Longitudinal Employer - Household Dynamics

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Employer-Provided Benefit Plans, Workforce Composition and Firm Outcomes

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I. **Introduction**

What types of firms offer benefits to their workers – and what workers are covered as a result? Do firms that offer benefits experience good results? The aging of the U.S. workforce, combined with the looming financial burden of the Social Security program, has increased the urgency of answering these questions. However, doing so has been hampered by a lack of data combining detailed information on benefit plans with characteristics of employers and their employees. This paper presents an initial step in filling this gap through construction and analysis of a new dataset that combines administrative data on benefit plans with integrated employer-employee data that provide detailed information on workforce composition, earnings and turnover for over 1 million U.S. businesses and their employees.

Our empirical work addresses three issues:

1. What are the differences between firms that provide benefits and firms that don't? In particular, how do their workforces differ?
2. What is the relationship between firms' wage distributions and benefits?
3. Is there an important relationship between the provision of benefits and subsequent firm survival?

We begin by briefly describing the literature that informs our analysis. The next section describes the construction and unique characteristics of the dataset. This is followed by an investigation of the relationship between benefits provision and workforce composition and turnover, and then by estimation of the relationship between benefit provision and subsequent firm survival. We conclude by summarizing our results.

II. Background

Hedonic wage models posit that firms differ in their costs of providing non-wage compensation, perhaps because of economies of scale in benefit provision or differing access to particular types of benefits plans. Workers face a continuum of different compensation packages given by the envelope of firms' varying wage/benefit isoprofit lines, as in the standard textbook by Ehrenberg and Smith (1996, 6th ed., p. 247). Variation in workers' willingness to trade off wages and benefits leads to sorting of workers into firms on the basis of fringe benefit offerings. U.S. tax policy encourages the provision of benefits by eliminating or deferring taxes on pensions, life, and health insurance, thereby shifting the wage/benefit trade off faced by workers.

In this model, sorting serves to match workers with their preferred compensation package and to minimize employers' costs of employing labor. But if workers' productive characteristics are correlated with their demands for benefits, employers will take those effects into account as well in designing compensation packages. For example, employers may offer better benefits to reduce turnover and to attract and keep a better pool of workers. In this way, compensation strategy may have important effects on firm outcomes such as productivity, profitability, and survival.

In this section we discuss what the existing empirical literature tells us about the relationship between benefits, worker characteristics, and firm outcomes. We then identify some unsettled empirical issues that our data can be used to address.

Workforce composition and turnover

A long literature has documented that both pensions and health insurance are associated with lower turnover. For pensions, economists working with household surveys have found a negative relationship between pensions and quit rates for both defined benefit (DB) and defined contribution (DC) plans. Implicit contract theory has been the primary explanation for this pattern: deferred compensation arrangements make quitting costly and lead to self-selection so that firms offering pensions end up with a workforce made up of stayers. One problem for this theory has been the finding that quit rates are low for firms offering DC plans as well as those offering DB plans, despite the fact that DC plans impose much smaller quitting costs (Gustman and Steinmeier, 1993; Even and Macpherson, 1996; Ippolito, 2002).

Ippolito (2002) argues, based on evidence of turnover patterns and DC contribution rates after the federal government's switch from a DB to a largely DC plan, that this pattern arises because pensions in general attract savers, and that those who save at a higher rate also have lower quit propensities. Another explanation is that firms with pensions may also pay higher wages than firms without, and that the difference in wages is what accounts for lower turnover (Even and Macpherson, 2001).

Changes in Benefits

The amount and forms of employer provided benefits have changed substantially in the last few decades. Employers have shifted away from defined benefit (DB) pension plans first toward defined contribution (DC) plans (Papke, 1999; Mitchell, 1999), and more recently towards hybrid cash balance plans (Copeland and Coronado, 2002).

Research in this area has pointed to the introduction of 401(k) plans, other changes in the tax code (Papke, 1999; Ippolito, forthcoming), and changes in the industry and firm size distribution of the U.S. economy (Gustman and Steinmeier, 1992) as contributing to these shifts. But increased demand by an increasingly mobile workforce for more portable plans (Copeland and Coronado, 2002), and better ability to attract and retain the right workers (Ippolito, 1997), are also thought to be important.

Wage/fringe trade-offs

The notion that workers pay for their benefits through reduced wages underlies much of the work in this area. But empirical work on both pensions and health insurance has often found a positive association between wages and benefits (holding constant worker characteristics) that seems at odds with this theory.[1] There is nothing surprising about a positive association between total compensation and the level of fringe benefits, but what is a puzzle is why overall compensation varies for what appear to be similar workers.

Dual labor market theory (Bulow and Summers, 1986; Dickens and Lang, 1985) postulates that there are two sectors: one with 'good' jobs that pay well and have good working conditions, including fringe benefits; and a second with 'bad' jobs having low pay and few benefits. Alternatively, inadequate controls for worker productivity could also explain this result, as more productive workers would have higher compensation packages and so would prefer to have higher levels of fringe benefits.

[1] Currie and Madrian (1999) review the literature on wage/health insurance trade offs. Ippolito (1994) discusses the literature on compensating differentials for pensions.

Firm outcomes

Another important issue is the impact of benefit provision on firm outcomes. Since benefit choices directly affect recruitment and retention of the most critical factor of production – labor – the effect on firm outcomes such as productivity, firm growth, and survival are likely to be non-trivial. In addition to workforce composition, benefits may also affect productivity more directly by altering employees' incentives to invest in firm-specific knowledge or by reducing turnover and training costs (Even and Macpherson, 2001). While theory suggests that firms optimally choose benefit levels by equating the value of productivity gains resulting from worker investment with the costs of benefit provision, lack of information about the returns to such investment, or possibly lack of access to low-cost plans, might lead to under-investment, even with favorable tax treatment.

