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SALARY OR BENEFITS?

Paul Oyer

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ABSTRACT

Employer-provided benefits are a large and growing share of compensation costs. In this paper, I consider three factors that can affect the value created by employer-sponsored benefits. First, firms have a comparative advantage (for example, due to scale economies or tax treatment) in purchasing relative to employees. This advantage can vary across firms based on size and other differences in cost structure. Second, employees differ in their valuations of benefits and it is costly for workers to match with firms that offer the benefits they value. Finally, some benefits can reduce the marginal cost to an employee of extra working time. I develop a simple model that integrates these factors. I then generate empirical implications of the model and use data from the National Longitudinal Survey of Youth to test these implications. I examine access to employer-provided meals, child-care, dental insurance, and health insurance. I also study how benefits are grouped together and differences between benefits packages at for-profit, not-for-profit, and government employers. The empirical analysis provides evidence consistent with all three factors in the model contributing to firms' decisions about which benefits to offer.

Paul Oyer
Graduate School of Business
Stanford University
518 Memorial Way
Stanford, CA 94305-5015
and NBER
pauloyer@stanford.edu

"Concierge services, petsitting, nap rooms and the option to telecommute are really just sneaky new ways to get already overworked employees to toil even harder, says Jill Andresky Fraser, author of *White-Collar Sweatshop*. 'These perks are often illusory. They exist just for their publicity value,' she says. 'In reality, staff face resentment if they try to work from home or take family days. And free food, nap rooms and home computers just keep people tied to their work.'" – Economist (2001)

1 Introduction

Significant effort has gone into the economic analysis of firms' choices about what to make and what to buy. Economists have also often considered when parties to a transaction exchange goods and services rather than one side simply purchasing from the other with currency. The provision of employee benefits, which are a large and growing portion of employment costs, is driven by both the make or buy decision and non-monetary barter. The most widely discussed employer-sponsored benefit is health insurance, but some employers also provide dental care, subsidized or free beverages and meals, subsidized or free child care, discounts on the firms' products, and even in-office massages.[1] Given the wide use of non-cash compensation, it must be the case that these *workplace* benefits create *economic* benefits that cannot be captured if employees make all their own consumption choices.[2] In this paper, I model potential sources of this value and explore these sources empirically.

As modeled by Rosen (1974) and others, benefits can create value in the employment relationship when firms can purchase goods and services more cost effectively than employees. That is, the firm acts as a buyers' club for its employees with much of the potential cost advantage of this arrangement driven by tax treatment of benefits. I develop a model that adds two elements to this "tax/buyers' club" explanation of employee benefits. First, I consider the potential costs of matching employees who value certain benefits with firms that can procure them efficiently. I add an element of search costs to a model where employees have heterogeneous tastes and the firm cannot price discriminate (in the sense of tying compensation to benefits consumption.) In this case, hiring workers at random would reduce or eliminate the value created by employer-provided

[1] In this paper, I only consider non-monetary benefits. I do not analyze why and how firms choose among forms of financial compensation (that is, cash, stock, or profit sharing), nor do I look at the timing of pay (such as retirement benefits.)

[2] This sentence suggests the potential confusion when looking at an economic model of employee benefits given the natural tendency to discuss marginal costs versus marginal benefits. Hereafter, I use the term benefits solely to refer to non-cash employee compensation and use other terms when referring to economic benefits more generally.

benefits, so the firm trades off the cost of finding employees that value the benefits it can provide efficiently against its procurement cost advantage.

As long as employee preferences are reasonably fixed, the "tax/buyers' club" model, with or without search costs, suggests that benefits packages will be stable over time. The second innovation in the model, on the other hand, helps explain the fact that many benefits are sensitive to the business cycle.[3] I consider the possibility that certain benefits are provided as a means of reducing employees' cost of effort. When the marginal product of labor is high, the employer may want to encourage the worker to extend his work week. Assuming the employee's cost of effort is convex in hours worked, the employer is trying to buy additional hours that are very costly to the employee. By offering benefits such as meals, entertainment options at the workplace, and errand services, employers lower the employee's cost of effort. That is, by helping the employee subcontract some of his personal duties to a party that can execute these duties at lower cost, the employer can free more time for the employee to engage in high value tasks.

I derive a simple model that integrates these various factors that may lead firms to offer benefits. The model generates several testable implications, which I explore using data from the National Longitudinal Survey of Youth (NLSY). In 1979, the NLSY interviewed 12,686 people born between 1957 and 1964. When possible, these same individuals were interviewed annually through 1994 and bi-annually through 2000. From 1985-2000, the NLSY included questions about fringe benefits at the person's main job. I use these data to perform empirical analysis in three stages. First, I examine factors associated with firms' providing individual benefits, including employer-provided or employer-subsidized meals, child care, dental insurance, and health insurance. Second, I look at how these benefits are combined with other offerings to form benefits "packages" that are likely to either attract certain types of workers or help lower the cost of employee effort. Finally, I compare the benefits policies of employers in the for-profit, not-for-profit, and government sectors to see if the variation is consistent with expected differences in attributes of employers and workers in these sectors.

I find results that are consistent with the implications of the model. I show that employer-sponsored benefits are associated with factors that proxy for employers' costs and employees' tastes. For example, larger firms, which can gain greater scale economies in benefits purchasing, are more likely to provide all benefits. Firms are more likely to provide benefits related to their industry, suggesting they provide benefits when they can create them at low cost. It appears people sort to firms based on their demand for benefits. For example, similar to prior work, I show that people

[3]For anecdotal discussions of discontinuation of benefits when economic conditions weaken, see Economist (2001) and Raghavan (2003).

with families are significantly more likely to hold jobs with employer-provided health insurance. I also show that sorting extends to other benefits such as child care and on-the-job meals.

The correlation between hours of work and some benefits is highly supportive of these benefits lowering the cost of effort. All benefits are more likely for full-time workers than for part-time workers. However, employees who work particularly long hours are significantly more likely to have employer-provided meals than other full-time workers. This relationship between long hours and benefits does not hold for benefits that would seem less naturally complementary to effort such as dental care and health care. Also, it seems likely that employer-provided child care can help lower the costs of switching from part-time to full-time but that people who work very long hours prefer not to keep their children at the workplace. The evidence is consistent with this notion, as employer-provided child care is significantly more likely for full-time workers than part-time workers. However, employees who work particularly long hours are less likely to have employer-provided child care than those who work standard full-time hours.

The model's implications are also consistent with the empirical analysis of benefits "packages." I show that people who work long hours are relatively likely to receive a package of benefits that lower the cost of effort, including meals, parking, and flexible time. I also show that workers who are likely to be seeking stable employment relationships are more likely to get a package of benefits that the firm can purchase efficiently but that do not affect the cost of effort.

The final set of empirical results shows interesting patterns in benefits packages across different types of employment classes. I show that government employers are much less likely than for-profit companies to provide benefits that lower the cost of effort. Government and not-for-profit employers are much more likely to provide a package of benefits that might be valued by employees interested in long-term employment relationships. Self-employed workers show the exact opposite pattern, however. This is consistent with government and non-profit employees being risk averse and seeking stable employment without long hours while self-employed workers try to lower the burden of working hard.

The theory and the empirical evidence lead to the conclusion that the optimal compensation package can be affected by numerous factors. As a result, firms get involved in the procurement of various products and services that are only related to their business because of employee preferences. Due to variations in labor market conditions, income tax structure, and purchasing economies, it is often efficient for firms to expand their scope into creating employment packages rather than simply engaging in cash-only transactions with workers.

This paper builds on a large existing theoretical and empirical literature on employer-provided benefits. Rosen (1986) surveys the theoretical and empirical work on compensating differentials

in the labor market. He outlines a model where employees sort efficiently and costlessly to the employer that offers the benefits they value most. As he and Brown (1980) discuss, it is very difficult to measure the "price" of employee benefits in terms of lowering wages.[4] To avoid this issue, I primarily analyze the existence of benefits rather than the exact salary trade-off. For a more recent survey, focusing on employer-sponsored health insurance, see Gruber (2000).

