	51-250	251-1,000	1,001+
1. Firm Layoff Incidence for All Firms (Proportion of All Firms with Layoffs):						
a) 1 PD	0.32	0.17	0.41	0.70	0.89	0.95
b) 2+ PD	0.07	0.02	0.09	0.20	0.36	0.35
c) TOT NOT PD	0.13	0.03	0.14	0.46	0.80	0.88
d) TOT CLAIM	0.35	0.18	0.45	0.77	0.92	0.95
2. Layoff Rates, All Firms:^a						
a) 1 PD / EMP	0.05	0.05	0.05	0.05	0.06	0.04
b) 2+ PD / EMP	0.02	0.01	0.01	0.02	0.02	0.01
c) TOT PD / EMP = a) + b) ^b	0.07	0.05	0.06	0.07	0.08	0.05
d) 2+ PD / 1 PD = b) / a) ^b	0.31	0.11	0.29	0.38	0.29	0.31
e) TOT NOT PD / EMP	0.01	0.01	0.00	0.01	0.02	0.01
f) TOT CLAIM / EMP=c)+e) ^b	0.08	0.06	0.07	0.08	0.09	0.06
3. Layoff Rates, Some-Layoff (SL) Firms:^a						
a) 1 PD / EMP	0.07	0.19	0.10	0.07	0.06	0.04
b) 2+ PD / EMP	0.02	0.02	0.03	0.03	0.02	0.01
c) TOT PD / EMP = a) + b) ^b	0.09	0.21	0.13	0.10	0.08	0.05
d) 2+ PD / 1 PD = b) / a) ^b	0.31	0.11	0.29	0.38	0.29	0.31
e) TOT NOT PD / EMP	0.02	0.02	0.01	0.02	0.02	0.01
f) TOT CLAIM / EMP=c)+e) ^b	0.11	0.22	0.14	0.11	0.10	0.06
4. Average Weeks of Duration for Layoffs During 4-5 Quarter Window, Some-Layoff (SL) Firms:						
a) 1 PD	11.67	17.59	12.55	10.92	9.92	12.74
b) 2+ PD	6.80	11.19	5.68	7.93	5.23	5.43
c) TOT PD	10.51	16.95	11.01	10.10	8.88	11.03

Table 7 (continued)
Population Estimates of Layoff Incidence, Rates and Duration by Number of (Different) Workers Reported by Firm for 1987 UI Purposes

	Total	Number of Employees Reported for 1987				
		1-10	11-50	51-250	251-1,000	1,001+
5. Total Layoff Weeks Per Employed Worker for Layoffs During 4-5 Quarter Window, All Firms:						
a) 1 PD	0.58	0.84	0.06	0.56	0.58	0.45
b) 2+ PD	0.11	0.06	0.01	0.15	0.09	0.06
c) TOT PD = a) + b) ^b	0.69	0.90	0.07	0.71	0.67	0.51
6. Total Layoff Weeks Per Employed Worker for Layoffs During 4-5 Quarter Window, Some-Layoff (SL) Firms:						
a) 1 PD	0.83	3.27	1.27	0.78	0.63	0.47
b) 2+ PD	0.15	0.23	0.17	0.21	0.10	0.06
c) TOT PD = a) + b) ^b	0.98	3.50	1.44	0.99	0.73	0.53

^a All layoff rates are "employment weighted" rates, defined as the total layoffs for any group of firms divided by total employment for that group of firms (not defined as the average of the layoff rates for the individual firms in the group).

^b All figures reported in this table have been rounded to two decimal places from raw data that include several more decimal places. As a result, using the rounded components that are either added or divided to obtain items 2c., 2d., 2f., 3c., 3d., 3f., 5c. and 6c. may not compute to the figures reported for those items. However, all rounded entries reported in the table are correct to two decimal places.