Value of employer-employee data in this context

This literature leaves important questions unanswered, primarily due to data constraints. Household surveys cannot provide detailed information about firm characteristics, workforce composition, and turnover. Nor can such data offer a longitudinal perspective on firm outcomes. Similarly, business surveys cannot provide detailed information on workers and worker outcomes. The difficulty of adequately controlling for worker quality in analyzing the wage/benefit/turnover relationship makes longitudinal data of great importance. For these reasons, developing longitudinal employer-employee data is of great value to this area of research.

Three approaches are possible. One is to mount a survey that asks respondents for contact information for their employers, and then goes to their employers to ask about the details of benefit plans. Several surveys have taken this approach. The Health and Retirement Survey and the National Longitudinal Survey of Mature Women have collected pension information in this way while the Medical Expenditure Panel Survey has used this method to collect health insurance information. An alternative approach is to first sample employers and then contact a sample of their workers, an approach that was tried in the Canadian Workplace and Employee Survey (described in Krebs et al, 1999). However, these approaches have the drawback that they cannot be adapted to provide longitudinal information on both employers and employees, along with information on multiple employees at each employer, without being extraordinarily costly and complex. Thus for the questions we would like to address here, these data collection methods are inadequate.

We take a third approach using administrative data that has longitudinal information on both firms and workers, and includes data for the universe covered by these administrative systems, as opposed to a sample. With observations on multiple workers at a firm, and on multiple employers for a given worker, these data permit construction of measures of the portable component of skill for individual workers, and of any wage premia or discount associated with individual firms, after controlling for the quality of their workers.

III. Data and Approach

We posed three questions in the introduction: What are the differences between firms that provide benefits and firms that don't? What is the relationship between wages and benefits? What is the relationship between the provision of benefits and subsequent firm survival? Since data availability drives our approach to these issues, we first describe construction of the dataset, and then turn to our empirical methodology.

Dataset construction

The ideal dataset to answer our first two questions – about the incidence of firm provided benefits and the relationship to firm earnings distributions- would have business microdata with information on whether the business provided benefits, detailed benefit provisions, workforce composition, turnover, and the distribution of worker earnings. Understanding the effect on firm survival in addition requires longitudinal data.

The data with which we work has all of these features. It combines data from four sources of information:

- Firm reports on benefit plans offered to employees (the Internal Revenue Service/Department of Labor Form 5500 file);
- The Census Bureau's Business Register (BR);
- Unemployment Insurance (UI) wage record data; and
- The Census Numident file.

Benefit information comes from the IRS Form 5500 file, made up of annual reports on employee benefit plans that the sponsor (usually the employer) is responsible

for filing. The filing is required under ERISA for most types of tax-preferred benefits. The IRS shares this information with the Department of Labor, who in turn makes it publicly available under the Freedom of Information Act. In the results presented later in the paper we use information on plans that end in 1997, drawing from the 1996-1998 data files.

These data contain information about employer-provided pensions (defined benefit and various types of defined contribution plans), 'welfare' plans (e.g. health, life, supplemental unemployment, and disability insurance plans) and 'fringe benefit' plans (cafeteria or flexible benefit plans and educational assistance plans). In addition to these variables describing plan features, the data also include name, address, and an EIN for the plan sponsor.

Figure 1

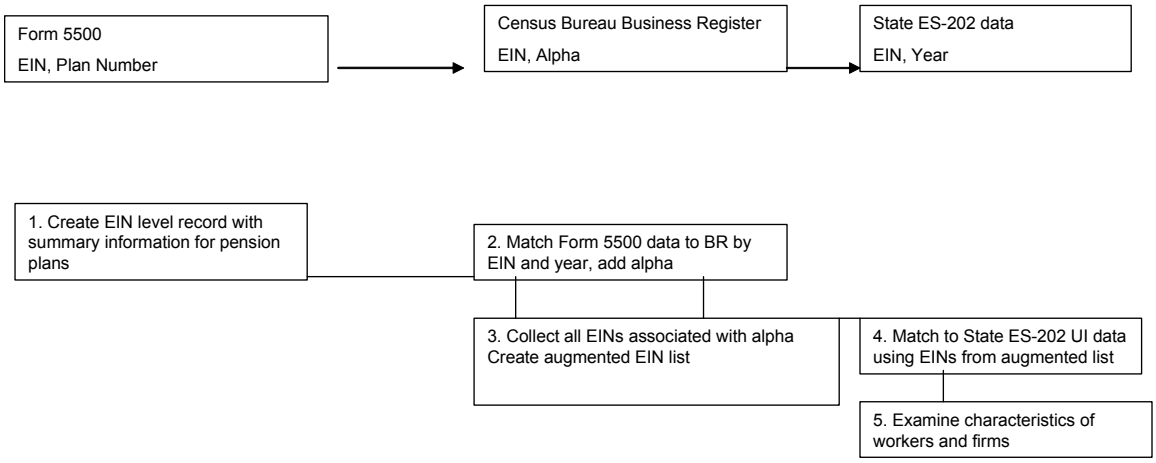

Figure 1 describes how the dataset is constructed. The 5500 files are first integrated with Census's Business Register using sponsor EINs. The BR (historically known as the Standard Statistical Establishment List, or SSEL) is a list of all private

establishments with paid employment.[2] It is constructed from a variety of administrative and survey sources, but its backbone is quarterly employment tax filings that include EINs. The quinquennial economic censuses and the annual Company Organization Survey are used to identify different locations that may file under a single EIN. These sources are also used, in combination with administrative data, to identify different EINs that may be affiliated through parent-subsidiary relationships.