The paper makes several novel contributions to this literature. First, by adding search costs to prior models of workplace benefits, I derive a relationship between benefits and job tenure. Second, to my knowledge, the only other work on the relationship between benefits and effort is a contemporaneous paper by Rajan and Wulf (2005). Their focus is quite different, however, as they analyze senior executives, large firms, and "perks" such as company jets, chauffer service, and country club membership. Third, while the bulk of prior work studies health insurance (probably because it is such a large cost), I focus on a broader set of benefits that can provide more insight into a greater variety of motivations for employers to sponsor workplace benefits. Though not as large as health-related benefits, some of these benefits, such as workplace meals and child-care, are growing in prevalence and have become large markets. Finally, my findings on differences in benefits policies between for-profit companies and other types of employers are novel and may inform understanding of differences among employer classes.

The rest of this paper proceeds as follows. In the next section, I develop a model of employer-provided benefits that incorporates several factors that can affect the optimal salary/benefit mix and derive testable empirical implications of the model. Section 3 tests the model's implications using self-reported data on individuals' work-related benefits. I conclude and discuss the implications of the analysis for firms and policy makers in Section 4.

2 A Model of Employer-Provided Benefits

In this section, I develop a simple model of a firm's optimal mix of compensation between salary and employer-sponsored benefits. I focus on four factors that may affect the salary/benefits trade-off: heterogeneity across firms in the cost of providing benefits, heterogeneity across employees in their relative preferences for money and benefits, costs to firms of finding workers that will accept the compensation packages they offer, and the possibility that some benefits may lower the cost of work-related effort. I briefly motivate consideration of each of these four factors. Then I develop the formal model that integrates these effects and discuss the model's empirical implications.

[4] See Olson (2002) and Thaler and Rosen (1975) for evidence that workers pay for health insurance and job safety, respectively, through lower wages.

Employers can be efficient providers of goods and services for their employees for several reasons.[5] First, people interact regularly at work, so the marginal costs of organizing group buying is lowered there. Also, firms may attract people with similar tastes, enabling larger purchases. Perhaps most importantly, there can be substantial tax advantages to some benefits being provided by firms relative to paying employees more money and letting them purchase goods with after-tax income.

The efficiency of benefits is also affected by differences across individuals in their taste for benefits. For example, those workers who do not drink coffee will not accept a wage discount in exchange for employer-provided coffee. But, if firms can find employees who value the benefits they offer, then they can lower their total compensation expenses.

Given the heterogeneity of firms and employees, random assignment of employees to firms would not allow firms to maximize the efficiency of benefits. That is, in the absence of being able to price discriminate by lowering individuals' salaries according to their taste for benefits, firms and workers have to expend resources searching for appropriate matches.

While the discussion to this point has focused on the trade-off between salary and benefits, there is also a relationship between some benefits and leisure. Consider a simple example. Some firms provide "concierge services" to their employees.[6] These services help employees to subcontract out some of the necessities of their personal lives so that they can engage in higher value activities at work. That is, by taking care of details in people's personal lives such as laundry, shopping, and even planning children's birthday parties, concierge services lower employees' cost of effort.

To see how these issues relate to one another in a more formal context, consider a labor market where firms contract with workers who provide a set of tasks (or level of effort) e. Firms capture revenue of θe per period of an employment relationship. There is no hidden action problem, so firms offer a package of wages, benefits, and effort, (w, b, e), to potential employees. b is the dollars per employee that the firm spends on benefits. Firms vary in how efficiently they can spend their benefits dollars. Let N be a parameter that captures firm heterogeneity in the cost of providing a benefit. N is increasing in the amount of benefits a given firm can purchase with each dollar it expends. It is convenient to think of N as the number of employees at the firm (where N is exogenously determined.) However, N can also be such factors as how closely a benefit is related to products the firm is already producing. For example, a ski resort can presumably provide lift

[5] See Rice (1966) and Woodbury (1983) for early discussions of the potential efficiency of employer-sponsored benefits. Theoretical foundations can be found in Rosen (1974).

[6] Several companies, including Circles, VIPdesk.com, and Virtual Concierge, contract with employers to provide these services to workers.

tickets at relatively low cost to its employees (assuming there is at least some idle capacity on the mountain), so ski resorts would have relatively high N if the relevant benefit is lift tickets. At the time of hiring, each employee is expected to work for T periods. T is driven by such factors as the nature of the work, the value of firm-specific human capital, and the stability of employee preferences.[7]

Employees vary in how much utility they derive from benefits. In particular, person i derives $\delta_i V(b, N)$ from the firm's expenditure (b) on employee benefits. Let δ_i be drawn from a distribution with density $f(\delta)$ and cumulative density $F(\delta)$. The function V incorporates representative preferences, individual heterogeneity in preferences (through δ), and the relative efficiency of purchasing on the part of the firm. That is, it is convenient analytically to capture the heterogeneity of both workers and firms through the representation of the individual's utility function. This also allows the value of $\delta_i V(b, N)$ to be interpreted as a match-specific valuation of benefits. But it is important to bear in mind that b is the *amount the firm spends* on benefits, while $\delta_i V(b, N)$ is the *amount the employee values* those expenditures.

I make the following assumptions about the benefits valuation function. People prefer more benefits to less, but the marginal value of additional benefits is decreasing (that is, $V_b \geq 0$ and $V_{bb} \leq 0$.) The purchasing advantages of employers (scale economies) are concave (that is, $V_N \geq 0$ and $V_{NN} \leq 0$.) Also, the marginal value to the employee of a dollar spent on benefits is greater at larger firms (that is, $V_{bN} \geq 0$.) Figure 1 graphs V as a function of b at two different levels of N, under these assumptions. In this example, if $\delta_i = 1$, then any level of b such that $V(b, N)$ is below the 45-degree line is inefficient because the firm is spending more on benefits that it can "charge" the employee through a wage discount.

The cost of effort completes the employee's utility function. An employee bears personal cost of doing his job of $c(e, b)$. Assume the standard convex cost of effort ($c_e(e, b) > 0$ and $c_{ee}(e, b) > 0$). Now assume that benefits lower the employees' cost of effort ($c_b(e, b) < 0$). Most importantly, I assume $c_{eb}(e, b) < 0$. That is, the marginal cost of an extra unit of effort is decreasing in benefits. This captures the notion that working late is less costly if dinner is provided, that working hard all week is less costly when a concierge is provided, or even that working is less unpleasant when attractive art is posted in the firm's corridors.[8]

[7] One dimension on which people vary is how long they are likely to stay on the job. Benefits would then have the additional value of separating quitters from stayers, as in Salop and Salop (1976).

[8] Note that I assume that the complementarity between e and b is independent of the individual's taste for benefits or the firm's purchasing power. In reality, the complementarity would likely be increasing in δ_i and N. Allowing for this would add complexity without affecting the conclusions.

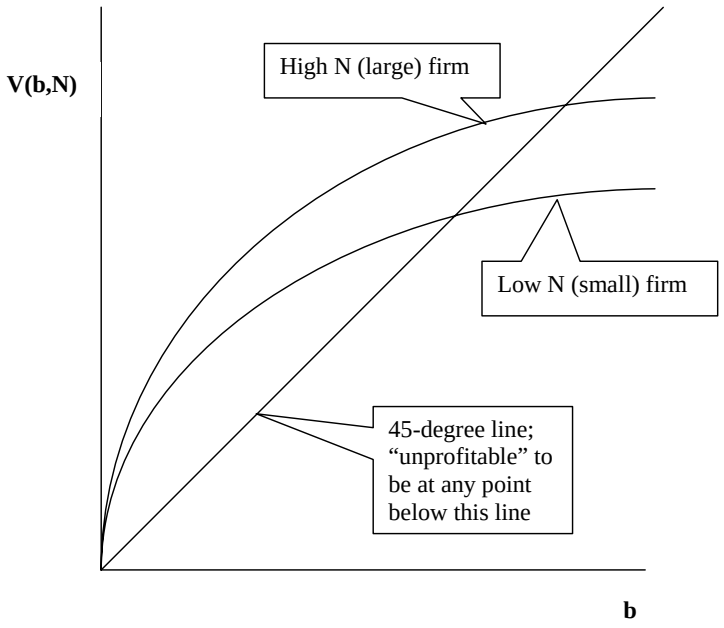

Figure 1: Employee valuation of benefits

The employee has an alternative job that pays w_0 in cash with $e = 0$, so he accepts any (w, b, e) combination such that $w + \delta_i V(b, N) - c(e, b) \geq w_0$. All potential employees accept an offer of $(w, b, e) = (w_0, 0, 0)$. Ideally, the model would solve for w_0 endogenously. That is, market wages would be a function of firms' benefits cost structure and employee preferences for benefits. Adding this to the model would add a great deal of complication and require assumptions about the workers' information when engaging in search. However, I believe the basic results and intuition would be unchanged. One way to avoid concern over the exogenous market wage is to interpret the current model as being about choices the employer makes regarding benefits that other employers cannot provide.