Table 8

Population Estimates of First-Paid Layoff Incidence and Rates
for Charged and Free Layoffs to Layoff Firm by Tax Rate, Industry and Firm Size

	First-Paid Layoff Proportions for All Firms		First-Paid Layoff Rates for All Firms			Free Proportion of First UI Layoffs for All Firms
	Proportion with UI Paid Layoffs (1 PD)	Proportion of Layoff Firms with First Layoffs that Include Only Free Layoffs $\left(\frac{\text{NO CHG}}{1 \text{ PD}}\right)$	1 PD	NO CHG	CHG 1 PD	$\left(\frac{\text{NO CHG}}{1 \text{ PD}}\right)$
			EMP	EMP	EMP	
Total	0.32	0.11	0.05	0.01	0.04	0.27
1987 Tax Rate Distribution						
1) 0.80% (minimum)	0.15	0.30	0.02	0.01	0.01	0.31
2) 0.81-1.99%	0.44	0.02	0.02	0.00	0.01	0.23
3) 2.00-3.49%	0.39	0.10	0.03	0.01	0.02	0.26
4) 3.50-4.99%	0.37	0.12	0.04	0.01	0.03	0.16
5) 5.00-7.29%	0.48	0.12	0.05	0.01	0.03	0.27
6) 7.30% (maximum)	0.48	0.02	0.14	0.04	0.10	0.31
Industry						
1) Construction	0.32	0.09	0.19	0.08	0.12	0.39
2) Manufacturing	0.62	0.06	0.06	0.01	0.05	0.21
3) Trans./Commun./Pub. Util.	0.26	0.03	0.03	0.01	0.02	0.25
4) Wholesale Trade	0.38	0.04	0.05	0.01	0.04	0.18
5) Retail Trade	0.21	0.07	0.02	0.00	0.01	0.22
6) Fin./Ins./Real Estate	0.26	0.10	0.03	0.00	0.02	0.15
7) Services	0.32	0.22	0.04	0.01	0.03	0.27
8) Other	0.48	0.05	0.06	0.01	0.05	0.18
Firm Size (# Annual Workers for 1987)						
1) 1-10	0.17	0.20	0.05	0.01	0.04	0.16
2) 11-50	0.41	0.07	0.05	0.01	0.04	0.21
3) 51-250	0.70	0.10	0.05	0.02	0.04	0.29
4) 251-1,000	0.89	0.01	0.06	0.02	0.04	0.38
5) 1,001+	0.95	0.01	0.04	0.00	0.03	0.13

Table 9

Population Estimates of Employment, Layoffs and Layoff Weeks by Selected Firm Characteristics^a

	Distribution of Total Employment by Firm Characteristics	Distribution of First UI Paid Layoffs by Characteristics of Layoff Firms		Distribution of Total Weeks of UI Benefits Paid by Characteristics of Layoff Firms
		Total Layoffs	Free Layoffs	
<u>1987 UI Tax Rate:</u>				
1) 0.80% (minimum)	0.13	0.05	0.06	0.08
2) 0.81-1.99%	0.15	0.06	0.05	0.07
3) 2.00-3.49%	0.19	0.10	0.09	0.11
4) 3.50-4.99%	0.22	0.16	0.09	0.18
5) 5.00-7.29%	0.12	0.11	0.11	0.12
6) 7.30% (maximum)	0.18	0.52	0.60	0.45
<u>Industry:</u>				
1) Construction	0.07	0.29	0.42	0.20
2) Manufacturing	0.19	0.24	0.18	0.23
3) Trans./Commun./Pub. Util.	0.05	0.03	0.03	0.04
4) Wholesale Trade	0.08	0.08	0.05	0.08
5) Retail Trade	0.23	0.09	0.07	0.11
6) Fin./Ins./Real Estate	0.07	0.04	0.02	0.06
7) Services	0.26	0.20	0.19	0.24
8) Other	0.04	0.04	0.03	0.04
<u>Firm Size (# Annual for Workers for 1987):</u>				
1) 1-10	0.07	0.07	0.04	0.10
2) 11-50	0.21	0.21	0.17	0.23
3) 51-250	0.40	0.40	0.44	0.38
4) 251-1,000	0.19	0.22	0.31	0.19
5) 1,001+	0.13	0.09	0.04	0.10

^a The column total for each characteristic equals 1.000.

APPENDIX

Sampling Procedures and Data Collection*

* The material in section I. of this Appendix is adapted from Burgess and St. Louis (1990, Appendix D).

The firm sample analyzed originally was provided by the Illinois Department of Employment Security (IDES) for an analysis of compliance with UI reporting provisions described in Burgess and St. Louis (1990). For the current study, we select a subsample of those firms based on firm size. Then, all employees of the smaller subsample firms and a sample of the workers employed by the larger ones were selected. These sampling procedures and some characteristics of the firms analyzed are discussed in this appendix.