A major complication in integrating the 5500 data and the BR is that each plan reports a single EIN, but many large firms use multiple EINs. For 5500 EINs that appear on the BR as part of a multi-location firm, we use information on company structure from the BR to identify any other EINs (and affiliated establishments) that belong to the same company. One difficult question is whether a particular benefit is in fact offered to all establishments belonging to a company, or only to establishments reporting under the EIN appearing on the 5500 form. For now, we treat all parts of a company as offering benefits if at least one EIN belonging to that company matches to the 5500 file.

The UI wage record data have been extensively described elsewhere (Burgess, Lane and Stevens 2000), but it is worth noting several salient characteristics. First, the data are longitudinal in both firms and workers – permitting an analysis of the dynamics of employment growth, workforce change, and firm entry and exit from the mid-1990s to 2001. Second, because earnings data are available, it is possible to analyze both earnings and employment outcomes for workers in each business. Finally, the data are almost universal in nature – capturing some 98% of employment in each state for which the data

[2] An establishment is defined as a single physical location where business is conducted or where services or industrial operations are performed.

are collected. We report results for 6 states (Illinois, Florida, Minnesota, Maryland, North Carolina and Texas).

Although the UI wage record data are very rich in terms of sample size and coverage, they have no demographic information attached to them. Hence, we have assembled the fourth piece of the puzzle by matching the records with internal administrative records that have information on date of birth, place of birth, race and sex for all workers – the Census Numident - thus providing limited demographic information.

In addition, LEHD program staff have created measures of both firm and individual worker fixed effects (see Abowd, Lengermann, and McKinney, 2002). These estimates are based on the following wage equation:

$$(1) \qquad w_{ijt} = x_{it}\beta + \theta_i + \psi_{J(i,t)} + \varepsilon_{ijt}$$

The components provide, for each worker, a measure of the portable component of their skill (θ_i), and for each firm, a measure of the premium (or discount) that the firm pays observationally equivalent workers ($\psi_{J(i,t)}$).

In our empirical results we use the following as a measure of general human capital:

$$(2) \qquad h = x_{it}\beta + \theta_i$$

where x_{it} is quarters of experience. As described in Abowd, Haltiwanger, et al (2002), a six-state distribution of human-capital was created and individual workers were classified as low-skill or high-skill depending on their location in this distribution. Summary level statistics for firms were created by calculating the percentage of workers at each firm that belonged to each quartile of the overall human-capital distribution.

Data Coverage

In the results that follow, we use the presence of a matching record in the 5500 file as an indicator that a firm offers benefits for all of its establishments on the BR. Whether this is a reasonably accurate measure depends first on the filing requirements for the Form 5500—do all plans in fact appear in that file?—and secondly on our success in matching employers to the file if the plan they offer is in fact in it.

Filing requirements differ somewhat for pensions and other types of plans (welfare or fringe benefit plans). For pensions, only church plans and certain types of plans for small employers and the self-employed are exempt from the requirement to file.[3] Pension plans with fewer than 100 participants are required to provide less information than larger plans, but are generally required to file. Small welfare and fringe plans are more likely to be exempt from filing, as plans of these types with fewer than 100 participants are not required to file if they are either unfunded (that is, the employer pays the costs out of general funds) and/or fully insured through an insurance provider (for example Blue Cross/Blue Shield). Hence only plans that are self-insured are required to file and since self-insurance rates are fairly low among small health insurance plans,[4] most small health plans are probably not included in the 5500 file.

[3] Simplified Employee Pension (SEP) plans are exempt, as are Savings Incentive Match Plans for Employees (SIMPLE) if they take the form of an IRA (but not SIMPLE 401(k) plans). Both plans can be used only by employers with at most 100 eligible employees. SEP plans do not allow for employee contributions, and employer contributions must be a fixed percentage of pay up to a maximum.

[4] In 1997 among firms with fewer than 100 employees, 14.7% of establishments that offered health insurance self-insured at least one plan. (*1997 Employer-Sponsored Health Insurance Data. Private-Sector Data by Firm Size, Industry Group, Ownership, Age of Firm, and Other Characteristics.* July 2002. Agency for Healthcare Research and Quality, Rockville, MD. http://www.meps.ahrq.gov/mepsdata/ic/1997/index197.htm)

For most plans, the employer and sponsor are one and the same. In these cases, Form 5500 provides the employer EIN and integration with the BR is straightforward. However, plans that involve multiple employers present more challenges. Taft-Hartley plans are sponsored by trade unions—generally in occupations where employers have few employees and workers often change employer without changing occupation, such as electricians or plumbers. Typically union labor contracts for workers covered by these plans would require an employer to pay a certain amount per hour into the plan, and workers would have some ability to maintain the same coverage while between jobs, as well as from one job to the next. These plans are included in the 5500 file, but the EIN associated with such a plan belongs to the trade union rather than to any particular employer. The challenge here is to develop a method to identify participating employers, a task we are still working on. 'Group insurance arrangements' present a similar problem in that these plans appear on the 5500 file, but the link would be to the sponsoring organization (e.g. a trade association) rather than to the employers involved. Taft-Hartley plans account for approximately 9 percent of total pension plan enrollment (U.S. DOL, 2001), based on enrollment numbers from the 1997 5500 file. Group insurance arrangements account for a much smaller fraction of enrollment.