All else equal, the firm wants to lower costs of employment, which it can do by finding potential employees with the highest values of δ_i. However, it is costly to search for such workers. To capture this in the model, I assume that it costs m to offer a job to an employee and that, at the time the job is offered, the firm does not know the employee's preferences. As a result, the expected costs of hiring a new worker are $\frac{m}{pr(accepts)}$, or $\frac{m}{1-F(\frac{w_0-w}{V(b,N)})}$. The firm sets the wage such that

$$w = w_0 - \overline{\delta} V(b, N) + c(e, b) \tag{1}$$

for some critical $\overline{\delta}$.[9]

[9] Given the static nature of the model, the firm picks its benefits and then workers. In reality, as firm strategies and

The firm maximizes profits over T periods, including both the costs of hiring and the annual cost of compensation. Substituting for w using (1), this problem can be written

$$\max_{\overline{\delta},b,e} \theta e - b - w_0 + \overline{\delta} V(b,N) - c(e,b) - \frac{m}{T(1-F(\overline{\delta}))}. \tag{2}$$

The profit function is quasisupermodular in $(\overline{\delta}, b, e)$ and, given the assumptions of the model, satisfies the single crossing property in $(\overline{\delta}, b, e; T, N, -m)$. Therefore, Theorem 4 of Milgrom and Shannon (1994) applies to the firm's problem and I can state the following results. I do not provide formal proofs, as they are derived from various simple cross-partial derivative calculations.

Implication 1: b and $\overline{\delta}$ are increasing in N.

In words, a comparative advantage in purchasing a benefit has two effects on a firm – it leads the firm to provide more of that benefit and it leads the firm to invest in finding employees who value that benefit relatively highly. In the model, there is efficient sorting between firms that can cost-effectively supply a benefit and employees that value the benefit highly.

Implication 2: b and $\overline{\delta}$ are positively correlated.

In the model, benefits and strong tastes for benefits are complements. That is, if a firm wants to select people that have relatively high valuations for a certain benefit, they will provide more of that benefit. This suggests that workers with a taste for a benefit will sort to firms that provide that benefit.

Implication 3: b and $\overline{\delta}$ are increasing in T.

When firm/worker matches last longer, then any value that can be created by the use of benefits becomes larger relative to the costs of matching firms to workers. As a result, in longer employment relationships, firms will want to offer more benefits and attempt to screen more carefully for workers who will take large wage discounts for those benefits.

Implication 4: e and b are positively correlated if $c_{eb} < 0$.

Firms will provide more of the types of benefits that lower the cost of effort when they ask for higher levels of effort. Empirical tests of this implication require some judgment, as not all benefits are likely to lower the cost of effort. For example, while concierge services may make it easier for employees to stay at the office, it seems unlikely that an employer can lower the cost of employee effort by providing dental insurance.

Implications 1-4 are the key testable empirical hypotheses that I will analyze in the empirical section below. The model does make additional predictions, though the NLSY data that I use will

cost structures evolve, firms change their benefits plans to meet the tastes of the employees they already have. While this might make the search aspects of the model a bit less important, it should not change the basic relationships or implications.

not allow me to test these directly. I now briefly state and discuss these implications.

Implication 5: b and e are increasing in θ if $c_{eb} < 0$.

When the marginal return to effort is high, firms will find it efficient to provide more of the benefits that make it easier for the employee to exert effort. The use of concierge services during the boom of the late 1990's, followed by a drop in the use of such services after the boom, is consistent with this idea. During the good times, firms attempted to make high-value employees' personal lives easier so they could stay late. But when long work weeks were no longer valuable, firms let employees take care of their personal chores. This implication could, in principle, be tested cross-sectionally because I would expect higher wage employees (where wage proxies for marginal product) to receive more benefits than lower-level employees. However, while this interpretation will clearly be shown to be consistent with the data in the next section, it cannot be separated from the idea that employees who value benefits more (due to higher tax rates and due to lower marginal utility for cash) are more likely to receive benefits. That is, this implication cannot be separated from Implication 2.

Implication 6: *b and $\overline{\delta}$ are decreasing in m.*

Increased search costs have the opposite effect of increasing expected length of the employment relationship in that they make the costs of finding a person who values benefits higher relative to the value created by benefits once the match is made. This suggests that lowering the costs to firms of finding and screening workers would lead them to make benefits a larger part of compensation.

Note that there is ample evidence regarding some of these implications in prior empirical studies of employer-sponsored health insurance. Implication 2, which suggests that employees will sort to firms based on benefits, has been analyzed in the context of health insurance by Scott, Berger and Black (1989), Dranove, Spier and Baker (2000), and Levy (1998). Scott et al. (1989) study the effect of Internal Revenue Service rules that require benefits to be offered on a nondiscriminatory basis in order to qualify for tax exemption. They show that this has enhanced sorting of workers into occupations that match their preferences (using income as a proxy.) Dranove et al. (2000) develop a model where employers offer health insurance due to cost and tax advantages, but, in order to discourage over-consumption of this benefit, require employees to make a contribution to insurance premiums. This saves the firm some expense, at the cost of some efficiency in the total costs to the firm and the workers, by encouraging some employees to utilize health insurance offered by their spouse's employer. Levy (1998) draws similar conclusions by studying the relationship between employee contributions and average age of a firm's employees. I will perform similar analyses of sorting in the health insurance context. However, I will also analyze the role of sorting workers

through other benefits that have not received as much attention in prior studies.[10]

As mentioned above, Implication 2 can be interpreted as suggesting a connection between benefits and taxes. This implication has also received support from prior studies of health insurance. See, for example, Royalty (2000) and Gruber and Lettau (2004), who show that health insurance provision is highly sensitive to tax rates. The results in Gruber and Lettau (2004) are also consistent with economies of scale and, more specifically, with the assumption that $V_N > 0$ because insurance benefits are, on average, significantly higher at larger firms.

I have emphasized the firm's purchasing efficiency and matching of employees with firms strictly based on employee tastes. However, a firm could also use benefits if employee tastes for a certain benefit are correlated with productivity at the firm. Consider, for example, a firm that felt the most productive workers were those who were intellectually curious and valued education. In the context of the model, this would imply a positive correlation between θ and δ. The firm might offer a tuition reimbursement benefit, even in the absence of any tax or purchasing advantage, as a means of inducing the most productive potential employees to signal their tastes (and, therefore, their productivity.) While this suggests a somewhat different model from the one I have outlined (and one that is closely related to Salop and Salop (1976)), both emphasize the firm using benefits to sort on a certain type of worker. As a result, the empirical implications (at least those that are testable) are quite similar. Therefore, at this point, I make no attempt to distinguish between sorting strictly on preferences and using benefits to sort on productivity.

3 Empirical Analysis

3.1 Data

I use data from the National Longitudinal Survey of Youth (NLSY). The NLSY started with a sample of 12,686 Americans who were between the ages of 14 and 21 in 1979. Every year from 1979 to 1994, and then in the years 1996, 1998, and 2000, those members of the original sample who could be found and interviewed were asked many questions about employment and other issues.[11] I use the 1985-2000 interviews because most respondents had become permanently attached to the labor force by then and these are the years with the most questions related to employee benefits. The total NLSY sample size in these years varies from 10,894 to 8,033. However, because I only

[10] As Rosen (1986) discusses, workers can also be expected to sort based on the risks associated with jobs. See DeLeire and Levy (2004) for empirical evidence of such sorting.

[11] The original NLSY oversampled disadvantaged youth and a members of the military. These samples were reduced over the years, so attrition from these groups is higher.

look at employed respondents, the usable sample size is somewhat smaller.

In each year, I use responses relating to the job that the NLSY determined to be the respondent's "main job." This is the job at which he worked the most hours at the time of the interview or, if the person is not working at the time of the interview, it is the last job he held (as long as he worked there after the previous interview.) Table 1 provides summary statistics of key demographic and employment variables in the NLSY sample. I use a total of 82,555 observations from 10,658 workers, with any given worker providing up to thirteen observations. The summary statistics do not apply to each of the individual analyses that follow, because some of the relevant questions were not asked each year.