I. The Firm Sample for Burgess and St. Louis (1990)

Samples were drawn for the Burgess and St. Louis (1990) study from three distinct populations of Illinois covered employers as of the third quarter of 1987: employers who reported zero employment for 1987.3; employers who were delinquent in filing their 1987.3 reports; and all other employers (referred to as "regular" employers). These procedures are explained in this section.

Sample Selection: Regular Employers

Regular employers were computer sampled by IDES according to the following procedure. Three sorts were applied to the 1987.3 employer master file before sampling. The primary sort was based on 10 major SIC industry groups (including other). The secondary sort was based on eight 1987 UI tax rate categories (from 0% through 8% in one percentage point increments). The final sort was based on company size, defined as the median number of employees reported by the company for the months of July, August and September of 1987. A systematic sample then was selected from this sorted employer file, resulting in the selection of 933 regular employers for Burgess and St. Louis (1990).

Sample Selection: Zero Employment and Delinquent Employers

Zero employment and delinquent employers were manually selected from computerized listings of all 1,657 zero-employment employers and 20,653 delinquent employers as of the third quarter of 1987. Different information was available for delinquent and zero-employment employers, so somewhat different sampling procedures were used for each.

Reported company size for 1987.3 obviously was not available for firms that were delinquent in filing IDES reports at the time the three population subgroups were identified for sampling. Accordingly, delinquent employers were sorted by industry and tax rate (but not by company size). Then, a systematic sample of delinquent employers was selected manually from this sorted population, resulting in a sample of 123 delinquent employers.

There were relatively few zero-employment firms in the population, so industry and tax rate sorts were not used for these employers. However, it was desirable to have the zero-employment sample subject to approximately the same noncompletion proportion (due to out-of-state records) that applied to other employers. Consequently, zero-employment firms were sorted by ZIP code prior to sampling. A sample of 66 zero-employment employers were selected for the Burgess-St. Louis compliance study. (Several of the delinquent employers discussed above also ultimately reported zero employees.)

Data Collection, Encoding and Reconciliation

The novel data for the firms in Burgess and St. Louis (1990) came from comprehensive field audits as well as a substantial amount of information already contained in IDES data bases. Given the large number of firms and the necessity of merging data from different sources, procedures were adopted to verify the final status of all sampled firms. As an

outcome of the verification process, each employer was assigned a disposition code and a status code. The original status and ultimate disposition for all sampled cases are summarized in Appendix Table 1. Audits for companies with disposition codes 3 through 8 in this table were not completed. The consequences of not completing audits for some of the sampled companies are discussed in a subsequent section on reliability and validity.

Weights

The completion rates (and noncompletion reasons) for the sample firms selected from the three population subgroups are reported in Appendix Table 1. The procedure for assigning weights differed for the zero-employment, delinquent and regular employer population subgroups. Accordingly, the weighting procedure is explained separately for each population subgroup.

Zero Employment Employers. If audits had been completed for all 66 of these sampled employers, the weight for each company would be $1657/66$ (population size/sample size). However, as shown in Appendix Table 1, nine of these companies had tax records located outside of Illinois. Audits were completed for all 57 of the remaining in-state employers that reported zero employees. Hence, the weight assigned to each in-state employer was $1476/57$ (total # of zero employment in-state companies/# of completed zero employment in-state company audits). But it also should be noted that over half of the sample firms with zero employees in Burgess and St. Louis (1990) ultimately came from the delinquent employer population discussed immediately below.

Delinquent Employers. The procedure for assigning weights to delinquent employers was very similar to the one used for the zero-employment category. Below is a summary from Appendix Table 1 of the disposition for these 123 sampled firms:

Original Sample	=	123
Less Out-of-State	=	-11
Less Terminated	=	-36
Less Refused to Cooperate	=	<u>-5</u>
Completed	=	71

Since no audits could be completed for the 52 firms in the out-of-state, terminated or refused-to-cooperate categories, the weight assigned to each delinquent in-state employer was 13,162/71 (estimated # of non-terminated delinquent in-state companies/# of completed non-terminated delinquent in-state company audits).