We are able to match 97% of the EINs in the 5500 file to the 1997 BR.[5] Limiting our analysis to payroll active records in the BR, gives us a match rate of 88%. However, only about 12.3% of the 5.9 million businesses in the Census Business Register have a match to a 5500 form. The evidence presented in the appendix in Tables A2, A3 and A4 suggests that the vast majority of companies that do not match to the Form 5500 data are in fact very small companies. Of the non-matches, 55% have 5 or fewer employees, and

an additional 23% have between 6 and 25 employees. Large firms (>=100 employees) account for only .64% of all non-matches but they do account for 13.1 % of all matches. These results are no surprise, but are reassuring. Larger firms are more likely to offer benefits and are also more likely to be required to file Form 5500 given that they offer plans. Even more encouraging, it appears that the majority of large firms in the Business Register can actually be matched to a Form 5500 filing.

Table 1: Match Rate to Business Register

	Frequency	Percent
Match to BR-Single-unit file	536,009	73.26%
Match to BR-Multi-unit file	107,564	14.70%
No match to active record of SSEL	88,036	12.03%
Total EINs in 5500 file	731,609	100.00%

The employment coverage is presented in Table 2. The firms in the Business Register that have a match in the 5500 file employ about 65% of all workers (75 million out of the 116 million in the workforce). About 89% of workers who work for multi-unit firms are employed by matching firms, compared with 38% of single-unit firms.

[5] Extensive documentation of the matching exercise is provided in Decressin et al. (2003).

Table 2: Match Statistics by Employment

Employment	*Single-Units*	*Multi-Units*	*Total*
Match	21,000,884	54,068,338	75,069,222
(Row percentages)	27.98%	72.02%	100.00%
(Column percentages)	*38.37%*	*88.76%*	*64.91%*
Non-Match	33,732,412	6,847,410	40,579,822
	83.13%	16.87%	100.00%
	61.63%	*11.24%*	*35.09%*
Total	54,733,296	60,915,748	115,649,044
	47.33%	52.67%	100.00%
	100.00%	*100.00%*	*100.00%*

Because of filing exemptions and difficulties in matching, we expect coverage to be incomplete for small firms and in industries with large numbers of Taft-Hartley plans. For this reason, in some of what follows we present results for only manufacturing or wholesale (industries with little Taft-Hartley coverage) and only for larger firms (those with at least 100 employees).

The last piece of the puzzle involved the integration of the Business Register with UI wage record data and Census Numident data. LEHD program staff has spent a great deal of effort integrating the Census Numident with UI wage record data, and the results are documented elsewhere (LEHD technical TP2002-05). Here we simply note that about 96% of the records in each state's UI wage records data can be matched to the Numident, which provides place of birth, date of birth and sex information for matched workers.

IV. Results

What are the differences between firms that offer benefits and those that don't?

We begin by comparing the characteristics of firms that offer benefits with those that don't in Table 3. Our firm-based analysis yields the basic results found in the previous literature:

- larger firms (both those with more employees and those with more establishments) are more likely to offer benefits
- there is substantial inter-industry variation in benefit offerings
- firms offering benefits have higher proportions of male, native-born, white and prime-age workers than those that don't.

A less expected result is that benefit-providing firms actually have higher rates of labor churning. Churning measures the number of accessions and separations that occur at a firm over one quarter, above and beyond those needed to allow for the firm's net growth or shrinkage over that period.[6]

[6] The formula used is (|A+S| - |E-B|) / ((B+E)/2), where A=accessions, S=separations, B=employment at the beginning of the quarter, and E=employment at the end of the quarter.

Table 3: Firm and Workforce Characteristics

	Benefit-Providing Firms	Non-Benefit-Providing Firms
Worker characteristics		
% in bottom quartile of human capital distribution	0.23	0.33
% female workers	0.42	0.47
% foreign born workers	0.09	0.15
% white workers	0.83	0.76
% prime age workers (25-55)	0.77	0.69
Churning rate	0.5	0.41
Firm size		
Multi-unit	0.1	0.03
Number of establishments	1.91	1.08
Firm size class 1 (1-5)	0.34	0.68
Firm size class 2 (6-99)	0.54	0.31
Firm size class 3 (100-999)	0.11	0.008
Firm size class 4 (1000+)	0.01	0.0005
Industry		
Agriculture	0.01	0.03
Mining	0.005	0.005
Construction	0.06	0.11
Manufacturing	0.1	0.05
Transportation	0.04	0.04
Wholesale trade	0.21	0.078
Retail trade	0.08	0.2
Finance	0.09	0.08
Services	0.38	0.4
Industry missing	0.002	0.002

Notes: The human capital measures exclude firms with <5 employees.

Our micro-data allow us to examine the relationship between benefits and workforce composition in more detail. In Table 3 we look at the mean relationship between general human capital and benefit offering. The firm-specific measure we use is the fraction of a firm's workers who have human capital in the bottom quartile of the human capital distribution. That is, using the measure of general human capital introduced in equation (2), h_{it}, we calculate the fraction of workers in a firm that have h_{it}

below the economy-wide 25th percentile[7]. Clearly firms that offer benefits on average hire fewer low skill workers. Figure 2 compares the distribution of this measure of workforce quality at benefit-providing vs. non-benefit providing firms in manufacturing. This makes even clearer that benefit providing firms employ relatively few workers at the low-skill end of the distribution – very few have more than 25% of the workforce that is low skill.