Just under half the observations are women and just over half are married. About 60% of the observations are people with children, with the average respondent having 1.2 children at the time of an interview.[12] Naturally, given that the sample ages over time, this average (as well as the marriage rate) varies across years in the sample. Fewer than 40% of 1985 respondents had children, while almost 80% of those interviewed in 2000 had at least one child. This aging and changing demographics could complicate the empirical analysis in that controls for year could also control for aging of the sample. I attempt to minimize this effect throughout the following analysis by always controlling for a full set of age indictor variables so that the year effects should pick up, for example, differences between thirty-year-old workers in 1989 and 1990.

The NLYS includes a measure of the unemployment rate in the local labor market for each person in the sample. The measure is crude, however, revealing only whether the unemployment rate is 0-3%, 3-6%, 6-9%, etc. Most of the variation in this variable is explained by person fixed effects and year effects. That is, the unemployment rate does not change much in local markets during the sample, except as it moves up and down with national trends. Therefore, after controlling for year, this variable is largely a crude region indicator variable.

The "employees" row shows the number of employees at the site where the respondent works. The NLSY has other measures of firm size, such as whether the employer has multiple locations and the total number of workers at all the employer's locations. I use employees at the worker's site for most of the analysis. The results are not sensitive to using alternative proxies for firm size. Section 3.7 discusses this and alternative interpretations to the firm size results.

Over 90% of the sample regularly works 30 hours/week or more, with 67% reporting working 30 to 40 hours per week ("full-time") and 27% working more than 40 hours/week ("more than full-time"). The median wage is about $9/hour (real $1990) and the average is considerably higher.

[12] In the analysis that follows, I use the children indicator rather than the number of children. The results are not sensitive to this choice.

Table 1 displays the fraction working in industries related to the employee benefits I analyze because these industries can presumably provide these benefits at low cost.

The last four rows of the sample show the fraction of employees who reported that their employer offered various benefits. In 1988, 1989, and 1990, the NLSY asked respondents if their employer made "company paid or subsidized meals" available to them. Approximately 15% of respondents said their employer offered them this benefit. From 1988-2000, the NLSY asked if respondents' firms offered them "company provided or subsidized childcare." Only 7% said their firm provided this benefit.[13] Not surprisingly, health-care-related benefits were more common. Over half of the NLSY sample reported that their employer offered dental benefits and about three quarters said yes when asked "Does your employer make available to you medical, surgical, or hospital insurance that covers injuries or major illnesses off the job?"

3.2 Employer-Provided Meals

Meals that employees receive at the workplace present an opportunity to investigate all four of the testable implications of the model. Implication 1 of the model says that firms with a cost advantage in providing a benefit (either due to scale economies, tax savings, or simply saving individual effort of food preparation) will provide that benefit. This suggests employees are more likely to receive meals from their employer when the firm is in the food business (that is, surely it is efficient for restaurants to provide meals to employees) and when the firm is relatively large, allowing it to take advantage of scale economies in purchasing (especially in the case of on-site subsidized cafeterias.)

Implication 2 predicts that workers will sort to firms that provide benefits that they value relatively highly. To proxy for value to the employee, I include children and marital status. I would expect people with families to have a higher opportunity cost of dining at the workplace and, therefore, expect these proxies to be negatively related to on-the-job meals. I also expect higher-paid workers to be more likely to receive meals at the workplace, as the tax advantages are greater for these workers. Implication 3 implies that meals will be more common with longer employment spells.

The hours of work variables are potentially informative about Implication 4 of the model, which predicts that benefits will be related to employee effort. As the model suggested, benefits that lower the cost of effort are more valuable when greater effort is required. Therefore, Implication 4 predicts that employer-provided meals will be increasing in hours worked.

The first column of Table 2 presents the results of a logit regression that tests these hypothe-

[13] See McIntyre (2000) for further details on the growth and prevalence of on-site day care.

ses. The dependent variable is the indicator for whether the person receives employer-provided or employer-subsidized meals in a given year. The coefficients displayed are the marginal effect on the probability of receiving this benefit if the explanatory variable increases by one.

The regressions provide support for the relationship between employer-provided meals and firm cost of providing benefits (Implication 1). First note that a doubling of the number of employees at the work site increases the likelihood of the firm providing meals by approximately one percentage point. Given a base probability of 15% of receiving meals, this is a large effect. See Section 3.7 for a more detailed discussion of possible interpretations of the firm size/benefits relationship. Firms that are in food-related businesses, such as bakeries and restaurants, are much more likely to provide meals.

The data are also consistent with employees who value meals more sorting to firms that provide them (Implication 2), as both marriage and children are negatively related to workplace meals. Married workers with non-working spouses are about 20% less likely (3 percentage points on a base of 15%) to receive meals at work than single workers. Married workers with working spouses are also less likely than single workers to be offered meals at work, though less likely than married workers whose spouses do not work. This is consistent with couples where both people are busy finding it less personally costly to be at work. Similarly, people with children are much less likely to be in jobs where they are offered meals. Also, higher wages are associated with workplace meals, consistent with the tax effects.

The fact that people with longer tenure are *less* likely to receive meals contradicts Implication 3 of the model. This could be due to the fact that employee preferences for work-related meals are likely to change as their family status changes.

The logit results on hours worked are consistent with a relationship between benefits and effort costs (Implication 4). Full-time workers (the excluded category in the logit) are somewhat more likely to receive meals at work than part-time workers. However, the important effect of hours is for those who work more than full time. Employees who work more than 40 hours per week have about a 7% higher likelihood of receiving meals at work than part-time workers and about a 4% higher likelihood than those who work full time. The coefficients on part-time and more than full-time are both statistically different from zero at better than the 1% level. They are economically meaningful given an overall employer-provided meal probability of 15%. These results appear even more striking when compared to later regressions, which will show that employees who work more than full time are no more likely than full time workers to receive benefits that do not complement long hours of work.

Given that work-related meals are a key example of how the benefits/effort relationship can

affect firms' purchases, it is worth considering the size of these effects in the overall economy. Sodexho USA and Aramark are both large providers of meals to U.S. businesses. Aramark, for example, states in their 2003 10-K statement: "We satisfy the business dining needs of several million people annually." Both companies generate several billion dollars of revenue annually in this segment of the market, with double-digit annual growth. In addition, many work-related meals are provided by small caterers and restaurants.[14] The estimates in Table 2 suggest that working more than full-time increases employer-sponsored meal probability by about one quarter. It therefore seems likely that a non-trivial portion of this multi-billion dollar business is related to the complementarity between meals and effort.

Though not presented here, I ran several other specifications to probe the robustness of the results in column 1 of Table 2. First, I performed the analysis using the Chamberlain (1980) methodology to run fixed-effects ("conditional") logits. The qualitative conclusions for hours, wages, tenure, firm size, and children were the same as those presented in Table 2. However, effects of variables that do not vary over time for the same person (such as gender) cannot be identified. Effects of those where within-person variation is small (such as marital status and industry) were measured imprecisely. Second, I controlled for weekly, rather than hourly, wages. This had essentially no effect on the conclusions.

3.3 Child Care

I now consider employer-provided child care. Implication 4, regarding the complementarity between effort and benefits, operates quite differently in the child-care context than for meals. Employees who are primarily responsible for their children seem unlikely to be swayed to work very long hours as a result of employer-provided child care. However, it is plausible that employer-provided child care can help some employees increase their working hours, if not to extreme levels. The effort complementarity idea may apply to child care on the part-time vs. full-time margin rather than in leading people to work more than full-time.

Column 2 of Table 2 shows the results of logits where the dependent variable is one if the NLSY respondent reports that his employer provides or subsidizes child care. The explanatory variables are the same as in Column 1, except that the child indicator now is determined by whether the respondent lives in a household with a child under the age of seven. The results support the connection between benefits and firm cost structures (Implication 1). People who work in industries that are related to child services are much more likely to get child care through their employers

[14] Feel free to discuss this issue in more detail with me over a post-seminar dinner sometime.

and larger employers are far more likely to provide child care.

Child care benefits are also associated with factors that suggest employers search for those who value this benefit and these employees sort to employers that provide it (Implication 2).[15] Women are much more likely than men to get child care benefits and employees with this benefit have higher paying jobs (possibly due to tax effects). Note, however, that child care benefits are not significantly related to marital status, working status of spouse, or whether the employee has children.[16] This could be because people who plan to have children match to firms that provide child care, but do not need this benefit during much of their relatively long tenure on the job.