Regular (Computer Sampled) Employers. The weight assignment procedure was the most complicated for the computer sampled companies. As shown below in the disposition summary from Appendix Table 1, audits were completed for 750 of the 993 sampled firms in the regular employer subpopulation:

Original Sample	=	993
Less Out-of-State	=	-219
Less Protested	=	-5
Less Admin. Decision	=	-4
Less Terminated	=	-7
Less Refused to Cooperate	=	-1
Less Not Assigned	=	<u>-7</u>
Completed	=	750

Because the probability of sample inclusion for regular employers varied directly with firm size, the population was divided into the size categories shown in Appendix Table 2 (based on median monthly employment reported for 1987.3). A large number of size categories was

used to ensure that the probability of being included in the sample was nearly the same for each firm belonging to that size category.

The sampling procedures used for regular employers made it possible to: analyze the sample as a stratified random sample; and assign a weight to each sampled firm based on the size category of that firm. The formula used to assign weights was [total number of firms in the i^{th} size category] \div [number of sampled firms in the i^{th} size category for which audits were completed (or could not be completed due to out-of-state records)]. Clearly, unweighted means, and any inferences derived from them, could be very misleading. For example, the unweighted average company size for this sample would be much larger than the average company size for the population of covered employers, and estimating the total number of workers based on this unweighted mean (total number of companies times unweighted average company size) would substantially overestimate the total number of covered employees in Illinois during 1987.3. Accordingly, weighted means are reported in all text tables, and unweighted sample means are reported only in Appendix Table 4, which is discussed in a subsequent section. The sample weights used for regular employers are shown in Appendix Table 2.

Reliability and Validity

The number of assigned but incomplete audits is very small, as shown in Appendix Table 1. All of the audits for in-state firms that reported zero employment were completed. Five of the delinquent employers with in-state records refused to cooperate, but they were not clustered around a single size, industry, or tax rate. Hence, their omission is not likely to introduce any important bias.

Twenty-four of the audits for regular, in-state employers were not completed, as shown in Appendix Table 1. With the exception of the administrative decisions (three of the four firms for which audits were administratively closed produced the same product), these companies were not clustered around a single size, industry, or tax rate. Hence their omission is not likely to introduce any major bias.

Overall, the sampling and data collection appear to have been carried out very carefully for the firms analyzed in Burgess and St. Louis (1990). The audits were extremely comprehensive, almost all of the assigned audits were completed, and the sampling plan was adhered to quite closely. In short, substantial nonsampling errors or biases that could contaminate these data appear to be very unlikely.

II. Sampling to Reduce Search Space for Matched Firm-Worker Records

The interest in this study is the layoff behavior of firms through time. This required the matching of individual firm records with individual worker records in IDES data files. This process is immensely complex because employee records must be matched to individual firms over a fairly long time period, and these individual employee records are organized by worker rather than firm identification numbers. Moreover, the individual records for firms and workers are located in different data files, and the worker records themselves are separated depending on the time period involved. Because the Illinois system contains a very large number of individual employee records, it obviously is a difficult and time consuming process to search claimant records to find employees who match the firms in the sample. Accordingly, only a sample of the 878 firms analyzed in Burgess and St. Louis (1990) was

included for this study, and two firms with incomplete information were excluded. For the remaining firms, all those with 1987.3 reported employment of either 0-99 or 2,000+ workers were included, because there were relatively few such firms in the original sample. However, because there was a fairly large number of firms in the other size categories, one-half of the firms with 1987.3 reported employment of 100-599 and one-third of the firms with 1987.3 reported employment of 600-1999 were randomly excluded. These firm sampling procedures reduced the number of firms we analyze to 611.

The sampling to reduce the number of firms narrowed the search space, but approximately 1.5 million matched firm-worker records still remained. Thus, to further reduce the scope of the search process, all employees of smaller firms but only a random sample of those employed by larger firms were included in the final employee-firm match process (the employee sampling weights are reported in Appendix Table 3). This reduced the final number of matched firm-worker records for this study to 84,000 for the 611 firms analyzed. Some characteristics of the 611 firms we analyze are reported in Appendix Table 4, and briefly discussed in Section III of the text.