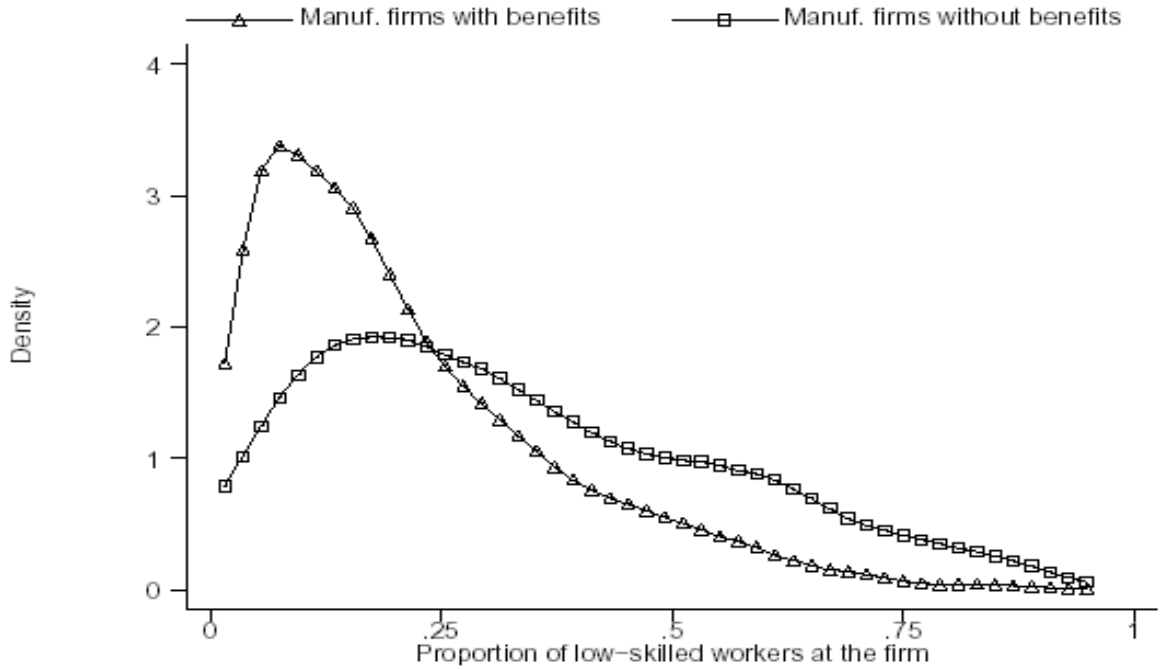

Figure 2

[7]As explained in Abowd, Lengermann and McKinney (2002) human-capital summary statistics are only created for firms with at least 5 employees. This is due to the difficulty of applying kernal density estimation techniques for calculating distributions to firms of very small sizes.

We know that benefit offering is correlated with a wide variety of firm characteristics, so we turn to simple firm-level regressions to examine the relationship between workforce composition and benefit offering while holding some of these other characteristics constant. We use measures of workforce composition as dependent variables, and a dummy variable that indicates whether or not the firms offer benefits as an independent variable while controlling for other firm characteristics such as size, industry, and the firm wage premia (or discount) $\psi_{J(i,t)}$. The results are presented in Table 4.

Briefly, the results confirm the means reported in Table 3. Firms that offer benefits have fewer low-skill workers, fewer foreign born, more white, and more prime-age workers. The positive relationship between benefits and churning, however, is reversed so that we obtain the expected result that firms that offer benefits have less churning.

Table 4: Workforce characteristics and benefit offering regressions

Independent Variables	*% low skill*	*% female*	*% foreign born*	*% white*	*% prime age*	*Churning Rate*
Offer benefits	-0.0821 (.00065)	0.0188 (.0009)	-0.0325 (.00068)	0.056 (.0009)	0.031 (.0006)	-0.1131 (.0041)
Firm wage effect $\Psi_{J(i,t)}$	-0.0199 (.00079)	-0.1093 (.0011)	0.0161 (.00083)	0.0211 (.0011)	0.1145 (.0007)	-0.1909 (.0050)
Multi-unit	0.0111 (.0011)	0.0179 (.0016)	-0.0425 (.0012)	0.0295 (.0015)	-0.0234 (.0001)	-0.0429 (.0071)
Firm size 6-99	0.0244 (.0011)	0.0226 (.0015)	0.0074 (.0011)	-0.043 (.0015)	-0.0564 (.0010)	0.1381 (.0069)
Firm size 100-999	0.0516 (.0016)	0.04 (.0022)	0.0464 (.0017)	-0.1595 (.0022)	-0.0591 (.0015)	0.3108 (.0101)
Firm size 1000+	0.0167 (.0042)	0.0721 (.0058)	0.0425 (.0044)	-0.1726 (.0057)	-0.0449 (.0039)	0.2404 (.0264)
Agriculture	0.0098 (.0017)	-0.0871 (.0024)	0.0417 (.0018)	-0.0826 (.0023)	0.0545 (.0016)	0.0176 (.0107)
Mining	-0.1182 (.0035)	-0.2089 (.0049)	-0.0625 (.0037)	0.1097 (.0048)	0.0991 (.0033)	-0.0925 (.0222)
Construction	-0.104 (.0011)	-0.2763 (.0015)	-0.0296 (.0011)	0.0277 (.0014)	0.11 (.0010)	0.0207 (.0066)
Manufacturing	-0.0713 (.0011)	-0.1322 (.0015)	0.0327 (.0011)	-0.0279 (.0015)	0.0946 (.0001)	-0.1464 (.0069)
Transportation	-0.0882 (.0015)	-0.1289 (.0020)	-0.0282 (.0015)	0.0133 (.0020)	0.115 (.0013)	-0.0462 (.0091)
Wholesale trade	-0.1036 (.0011)	-0.126 (.0015)	-0.0067 (.0012)	0.0247 (.0015)	0.0979 (.0001)	-0.1531 (.0070)
Finance, insurance and real estate	-0.0893 (.0013)	0.1536 (.0018)	-0.0386 (.0014)	0.0387 (.0014)	0.097 (.0012)	-0.1568 (.0081)
Services	-0.0545 (.0008)	0.1372 (.0011)	-0.0285 (.00084)	0.0143 (.0011)	0.1016 (.0007)	-0.0662 (.005)
Intercept	0.4426 (.0013)	0.401 (.0018)	0.1532 (.0014)	0.7085 (.0018)	0.7001 (.0012)	0.3078 (.0083)

Notes: Based on 403,359 firms. Omitted categories: Firm size 5 and under; service sector. Controls for states included but not reported

What is the relationship between wages and benefits?