The results also support Implication 3. Employer-provided child care is more common at longer tenure jobs (indicating high "T" in the buyers' club model).

The results are consistent with benefits being used to lower employees' effort costs (Implication 4). Full-time workers are significantly more likely to get child care at work than part time workers. The 1.3 percentage point decrease in child care probability for part time workers suggests these employees are about 20% less likely to get work-related child care than full time workers. However, those who work more than full time are less likely to get work-related child care than those who work full time. This difference is statistically significant at the 10% level and the point estimate indicates a large difference based on full-time versus more-than-full-time status. Combined with the results on hours worked and employer-provided meals, the importance of using benefits to affect effort costs is well supported by the data. The results are consistent with the idea that employers provide child care to ease the transition from part-time to full-time work and they provide meals to make it easier for employees to work long hours.

Finally, employer-provided child care is more common in more competitive labor markets. An increase of 3% in the local unemployment rate is associated with a one percentage point reduction in child care probability (or about a one-seventh reduction.) This provides some suggestive evidence that is consistent with Implication 3 in that it could indicate that, when labor markets are tight, firms use child care to increase labor supply by helping to ease the transition from part-time to full-time work.[17] In unreported regressions, I found further suggestive support for this hypothesis

[15] A similar alternative interpretation is that firms begin to offer child care assistance when they find that they have employees who would value this benefit.

[16] For the child care analysis, I set the child indicator equal to one if there is a person under the age of seven residing in the respondent's household. Results are similar when the child indicator is one if the respondent has any children.

[17] As noted above, the unemployment variable is very crude and does not vary much independently of the national economy. It does, however, indicate which labor markets are generally competitive. If child care were added and dropped regularly by firms and if this labor market measure were more accurate, the negative coefficient could imply

by interacting the unemployment variable with the hours variables. The hours effects are significantly larger when unemployment is low – that is, an unemployment/part-time interaction variable is positive, an unemployment/more-than-full-time interaction is negative, and both are at least marginally significant.

Again, I ran several other specifications to probe the results in Column 2 of Table 2. Fixed-effects logits led to similar conclusions to those presented, though the "greater than full-time" hours effect was no longer negative. This seems reasonable, as few people go from working very long hours to taking much responsibility for taking care of their children. On the other hand, in a specification controlling for weekly (rather than hourly) wages, the negative relationship between long hours and child care is stronger and statistically significant at the 1% level. I also ran a specification interacting marriage with children, but this did not generate results that reconciled the family variables with Implication 2. There is no evidence that single parents sort to jobs with child-care, for example.

3.4 Dental and Health Insurance

The largest benefit given to US employees, in terms of likelihood of receiving it and cost to firms is health insurance.[18] This is as much by historical accident and due to institutional factors as it is a reflection of any sort of optimal allocation of resources. Nevertheless, given the tax incentives and opportunities to use such a high-cost benefit to affect the employment relationship, it is well worth studying determinants of health insurance provision.[19]

Health insurance, as well as dental insurance, can help shed light on the relationship between benefits and effort because they are different in important ways from employer-provided meals and child care. It seems unlikely that either of these benefits is complementary to employee effort or hours of work (that is, I would expect $c_{eb} = 0$). It does not seem likely that the value of this benefit should be related to an employee's marginal product. Therefore, if insurance also shows different prevalence for full-time workers and more-than-full-time workers, I would suspect that the

firms cut this benefit when wages are rigid (as suggested by Oyer (2005).) However, this does not appear to be the case, based on unreported conditional logit regressions.

[18] This statement is somewhat dependent on the definition of employee benefits. Employer-provided health insurance is about as common in the NLSY as paid vacation. However, I am thinking of paid vacation as affecting the timing, rather than the form, of compensation.

[19] There is a large literature on health insurance and its effects on the U.S. labor market. Many of these issues are beyond the scope of this analysis. For further institutional detail on U.S. employer-provided health insurance and its effects on the labor market, see Gruber (2000).

results with regard to work hours for child care and meals are not driven by forces captured in the model. As columns 3 and 4 of Table 2 show, however, there is no meaningful difference in insurance likelihood between full-time and more-than-full-time employees.[20] This suggests that the provision of insurance is not driven by an attempt to affect effort.

As might be expected, the results are highly consistent with the relationship between benefits and employer costs (Implication 1). Working in a related industry (low cost of providing benefit) or for a large firm (which helps amortize the fixed cost of establishing a program and creates greater economies of scale) are strongly positively related to health and dental benefits. A 10% increase in firm size increases dental probability by 0.86 percentage points (which is a 1.5% increase on the unconditional 56% probability of having dental insurance.)

The predicted relationship between benefits and employee sorting (Implication 2) is also supported by the data, though some of the results are ambiguous in this regard. Higher pay (which proxies for tax rate) is associated with both benefits. Married workers, who may want to get benefits for the rest of their family, are far more likely to be offered health insurance. This relationship is limited to those with working spouses in the case of dental insurance, which could indicate these couples have relatively good jobs. Married workers may also have higher likelihood of being offered insurance because their employment relationships are more stable. However, people with children are *less* likely to receive these benefits than those with no children. This could be because some children are covered by spouses' insurance. In fact, when not controlling for marriage (in an unreported logit), children are associated with much higher rates of health insurance coverage.

Implication 3 receives strong support from the logit results, as tenure is related to notably higher rates of insurance. An extra year of tenure raises the probability of dental and health benefits by about one to two percentage points each.

These results are all robust to alternative specifications. For example, fixed-effects logits lead to similar conclusions, as do controlling for weekly wages. Also, limiting the sample to one gender or the other does not change the relationships with other variables.

3.5 Benefits Packages

The model and discussion to this point suggest two broad classes of justifications for firms' choices about which benefits to offer – some firms compile benefits to encourage long hours (Implication 4 of the model) and some compile benefits to encourage costs savings and long employment relationships (Implications 1-3). As the model suggests, these justifications can reinforce one another. However,

[20] More-than-full-time employees are more likely to be offered health insurance than full-time employees. However, the difference is quite small economically.

if firms where effort and benefits complement one another are not those with comparative advantage in purchasing, these two justifications can be quite distinct. To more directly assess this distinction, I now look at groups of benefits offered by individual employers.

The NLSY asks for details on several other benefits that can be used to define benefits packages. I start by forming an "effort package" that consists of benefits that are good candidates to help lower the cost of effort. That is, in the terminology of the model, I expect these benefits to have $c_{eb} < 0$. Unfortunately, the NLSY does not ask about many of the benefits (such as concierge service, game rooms in the office, etc. – see the quote at the beginning of the paper) that are most likely to complement effort and keep people at the workplace. I therefore define an indicator variable "effort package" that takes the value one if the employee has access to employer-provided meals, employer-provided parking, and flexibility in choosing work hours.

The NLSY asks about a variety of more traditional benefits that can help attract employees for a long relationship. I define a "tenure package" indicator that equals one if the employee's firm provides health insurance, dental insurance, maternity leave, on-the-job training, life insurance, and a retirement plan.[21]

Panel A of Table 3 provides descriptive statistics for each package, as well as each benefit within the package. One thing that is immediately clear from the table is that there is significant correlation across these benefits for a given person. That is, the 8.3% (30.7%) of people who have each element of the effort (tenure) package is almost double (six times) the fraction that would have all these benefits if they were provided completely independently of each other.[22] However, as Panel B shows, the correlation between the effort and tenure packages is not particularly noteworthy. While 8.3% of people have the effort package, 11.9% of those who get the tenure package also get the effort package. Similarly, while 26.1% of the relevant sample gets the tenure package, 37.3% of those who get the effort package also get the tenure package. While these numbers suggest these two groups of packages are related, the correlation is far from overwhelming. This provides some initial evidence that these types of benefits fit at different types of firms.

Table 4 shows the results of logits similar to those in Table 2, but with the two packages as dependent variables. Column 1 presents the results for the effort package. Not surprisingly, the

[21] On-the-job training and retirement plans do not necessarily meet the basic criterion I stated earlier that a benefit would be something the person got from the firm that it could also buy externally. However, both these benefits could meet that definition and, given the correlation in benefits within firms, are probably more likely to meet it when provided as part of a large package of benefits.