Appendix Table 1

Study Employers for Burgess and St. Louis (1990): Disposition by Status^a

Disposition Code	Status Code			Total
	1	2	3	
1	750	71	57	878
2	0	0	0	0
3	219	11	9	239
4	5	0	0	5
5	4	0	0	4
6	7	36	0	43
7	1	5	0	6
8	7	0	0	9
Total	993	123	66	1,192

^a The status codes are:

- 1 = regular employer
- 2 = delinquent employer
- 3 = zero employment employer

The disposition codes are:

- 1 = complete
- 2 = pending
- 3 = out-of-state
- 4 = protested
- 5 = administrative decision
- 6 = terminated
- 7 = refused to cooperate
- 8 = not assigned

Appendix Table 2
Sampling Weights for Regular Employers

Size Class	Weight	Size Class	Weight
1	35795/11	86-90	408/15
2	26821/16	91-95	380/ 7
3	19848/16	96-100	376/14
4	15250/16	101-120	1019/25
5	12102/15	121-140	757/26
6	9575/15	141-160	501/24
7	7707/12	161-180	432/17
8	6593/16	181-200	331/16
9	5279/14	201-220	282/16
10	4612/ 8	221-240	217/10
11	3713/11	241-260	181/14
12	3554/ 8	261-280	165/10
13	3015/ 8	281-300	133/ 9
14	2710/10	301-340	195/20
15	2371/ 8	341-380	164/16
16	2020/11	381-420	138/ 8
17	1754/10	421-460	96/15
18	1712/ 5	461-500	94/11
19	1337/ 7	501-550	89/12
20	1456/ 8	551-600	65/12
21-25	5334/36	601-700	96/13
26-30	3596/23	701-800	89/17
31-35	2678/21	801-900	69/14
36-40	2094/21	901-1000	41/ 8
41-45	1733/15	1001-1200	61/19
46-50	1389/17	1201-1400	51/17
51-55	1152/19	1401-1600	38/13
56-60	958/14	1601-1800	38/18
61-65	798/17	1801-2000	25/ 9
66-70	715/14	2001-2500	27/10
71-75	611/ 7	2501-3000	25/20
76-80	535/13	3001-3689	15/11
81-85	457/ 5	3690 & up	56/56

Appendix Table 3
Employee Sampling Weights

Reported Number of 1987.3 Employees	Weight
0-59	1/1
60-499	1/2
500-999	1/3
1000-1999	1/5
2000-3999	1/10
4000-5999	1/20
6000-9999	1/30
10000-19999	1/40
20000+	1/60

<u>Industry:</u>	
Construction	.075
Manufacturing	.192
Trans./Commun./Public Utilities	.054
Wholesale Trade	.093
Retail Trade	.211
Finance/Insurance/Real Estate	.092
Services	.246
Other	.038
<u>1987 Tax Rate Distribution:</u>	
0.80% (minimum)	.162
0.81-1.99	.159
2.00-3.49	.180
3.50-4.99	.208
5.00-7.29	.120
7.30 (maximum)	.172
<u>Mean 1987 Tax Rate:</u>	3.622
<u>Firm Size (# Annual Workers):</u>	
1-10	.121
11-50	.296
51-250	.336
251-1,000	.131
1,001+	.116
<u>Mean Employment:</u>	
1987 Total - All Firms	997
1987.3 - All Firms	734
1987.3 1987 total - All Firms	.694
1987 Total - Firms with Layoffs	1507
1987 Total - Firms with Repeat Layoffs for Some Workers	2270
<u>Total 1987 Earnings Per Worker:</u>	
< \$5,000	.229
5,000-10,000	.228
10,000-15,000	.157
15,000-20,000	.139
20,000-25,000	.102
25,000+	.146
<u>1987 Earnings</u>	
Total/Worker	\$14,158
Taxable/Worker	5,274
Taxable/Total Wages	.527
<u>Prior Earnings - Workers on Layoff:</u>	
Base Period Wages/Worker	\$ 6,185
<u>Organization Type:</u>	
Sole Proprietorship	.085
Partnership	.046
Corporation	.820
Other	.049
<u>Mean Number of Establishments:</u>	2.329
<u>Mean Number of Quarters in Business:</u>	55.142
<u>Mean Ratio of 1099 Issued to Total Employment + 1099 Issued:</u>	.090