Our data enable us to directly investigate this question. As shown in the first row of Table 5, average earnings at benefit offering firms are almost twice that in non-benefit offering firms. But, as is evident from both Table 4 (Column 1) and Figure 2, at least some of this is due to a higher quality workforce. In other words, part of the reason for the higher average pay in benefit providing firms is that they are less likely to have low-skill[8] workers and more likely to have prime age workers than are non-benefit providing firms – presumably as a result of a deliberate compensation setting strategy.

Table 5: Benefits and Pay

	Benefit Providing Firms	Non-Benefit-Providing Firms
Average payroll	10,904	5,174
Firm wage effect $\psi_{J(i,t)}$	0.06	-0.17

However, since our human capital estimation technique includes both firm and individual worker effects, we are able to directly estimate the proportion of wages paid by a firm that is due to firm-specific characteristics independent of worker characteristics. The second row of Table 5 shows that benefit providing firms in fact pay more regardless of the composition of their workforces. The firm fixed effect shows that the premium paid by benefit providing firms is about .06 log points, compared with -.17 points for non-benefit providing firms.

[8] Workers whose human capital is in the bottom 25% of the economy-wide skill distribution.

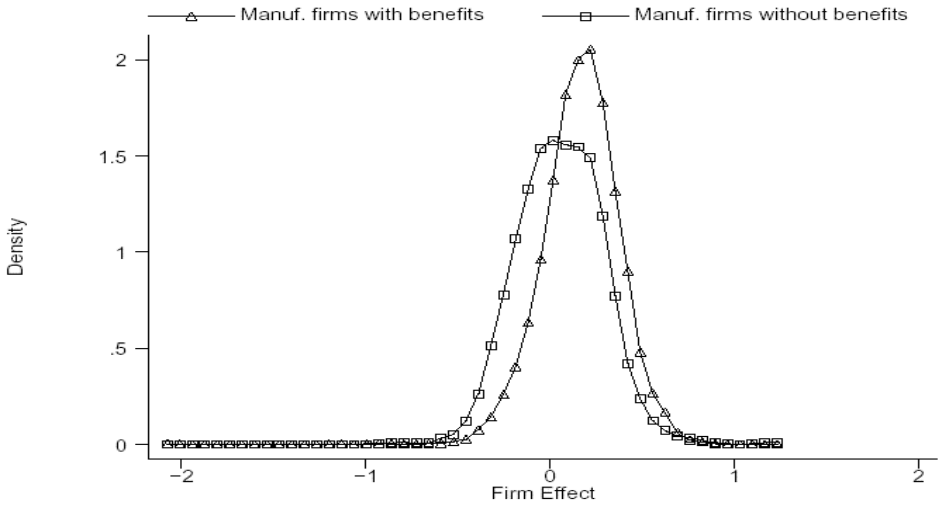

Figure 3

An alternative way of looking at this is provided in Figure 3, which describes the distribution of firm fixed effects for benefit providing and non-benefit providing firms. Clearly, the distribution of wage premia for benefit providing firms is substantially to the right of non-benefit providing firms. In other words, observationally equivalent workers who work for benefit-providing firms get both higher wages and benefits.

What are the consequences for firms?

The last question we set out to answer was the consequences for firms of offering benefits – given that providing benefits has substantial impacts on workforce composition, quality and turnover. This requires exploiting the longitudinal nature of the dataset. Here we use a Cox proportional hazard model to estimate the probability of a firm failing in the years after 1997, conditional on having offered benefits in 1997, and controlling for other observed characteristics such as firm age, industry and firm size.

We estimate this relationship in several different ways, and present the results in Table 6. The first column shows the results of estimating the model for all businesses, and shows a significant relationship between the provision of benefits and firm survival. The relationship not only holds but is strengthened when we narrow the focus to examine only multi-unit firms, and only large firms.

Table 6: The relationship between firm death and benefit offering

	All Businesses	*Only Multi-Units*	*EINS with 100+ employees*	
			All	*Only Manufacturing and Wholesale Trade*
Benefit	-0.0856** (.0060)	-0.2329** (.0298)	-0.2524** (.0383)	-0.4138** (.0942)
6 - 99 Employees	-0.2925** (.0042)	-0.4275** (.0269)		
100 - 999 Employees	-0.2931** (.0164)	-0.4504** (.0425)		
1000+ Employees	-0.4820** (.0631)	-0.5302** (.0828)	-0.0978 (.0658)	-0.1377 (.1688)
Multi-unit Firm	-0.0378** (.0113)		-0.0118 (.0336)	-0.1096 (.0702)
Agriculture	-0.0776** (.0116)	-0.0514 (.0676)	0.0104 (.1052)	-0.0683 (.0706)
Mining	0.1011** (.0252)	0.1516 (.1466)	0.2442 (.1634)	
Construction	-0.0121** (.0062)	-0.0953* (.0409)	-0.0152 (.0671)	
Manufacturing	0.0497** (.0084)	0.0752 (.0448)	0.2498 (.0437)	
Transportation etc.	0.2002** (.0085)	0.2695** (.0539)	0.4438 (.0629)	
Wholesale Trade	0.0880** (.0065)	0.1542** (.0417)	0.3257 (.0644)	
Retail Trade	0.2537** (.0048)	0.3** (.0277)	0.278** (.0468)	
Finance etc.	-0.0017** (.0068)	0.1766** (.0403)	0.5763** (.0580)	
Number of obs (EIN-years)	1,073,579	38,562	24,459	6,125
Number of failures	287,280			