[22] That is, if the components of the effort package were provided independently, roughly 4.3% (15.1% * 58.5% * 48.4%) of respondents would have the full package.

results are similar to the meals logit, given meals are a third of the package. Two results are worth highlighting. First, the greater-than-full-time indicator is again large (and statistically significant). The part-time indicator is not distinguishable from the less-than-full-time group, though this could be due to the small sample of less-than-full-time workers. These results mean that Implication 4 is consistent with the relationship between hours worked and availability of the effort package.

Second, there is no relationship between effort-related benefits and tenure. These benefits do not seem to be about attracting people who place a high value on a particular benefit and, therefore, stay with the firm. Rather, they appear to help induce high effort during the employee's stay at the firm, however long that may be.

Column 2 of Table 4 shows that these two results reverse when looking at the tenure package. That is, for these benefits where I would not expect benefits to lower the cost of effort (and, therefore, would not expect Implication 4 to hold) there is no difference between the likelihood of getting this group of benefits for those working full-time and those working very long hours. Implications 1-3 are consistent with the results for the tenure package, however. These benefits are strongly associated with relatively long-term jobs. This suggests that these benefits are packaged together to take advantage of firm buying power and to attract people who place a relatively high value on the benefits.

3.6 Benefits at Government and Non-Profit Organizations

Conventional wisdom suggests that people work for government and non-profit organizations because these employers tend to offer generous benefits. A commonly heard justification for taking jobs outside the private sector is, "The pay stinks, but the benefits are good." In this section, I extend the prior analysis to consider the type of firm. I show that non-profit and government employers are, in fact, much more likely to provide certain types of benefits than private firms and I consider how this fits with the theoretical analysis above.

At least based on a stereotypical view that government work is stable and that government jobs are not high stress, government organizations should be relatively unlikely to use benefits to lower effort costs. In addition, there may be political constraints that restrict government organizations from providing perquisites such as meals. Therefore, I expect meals, child care, and the effort package to be less prevalent at government employers.

Because of their size and potential power in procurement, government employers are likely to be able to take advantage of scale economies in purchasing insurance. Also, people who choose the stability of government jobs are likely to be risk averse and, therefore, to value insurance. That is, Implications 1-3 should apply at government organizations, suggesting dental and health insurance,

as well as the tenure package as a whole, will be relatively common for government workers.

Self-employed workers may have just the opposite profile – they are likely to be relatively risk tolerant and they cannot take advantage of scale economies in purchasing insurance.[23] In addition, self-employed workers may have less tax incentive to purchase health insurance, as they may be able to shield their income from taxes in other ways. Therefore, I would expect self-employed workers to be less likely to receive employment-related insurance. Self-employed workers have more to gain than other workers by providing meals at work. This is one way to shield income from taxes, for example. Also, a self-employed person need not worry as much about the variety of food preferences of a large group when purchasing meals.

Table 5 displays the results of logits similar to those in Tables 2 and 4, except I include indicator variables for working for the government, for being self-employed, and for working for a non-profit organization. The excluded category in all regressions is private company, so the coefficients show the difference in probability between each type of employer and a private company. Note that I limit the analysis, when possible, to 1994 and later. From the start of the survey until 1993, the NLSY asked respondents if they worked for a private company, worked for the government, or were self-employed. Starting in 1994, the option of non-profit organization was added. Before 1994, non-profit employees were classified as working at private companies.

The meal logit in column 1 confirms that government workers are significantly less likely to receive meals at work than people who work for companies, while self-employed workers are much more likely to get meals at work. Column 2 shows that government workers are somewhat less likely to get child care at work, though the effect is not significant. Employees of non-profit organizations, on the other hand, are much more likely to have employer-provided child care. This is not simply due to the fact that child care and child service providers are often non-profit agencies, because the regressions control for child-oriented businesses. Perhaps this connection between non-profits and child care reflects that some new parents who want to continue working move to the non-profit sector because they find the "work-life balance" better (which is a way to interpret this result as consistent with Implication 2). Non-profit employers would then find it efficient to set up a child care center given this common preference. However, there is not enough detail in the data to investigate this conjecture fully.

Columns 3, 4, and 6 confirm that the benefits at government and non-profit jobs are generous. Employees in both these sectors are much more likely to get insurance at work, as well as to have the entire tenure package. The results are statistically significant at any reasonable level and economically large. For example, while 56% of the sample as a whole receives dental insurance, this

[23] The NLSY sample of self-employed workers only includes those whose business is incorporated.

probability is increased by nineteen (twelve) percentage points for government (non-profit) workers. Also, self-employed workers are dramatically less likely to grant themselves these benefits.[24] The results are consistent with Implication 2 of the model. That is, if employees with strong preferences for insurance (those who are relatively risk averse) are also those who like the stability of government and non-profit jobs, then these organizations may be able to cost effectively employ these workers. Column 5, on the other hand, shows that government workers are far less likely than corporate employees to be provided with benefits that are conducive to increased effort.

3.7 Alternative Hypotheses and Historical Trends

I have argued that the empirical patterns in the NLSY are driven by factors modeled in Section 2, including that workers sort to firms that cost-effectively provide benefits they value and that some benefits lower the cost of employee effort. In this section, I briefly consider a few alternative explanations and I use an alternative dataset to look at historical changes in benefits (and to probe for potential weaknesses in the NLSY.)

The results regarding firm size are, as I have argued above, consistent with the importance of economies of scale in purchasing (and, therefore, Implication 1 of the model). However, as a large literature shows (see Oi and Idson (1999)), firm size is correlated with wages even when including extensive control variables. Therefore, there could be some omitted factor that causes large firms to have both high wages and generous benefits. In fact, given the positive firm size/wage relationship, I would expect a positive firm size/benefits relationship simply because employees at larger firms would consume some of the extra compensation in wages and some in benefits. I therefore think of the results that relate firm size to benefits as a necessary, but not sufficient, condition for the economies of scale relationship suggested by Implication 1 of the model.

I also found that, when combining various measures of firm size (specifically, employees at the respondent's site, whether the firm has other locations, and whether the firm has 1,000 or more employees at other locations), *each* of these measures is almost always positively and significantly related to the provision of any benefit. So I cannot specifically isolate whether it is economies of scale at the firm or establishment that lead firms to provide benefits.

One other potential worry with the firm size variable is that the functional form assumption (log of employees at the worker's location) is inappropriate and, therefore, it does not fully control

[24] As discussed by Gruber and Poterba (1994), before the Tax Reform Act of 1986, the tax advantages of employment-based health insurance were lower for self-employed workers than others. However, because the results in columns 3, 4, and 6 are for 1994 and later, they should be free of effects of tax differences between self-employed workers and others.

for firm size. This could lead to inappropriate conclusions about other variables that are related to firm size. However, while I cannot fully rule that possibility out, it is reassuring that none of the other conclusions are sensitive to any alternative controls for firm size. Specifically, I reran all the analysis with no controls for firm size and then controlling for various alternative functions of firm size. This never affected any conclusions.

In addition, I ran an alternative specification that provides support for the economies of scale interpretation of firm size. If economies of scale are an important part of the firm size/benefits relationship, I would expect this relationship to be weaker at firms that already have a cost advantage because of their industry. For example, while any firm that is larger might have an advantage in providing meals, the marginal effect of being large is likely to be greater at a law firm than at a restaurant. I therefore also reran all the analysis with the control for firm size interacted with the variable for being in a related industry (restaurants and food stores in column 1 of Table 2, child-care centers in column 2, etc.) In the case of all four benefits in Table 2, the data are consistent with the economies of scale interpretation. The coefficient on firm size is always positive, as is the coefficient on working in a related industry. But the coefficient on the interaction between size and related industry is negative and significant in each case.[25]

An alternative explanation for firms offering some benefits is agency problems. Lavish corporate benefits, or perquisites, are often cited as a classic example of agency problems for executives (see Yermack (2005).) Perhaps some employees in the NLSY are also in a position to capture rents and this is easiest to do by getting the firm to add perks. Agency seems like an unlikely explanation for the components of the "tenure package" because non-discrimination laws require that most of these benefits be provided to all employees if they are available at all. Similarly, it is hard to imagine this explains the patterns in child-care provision because employees trying to balance work and family concerns are unlikely to be well positioned to extract rents from the firm. However, this could explain the results regarding meals if employees who work long hours are relatively powerful. If this were the case, one might imagine that this agency issue would be a bigger problem at large firms with higher monitoring costs. In an unreported regression, I reran the analysis in column 1 of Table 2 and found that an interaction of greater than full time and firm size has a marginally significant *negative* relationship to meals.