REFERENCES

- Anderson, Patricia M. "Linear Adjustment Costs and Seasonal Labor Demand: Unemployment Insurance Experience Rating in Retail Trade." Princeton University Department of Economics Working Paper (November 1990).
- Baily, Martin N.: "On the Theory of Layoffs and Unemployment," Econometrica, (July 1977): 1043-1063.
- Becker, Joseph. Experience Rating in Unemployment Insurance, Baltimore, Md.: Johns Hopkins Press, (1972).
- Brechling, Frank. "Layoffs and Unemployment Insurance," in Sherwin Rosen, ed., Studies in Labor Markets, NBER Conference on Income and Wealth. Chicago, Ill.: University of Chicago Press (1981): 187-207.
- _____. "The Tax Rate Base of the U.S. Unemployment Insurance Tax: An Empirical Analysis." Review of Economics and Statistics (February 1980): 32-44.
- _____. "The Incentive Effects of the Unemployment Insurance Tax," in Ronald G. Ehrenberg (ed.) Research in Labor Economics. 1. JAI Press (1977): 41-102.
- Brown, Eleanor P. "Unemployment Insurance Taxes and Cyclical Layoff Incentives," Journal of Labor Economics (January 1986): 50-65.
- Burdett, K. and B. Hool, "Layoffs, Wages and Unemployment Insurance," Journal of Public Economics (August 1983): 325-57.
- Burgess, Paul L. and Robert D. St. Louis, "Employer Compliance with Illinois Unemployment Insurance Reporting Requirements." Chicago, Ill.: Illinois Department of Employment Security (February 1990).
- Feldstein, Martin, "The Effect of Unemployment Insurance on Temporary Layoff Unemployment," American Economic Review (December 1978): 834-46.
- _____. "Temporary Layoffs in the Theory of Unemployment," Journal of Political Economy (October 1976): 937-57.
- Halpin, Terrence, "The Effect of Unemployment Insurance on Seasonal Fluctuations in Employment," Industrial and Labor Relations Review (April 1979): 353-62.
- Haltiwanger, John C. "The Distinguishing Characteristics of Temporary and Permanent Layoffs," Journal of Labor Economics (October 1984): 523-38.
- Hart, R.A., "Unemployment Insurance and the Firm's Employment Strategy: A European and United States Comparison," Kyklos, (1982-Fasc. 4): 648-72.

Illinois Department of Employment Security. "Illinois Unemployment Insurance Act." Chicago, Ied.: Illinois Department of Employment Security (January 1988).

National Foundation for Unemployment Compensation. Highlights of State Unemployment Compensation Laws. Washington, D.C.: National Foundation for Unemployment Compensation (January 1987).

Saffer, Henry. "The Effects of Unemployment Insurance on Temporary and Permanent Layoffs," Review of Economics and Statistics, (Nov. 1983): 647-52.

_____. "Layoffs and Unemployment Insurance." Journal of Public Economics (October 1982): 121-9.

_____. "The Effects of Experience Rating on the Unemployment Rate," in Unemployment Compensation: Studies and Research. Vol. 2, Washington, D.C.: The National Commission on Unemployment Compensation (1980): 425-30.

Topel, Robert H. "Financing Unemployment Insurance: History, Incentives, and Reform." In Hanson, W.L. and Byers, J.F. ed., Unemployment Insurance: The Second Half-Century, The University of Wisconsin Press (1990).

_____. "Unemployment and Unemployment Insurance." In Ronald G. Ehrenberg, (ed.), Research in Labor Economics 7 JAI Press (1985): 91-136.

_____. "Equilibrium Earnings, Turnover and Unemployment: New Evidence," Journal of Labor Economics (October 1984a): 500-22.

_____. "Experience Rating of Unemployment Insurance and the Incidence of Unemployment." Journal of Law and Economics 27 (April 1984b): 61-90.

_____. "On Layoffs and Unemployment Insurance." American Economic Review (September 1983): 541-59.

Vroman, Wayne. "Experience Rating in Unemployment Insurance: Some Current Issues." Washington, U.S. Department of Labor UI Occasional Paper 89-6 (1989).

Wolcowitz, J. "Dynamic Effects of the Unemployment Insurance Tax on Temporary Layoffs." Journal of Public Economics (November 1984): 35-51.

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