Summary

We began by asking three questions:

1. What are the differences between firms that provide benefits and firms that don't – and what are the differences in their workforces?
2. What is the relationship between wages and benefits?
3. What is the relationship between the provision of benefits and subsequent firm survival?

Our first set of results confirmed the results from earlier work – firms that provide benefits tend to be larger and are more likely to be in manufacturing and wholesale trade. We used new measures to confirm other evidence that firms that offer benefits are better able to attract higher skilled, prime-age workers and have lower turnover. However, we also found that firms that offered benefits paid their employees more than those same employees would earn with the average non-benefit-offering firm—so workers appeared to earn both higher wages and better benefits than did observationally equivalent workers who worked for non-benefit offering firms – which supports a dual labor market view of the world.

Our second set of results was particularly interesting. We find that firms that offer benefits are less likely to fail – even after controlling for all other observable characteristics – than firms that do not offer benefits. Many interpretations could be put on this. One is that of endogeneity - firms that are more likely to die (either due to current financial problems, or perhaps because they are an inherently more risky business) are less likely to offer benefits. This could either be as a way to cut down on current costs, or because workers value the promise of a pension less when the risk of future default is higher.[9] Another possibility is that not enough firm-level controls were

[9] 86% of all firms that offer benefits offer at least one pension plan.

included. While our further research will certainly seek to determine the robustness of the current results, another intriguing possibility is that firms are, for some reason, under-investing in benefit provision. Given the aging workforce and the looming burden to Social Security that was alluded to in the introduction, there might be substantial gains to workers and to society if this under-investment were corrected.

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Appendix

Table A1 breaks down the benefit plans recorded for plan-end-year1997 in the Form 5500 file by exclusive plan type.

Table A1 Exclusive benefit plan types	Frequency	Percent
Defined benefit plans	64,313	6.00%
Defined contribution plans	657,324	61.32%
Other pension plans	24,916	2.32%
Health plans	65,333	6.09%
Fringe benefit plans	208,469	19.45%
Welfare and fringe benefit plans	42,851	4.00%
Welfare and pension benefit plans	2,915	0.27%
No info on plan benefit type	5,899	0.55%
Total	1,072,020	100.00%

Table A2 shows employee size categories for all firms in the Business Register in 1997, separately for matches and non-matches to the Form 5500 file.

Table A2
All Firms - Firm size - Total Employment at EIN - 8 categories

	Match	No Match	Total
No March 12th employment	19,303	946,663	965,966
(Row percentages)	2.00%	98.00%	100.00%
(Column percentages)	*2.67%*	*18.32%*	*16.40%*
1 - 5 employees	149,902	2,812,752	2,962,654
	5.06%	94.94%	100.00%
	20.76%	*54.42%*	*50.30%*
6 - 25 employees	279,521	1,177,799	1,457,320
	19.18%	80.82%	100.00%
	38.72%	*22.79%*	*24.74%*
26 - 50 employees	105,881	142,566	248,447
	42.62%	57.38%	100.00%
	14.67%	*2.76%*	*4.22%*
51 - 100 employees	73,069	55,298	128,367
	56.92%	43.08%	100.00%
	10.12%	*1.07%*	*2.18%*
101 - 250 employees	54,560	23,467	78,027
	69.92%	30.08%	100.00%
	7.56%	*0.45%*	*1.32%*
251 - 750 employees	26,338	7,414	33,752
	78.03%	21.97%	100.00%
	3.65%	*0.14%*	*0.57%*
751 - 2500 employees	9,840	1,732	11,572
	85.03%	14.97%	100.00%
	1.36%	*0.03%*	*0.20%*
2501 + employees	3,549	446	3,995
	88.84%	11.16%	100.00%
	0.49%	*0.01%*	*0.07%*
Total	721,963	5,168,137	5,890,100
	12.26%	87.74%	100.00%
	100.00%	*100.00%*	*100.00%*

Table A3 shows employee size categories for single-unit firms in the Business Register in 1997, separately for matches and non-matches to the Form 5500 file.

Table A3
Single-Units - Firm size - Total Employment at EIN - 8 (+1) categories

	Match	No Match	Total
No March 12th employment	14,011	942,226	956,237
(Row percentages)	1.47%	98.53%	100.00%
(Column percentages)	*2.64%*	*18.63%*	*17.11%*
1 - 5 employees	134,261	2,798,513	2,932,774
	4.58%	95.42%	100.00%
	25.30%	*55.34%*	*52.48%*
6 - 25 employees	232,634	1,127,318	1,359,952
	17.11%	82.89%	100.00%
	43.84%	*22.29%*	*24.34%*
26 - 50 employees	72,212	123,223	195,435
	36.95%	63.05%	100.00%
	13.61%	*2.44%*	*3.50%*
51 - 100 employees	41,941	43,448	85,389
	49.12%	50.88%	100.00%
	7.90%	*0.86%*	*1.53%*
101 - 250 employees	24,531	16,270	40,801
	60.12%	39.88%	100.00%
	4.62%	*0.32%*	*0.73%*
251 - 750 employees	8,255	4,832	13,087
	63.08%	36.92%	100.00%
	1.56%	*0.10%*	*0.23%*
751 - 2500 employees	2,316	1,094	3,410
	67.92%	32.08%	100.00%
	0.44%	*0.02%*	*0.06%*
2501 + employees	489	261	750
	65.20%	34.80%	100.00%
	0.09%	*0.01%*	*0.01%*
Total	530,650	5,057,185	5,587,835
	9.50%	90.50%	100.00%
	100.00%	*100.00%*	*100.00%*

Table A4 shows employee size categories for multi-unit firms in the Business Register in 1997, separately for matches and non-matches to the Form 5500 file.