Another alternative explanation is that firms add and remove benefits to adjust to the economic climate because it is easier to adjust benefits than to change wages (see Oyer (2005).) This is consistent with some of the results in Table 2, as the negative coefficients on local unemployment

[25] The interaction coefficient is marginally significant in the case of health care, but significant at better than the 1% level for the other three benefits.

suggest that benefits are higher when labor markets are tighter. This could be a contributing factor. However, low adjustment costs of benefits alone cannot explain the other factors that affect benefits, such as hours worked, wages, and tenure.

To see how benefits have changed over time and to insure there are not serious weaknesses in the NLSY, I gathered data from three surveys of workers from the 1970's. The 1970 Survey of Working Conditions and the 1973 and 1977 Quality of Employment Survey each asked approximately 1,500 workers many detailed questions about their primary job. The three surveys asked similar questions and I refer to the three surveys together as the QES. When asking about benefits, the QES specifically asked if the employer makes the benefit available to the respondent. As with the NLSY, there is no requirement that the person take advantage of the benefit. To maximize comparability with the NLSY, I drop QES respondents that are over 45.

Like the NLSY, the QES asked about free or discounted meals and health insurance for medical issues not related to work. I use the same components to form the "tenure package" as I used in the NLSY except maternity leave. The QES only asked women this question. The proportion of workers reporting employer-provided meals and health insurance, as well as those reporting the "tenure package" closely match those in the NLSY. The QES asked if the firm provided a day-care center, which is a little more specific than the NLSY question of whether the firm provides or pays for day care. Probably because of this difference in the question and because there are fewer women in the QES (24%), the day care rate is much lower (2.2%) than in the NLSY. The QES did not ask about dental benefits. Also, it did not ask about parking, flex time, or other benefits that could help form an "effort package."

I was able to construct most of the same explanatory variables that I used in the NLSY logits. The industry classifications are somewhat different in the 1970 sample, so the controls for related industry are measured with more error in that year. The QES does not include a measure of local labor market conditions. Analyses similar to those in Tables 2 and 4, but using the QES data, are displayed in Appendix Table 1. I do not discuss them in detail, but simply highlight a few conclusions relative to the NLSY results.

The connection between hours worked and meals is the most interesting result in the QES meals analysis. Confirming one of the main findings of the NLSY analysis, employees who work more than full time are more than 4% more likely to receive meals than those that work full time. This suggests that effort complementarity is important in the provision of meals. However, in the QES, employees who work part time are significantly more likely to be offered meals at work than those who work full time. While this effect is substantial and significant, note that under 9% of the sample worked part time. The positive effect of part time is the result of ten people in the 1970 and

1973 surveys who worked part-time in general merchandise stores or as domestic help. So, though part time workers may have been more likely to have work-related meals in the early 1970's, this affected a small portion of the workforce and was no longer true as the nature of retail stores and domestic help changed over time. If I applied a broader definition to "food-related" industries, the results in the QES would mimic those in the NLSY. As it is, the 1977 results do mimic the NLSY while the earlier results confirm the effect of working long hours but change the result for part-time employees.

The child-care results are not very enlightening, possibly because of how few women there are in the sample and/or because this benefit was much less common at the time of the QES. The health care and tenure package logit results are very similar for the QES and the NLSY except that women were no more likely to get these benefits in the QES. This increase in female benefits by the time of the NLSY could be due to women's increased attachment to the labor force and their ability to obtain higher quality jobs.

In general, the conclusions from the NLSY data are robust to using data from the QES as an alternative. The changes are what might be expected, given the increase in women's labor force participation during the 1970's and 1980's.

4 Conclusions and Further Research

One of the "make or buy" decisions nearly every firm faces is how much to simply "buy" labor input with salary and how much to "make" employee benefits that it can barter for labor services. In this paper, I analyzed several factors that go into this choice about firms' boundaries. I developed a model where firms do some of their employees' purchasing for them when the firm can more efficiently procure some items and where employee valuations of benefits vary with work-related effort. Using the National Longitudinal Survey of Youth, I showed empirical evidence that is consistent with these theoretical considerations playing a role in firms' decisions about which benefits to provide. For some key benefits that make up the bulk of benefits expenditures (especially health insurance), the efficient purchasing model appears to be particularly important. The relationship between benefits and employee effort is strongest for company-provided meals and child care. These are both large and growing portions of the economy, which suggests that "effort complementarity" of benefits will become more important in the overall economy in coming years.

Given the reduced-form nature of the analysis and the lack of an experiment that can help evaluate policy, the results in this paper do not have direct public policy implications. However, given that benefits continue to be a growing portion of employment costs and that sectors such

as work-related catering are a growing share of the economy, the paper does suggest that policy makers should consider how firms' choice of benefits will respond to any change in tax policy, overtime rules, or other policies that affect the structure of employment costs. For managers, the paper highlights the potential value that can be created in the employment relationship by crafting benefits packages that combine a firm's cost structure with employees who value certain benefits.

The comparative statics derived in this paper and the empirical relationships provide some evidence to suggest factors that affect firms' decisions on provision of benefits. One limitation of the analysis is that I have relied on individuals' self-reported benefits' eligibility. To more closely tie benefits to firm characteristics and to minimize measurement error, it would be informative to use a survey of firms and their benefits practices.

Finally, in this paper I did not address one important issue in employee benefits – overconsumption. That is, one of the costs of firms' providing benefits to employees is that, if employees pay no marginal cost to receive a benefit, they will consume to the point where the marginal value of their benefits consumption is zero. Given that the social optimum would be for employees to consume until marginal value equals marginal cost (to the firm), there will be a deadweight loss from overconsumption. See Marino and Zabojnik (2004) for a theoretical analysis of the optimal "price" firms should charge workers who consume benefits. Future research could gather detailed benefits usage data from individual firms to study how firms manage the trade-off between the value created by benefits and the cost of overconsumption.

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Table 1: NLSY Summary Statistics

	mean	median	standard deviation	sample size
Female	47.0%	na	na	82,555
Married	52.2%	na	na	82,555
Spouse works	74.1%	na	na	43,058
Children indicator	61.2%	na	na	82,555
# children	1.225	1	1.259	82,555
Local unemployment	6-9%	3-6%	na	81,051
Employees	1,981	50	12,195	79,832
Part-time	6.2%	na	na	82,529
More than full-time	27.3%	na	na	82,529
Tenure (weeks)	201.1	123	211.7	81,499
Hourly wage ($1990)	$16.26	$8.60	$397	82,555
Age	31.26	31	4.67	82,555
Food industry	8.1%	na	na	23,703
Child-related industry	4.6%	na	na	69,868
Dental industry	0.5%	na	na	82,261
Health-related industry	8.4%	na	na	82,555
Meals provided	15.1%	na	na	23,703
Child care provided	7.2%	na	na	69,868
Dental insurance	56.2%	na	na	82,261
Medical insurance	75.8%	na	na	82,555

Sample includes 82,255 person/year observations (from a total of 10,658 people) who hold a job and provided a positive wage. Years are 1986-1994, 1996, 1998, and 2000. Samples size varies (here and in the following tables) because respondent did not answer or the question was not asked each year. "Spouse works" indicates that the respondent's spouse worked at least 1,000 hours in the calendar year preceding the interview. "Local unemployment" is provided in 3% bands (that is, either 0-3%, 3-6%, etc.) "Employees" is the number of employees at the establishment where the respondent works. "Part-time" indicates people who usually work fewer than 30 hours per week at their main job. "More than full-time" includes people who usually work more than 40 hours per week at that job. "Food industry" includes stores that sell food and restaurants, "child-related industry" includes elementary and secondary schools, day care services, residential care facilities, and social services, "dental industry" includes dentist offices, and "health-related industry" includes doctors' offices, hospitals, nursing homes, and health services.