Table A4
Multi Units - Firm size - Total Employment at EIN - 8 (+1) categories

	Match	No Match	Total
No March 12th employment	5,292	4,437	9,729
(Row percentages)	54.39%	45.61%	100.00%
(Column percentages)	*2.77%*	*4.00%*	*3.22%*
1 - 5 employees	15,641	14,239	29,880
	52.35%	47.65%	100.00%
	8.18%	*12.83%*	*9.89%*
6 - 25 employees	46,887	50,481	97,368
	48.15%	51.85%	100.00%
	24.51%	*45.50%*	*32.21%*
26 - 50 employees	33,669	19,343	53,012
	63.51%	36.49%	100.00%
	17.60%	*17.43%*	*17.54%*
51 - 100 employees	31,128	11,850	42,978
	72.43%	27.57%	100.00%
	16.27%	*10.68%*	*14.22%*
101 - 250 employees	30,029	7,197	37,226
	80.67%	19.33%	100.00%
	15.70%	*6.49%*	*12.32%*
251 - 750 employees	18,083	2,582	20,665
	87.51%	12.49%	100.00%
	9.45%	*2.33%*	*6.84%*
751 - 2500 employees	7,524	638	8,162
	92.18%	7.82%	100.00%
	3.93%	*0.58%*	*2.70%*
2501 + employees	3,060	185	3,245
	94.30%	5.70%	100.00%
	1.60%	*0.17%*	*1.07%*
Total	191,313	110,952	302,265
	63.29%	36.71%	100.00%
	100.00%	*100.00%*	*100.00%*

Table A5 shows single-unit firms of the Business Register in 1997 by industry, separately for matches and non-matches to the Form 5500 file.

Table A5
Single-Units - Industry - Major SIC Division - EIN level

	Match	No Match	Total
Agriculture	10,731	304,288	315,019
(Row percentages)	3.41%	96.59%	100.00%
(Column percentages)	*2.04%*	*6.18%*	*5.78%*
Mining	1,862	17,086	18,948
	9.83%	90.17%	100.00%
	0.35%	*0.35%*	*0.35%*
Construction	46,025	606,330	652,355
	7.06%	92.94%	100.00%
	8.73%	*12.32%*	*11.97%*
Manufacturing	59,057	246,801	305,858
	19.31%	80.69%	100.00%
	11.20%	*5.01%*	*5.61%*
Transportation, Communications, Electric, Gas, and Sanitary	14,109	195,942	210,051
	6.72%	93.28%	100.00%
	2.68%	*3.98%*	*3.85%*
Wholesale Trade	54,762	314,816	369,578
	14.82%	85.18%	100.00%
	10.39%	*6.40%*	*6.78%*
Retail Trade	37,967	970,206	1,008,173
	3.77%	96.23%	100.00%
	7.20%	*19.71%*	*18.50%*
Finance, Insurances, Real Estate	40,975	395,390	436,365
	9.39%	90.61%	100.00%
	7.77%	*8.03%*	*8.01%*
Services	261,809	1,870,997	2,132,806
	12.28%	87.72%	100.00%
	49.65%	*38.01%*	*39.14%*
Total	527,297	4,921,856	5,449,153
	9.68%	90.32%	100.00%
	100.00%	*100.00%*	*100.00%*

Table A6 shows single-unit firms of the Business Register in 1997 by industry, separately for matches and non-matches to the Form 5500 file.

Table A6
Multi-Units - Industry - Major SIC Division- EIN level

	Match	No Match	Total
Agriculture	916	713	1,629
(Row percentages)	56.23%	43.77%	100.00%
(Column percentages)	*0.48%*	*0.64%*	*0.54%*
Mining	1,655	539	2,194
	75.43%	24.57%	100.00%
	0.87%	*0.49%*	*0.73%*
Construction	3,850	1,304	5,154
	74.70%	25.30%	100.00%
	2.01%	*1.18%*	*1.71%*
Manufacturing	28,187	4,262	32,449
	86.87%	13.13%	100.00%
	14.73%	*3.84%*	*10.74%*
Transportation, Communications, Electric, Gas, and Sanitary	11,596	4,560	16,156
	71.78%	28.22%	100.00%
	6.06%	*4.11%*	*5.34%*
Wholesale Trade	26,384	10,735	37,119
	71.08%	28.92%	100.00%
	13.79%	*9.68%*	*12.28%*
Retail Trade	29,119	44,267	73,386
	39.68%	60.32%	100.00%
	15.22%	*39.90%*	*24.28%*
Finance, Insurances, Real Estate	30,844	11,364	42,208
	73.08%	26.92%	100.00%
	16.12%	*10.24%*	*13.96%*
Services	58,762	33,208	91,970
	63.89%	36.11%	100.00%
	30.72%	*29.93%*	*30.43%*
Total	191,313	110,952	302,265
	63.29%	36.71%	100.00%
	100.00%	*100.00%*	*100.00%*