Table 2: Factors Associated with Benefits

	(1) – meals	(2) – child care	(3) – dental	(4) – health
Female	0.0019	0.0183	0.0705	0.0286
	(0.0063)	(0.0032)	(0.0081)	(0.0046)
Local unempl	-0.0003	-0.0095	-0.0166	-0.0058
	(0.0037)	(0.0015)	(0.0038)	(0.0021)
Children indic.	-0.0219	0.0004	-0.0324	-0.0371
	(0.0065)	(0.0027)	(0.0081)	(0.0048)
Married	-0.0307	-0.0059	-0.0004	0.0425
	(0.0101)	(0.0047)	(0.0111)	(0.0067)
Spouse works	0.0188	0.0046	0.0339	0.0158
	(0.0095)	(0.0039)	(0.0095)	(0.0059)
Log employees	0.0086	0.0124	0.0856	0.0558
	(0.0012)	(0.0005)	(0.0019)	(0.0013)
Part-time	-0.0330	-0.0132	-0.3130	-0.2424
	(0.0121)	(0.0050)	(0.0129)	(0.0078)
$>$ than full-time	0.0390	-0.0051	0.0067	0.0330
	(0.0060)	(0.0030)	(0.0071)	(0.0042)
Tenure (*100)	-0.0052	0.0016	0.0210	0.0364
	(0.0019)	(0.0006)	(0.0022)	(0.0015)
Log wage	0.0197	0.0164	0.2464	0.1471
	(0.0046)	(0.0020)	(0.0084)	(0.0053)
Related industry	0.1989	0.0444	0.4225	0.0259
	(0.0082)	(0.0055)	(0.0684)	(0.0077)
Sample Years	1988-1990	1988-2000	1986-2000	1986-2000
Pseudo-R^2	0.058	0.066	0.186	0.2522
Sample Size	21,852	64,021	77,082	77,345

Data are from the National Longitudinal Survey of Youth. Each column reports the results of a logit. Dependent variables are indicators that equal one if the respondent indicates his/her main employer provides paid or subsidized meals (column 1), child care (column 2), dental benefits (column 3) or "medical, surgical, or hospital insurance that covers injuries or major illnesses off the job" (column 4). Sample includes all employed people who report their wage and answer the relevant benefits question. Explanatory variables are described in Table 1. Each regression also includes year and age indicators. Sample years are 1986-1994, 1996, 1998, and 2000, though not all columns include all years (as noted). Standard errors, adjusted for correlation among multiple responses by the same person, are in parentheses. Coefficients are marginal effects on the probability that the respondent's firm provides the benefit.

Table 3: Packages of Benefits

Panel A: Summary Statistics

	mean	sample size
"Effort" package	8.3%	15,914
Meals	15.1%	23,703
Parking	58.5%	15,959
Flex Time	48.4%	15,948
"Tenure" package	30.7%	69,377
Medical insurance	75.8%	82,555
Dental insurance	56.2%	82,261
Maternity leave	62.5%	66,518
On-the-job training	48.6%	70,213
Life Insurance	65.1%	70,423
Retirement plan	59.8%	70,077

Panel B: Relationship between packages (1989 and 1990 only)

	No "Tenure" package	"Tenure" package	Total
No "Effort" package	68.7%	23.0%	91.7%
"Effort" package	5.3%	3.1%	8.3%
Total	73.9%	26.1%	100%

See Table 1 for sample details. Years included are 1986-1994, 1996, 1998, and 2000. Samples are smaller for some variables because respondent did not answer question or the question was not asked each year. "Effort" benefits and "Tenure" benefits are indicator variables that equal one for respondents who report having every one of the benefits in the relevant category. If respondent reports not knowing if he/she receives a benefit, that benefit is not included when determining if the person receives the relevant "package." As a result, package sample size can be bigger than individual benefit sample.

Table 4: Factors Associated with Benefits Packages

	(1)	(2)
Dependent Variable	"Effort" Package	"Tenure" Package
Female	0.0123	0.1144
	(0.0054)	(0.0069)
Local unempl	-0.0030	-0.0214
	(0.0036)	(0.0035)
Children indicator	-0.0071	-0.0272
	(0.0058)	(0.0071)
Married	-0.0280	-0.0194
	(0.0093)	(0.0103)
Spouse works	0.0145	0.0573
	(0.0087)	(0.0085)
Log employees	0.0024	0.0573
	(0.0010)	(0.0013)
Part-time	-0.0118	-0.2435
	(0.0113)	(0.0140)
$>$ than full-time	0.0177	0.0003
	(0.0054)	(0.0060)
Tenure (*100)	-0.0018	0.0145
	(0.0016)	(0.0015)
Log wage	0.0006	0.1935
	(0.0042)	(0.0068)
Sample Years	1989-1990	1988-2000
Pseudo-R^2	0.0074	0.1674
Sample Size	14,698	65,318

Data are from the National Longitudinal Survey of Youth. Each column reports the results of a logit. Dependent variables are defined in Table 3 and in the text. See Table 2 for sample and specification details. Standard errors, adjusted for correlation among multiple responses by the same person, are in parentheses. Coefficients are marginal effects on the probability that the respondent's firm provides the benefit.

Table 5: Benefits and Employment Sector

Individual data – NLSY

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable	meals	child care	dental	health	"effort"	"tenure"
Government	-0.0200	-0.0090	0.1916	0.1116	-0.0530	0.1244
	(0.0100)	(0.0065)	(0.0162)	(0.0102)	(0.0091)	(0.0127)
Self-Employed	0.0943	0.0007	-0.3084	-0.1193	0.0335	-0.4466
	(0.0278)	(0.0126)	(0.0291)	(0.0133)	(0.0252)	(0.0474)
Non-Profit		0.0450	0.1166	0.0571		0.1440
		(0.0066)	(0.0192)	(0.0122)		(0.0161)
Sample years	1988-1990	1994-2000	1994-2000	1994-2000	1989-1990	1994-2000
Pseudo-R^2	0.059	0.071	0.243	0.299	0.013	0.198
Sample Size	21,850	21,263	21,537	21,595	14,696	21,595

Each column reports the results of a logit. Dependent variables in columns (1)-(4) are the same as those used in Table 2. Dependent variables in columns (5) and (6) are the same as those in Table 4. Control variables include all those used in Tables 2 and 4. In columns (1) and (5), non-profit organizations are combined with for-profit entities (which is the excluded variable). Standard errors, adjusted for correlation among multiple responses by the same person, are in parentheses. Coefficients are marginal effects on the probability that the respondent's firm provides the benefit.

Appendix Table 1: Factors Associated with Benefits

Individual data – SWC and QES

	(1)	(2)	(3)	(4)
Dependent Variable	meals	child care	health	tenure package
Female	0.0255	-0.0046	-0.0194	0.0054
	(0.0190)	(0.0060)	(0.0185)	(0.0235)
Children indic.	0.0007	0.0022	0.0171	0.0194
	(0.0160)	(0.0051)	(0.0156)	(0.0182)
Married	-0.0024	0.0025	0.0307	-0.0147
	(0.0214)	(0.0064)	(0.0201)	(0.0235)
Spouse works	-0.0127	-0.0083	-0.0203	-0.0039
	(0.0185)	(0.0059)	(0.0185)	(0.0203)
Log employees	0.0128	0.0059	0.0587	0.0536
	(0.0034)	(0.0011)	(0.0036)	(0.0042)
Part-time	0.0914	0.0037	-0.1961	-0.1836
	(0.0256)	(0.0098)	(0.0273)	(0.0528)
$>$ than full-time	0.0442	-0.0048	0.0248	0.0022
	(0.0148)	(0.0048)	(0.0145)	(0.0165)
Tenure (*100)	-0.0026	-0.0007	0.0161	0.0108
	(0.0027)	(0.0008)	(0.0033)	(0.0029)
Log wage	-0.0100	-0.0043	0.0581	0.1191
	(0.0072)	(0.0018)	(0.0094)	(0.0279)
Related industry	0.2471	0.0142	-0.0447	na
	(0.0234)	(0.0067)	(0.0268)	
Pseudo-R^2	0.060	0.073	0.230	0.152
Sample Size	2,787	2,729	2,758	2,787

Data are from the 1970 Survey of Working Conditions and the 1973 and 1977 Quality of Employment Surveys. Each column reports the results of a logit. Dependent variables are indicators that equal one if the respondent indicates his/her main employer provides paid or subsidized meals (column 1), child care (column 2), or "medical, surgical, or hospital insurance that covers any illness or injury that might occur to you while off the job" (column 3). The dependent variable in column 4 is similar to the "tenure package" in table 3 except it does not include maternity leave. Sample includes all working people age 45 or under who report a wage at their main job. Explanatory variables are similar to those in Table 1. Each regression also includes year and 5-year age indicators. Coefficients are marginal effects on the probability that the respondent's firm provides the benefit.