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Employee demand for health insurance and employer health plan choices

M. Kate Bundorf*

Department of Health Medicine, HRP Rewood Building, Stanford University School of Medicine, Rm.T257, Standford, CA 94305-5405, USA

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Abstract

Although most private health insurance in US is employment-based, little is known about how employers choose health plans for their employees. In this paper, I examine the relationship between employee preferences for health insurance and the health plans offered by employers. I find evidence that employee characteristics affect the generosity of the health plans offered by employers and the likelihood that employers offer a choice of plans. Although the results suggest that employers do respond to employee preferences in choosing health benefits, the effects of worker characteristics on plan offerings are quantitatively small.

JEL classification: I11; J33

Keywords: Employer-sponsored health insurance; Non-wage compensation; Health plan choice

1. Introduction

As the intermediary between health insurers and consumers in the purchase of the vast majority of private health insurance, employers play an important role in health insurance markets in the US. In 1999, over 88% of those with private health insurance, received their coverage through an employer (Mills, 2000). Underlying the prevalence of employer-sponsored coverage, however, is considerable variation in the health plans workers and their families receive. Employers vary in whether they offer health insurance, the number and types of plans they offer, and their premium contribution policies (Gabel, 1999). Differences among employees in the coverage they receive from their employers have generated concern over the incentives facing employers in choosing health plans for workers.

* Tel.: +1-650-725-0067; fax: +1-650-723-3786.
E-mail address: bundorf@standford.edu (M. Kate Bundorf).

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My objective in this paper is to examine the relationship between employee preferences for health insurance and the plans offered by employers. My hypothesis is that employee preferences affect employer choices—employers have incentives to consider the preferences of their employees when choosing health plans, although they are constrained in their ability to cater to the diverse preferences of employees by the fixed costs of offering multiple plans. I empirically test this hypothesis by examining the relationship between the characteristics of workers which affect individual demand for health insurance and the generosity of health plans offered by employers. Although the results suggest that employers do respond to employee preferences in choosing health benefits, the effects of worker characteristics on plan offerings are quantitatively small.

2. Background

The role of the employer as an intermediary between consumers and health plans differentiates the purchase of health insurance from that of most other consumer products. The primary benefit to consumers of purchasing coverage through an employer is lower premiums. Economies of scale in the loading of premiums lowers the price of health insurance purchased as part of group relative to coverage purchased individually, and the favorable tax treatment of employer-sponsored benefits reduces the price of health insurance purchased through an employer. A potential disadvantage, however, is that workers are restricted in their ability to choose among plans. By definition, individuals purchasing group health insurance through an employer limit themselves to the options offered by the employer. In 1998, nearly half of the workers were offered only one or two plans by their employer (Gabel, 1999).

The effect of the employer as the purchaser on the welfare of the workers, however, depends on the incentives employers face in choosing health benefits. In a simple model of the allocation between cash wages and fringe benefits, the employer's cost minimizing compensation package for an individual employee is the employee's utility maximizing allocation between cash wages and fringe benefits (e.g. Summers, 1989). Thus, in an employment-based group comprised of workers with homogeneous preferences for health insurance, the employer would offer a single health insurance plan, reflecting the optimal allocation between wages and health insurance for each employee. [1]

Employment-based group purchasing, however, potentially aggregates individuals with heterogeneous preferences for health insurance into a single purchasing group (Goldstein and Pauly, 1976; Pauly, 1986). Studies of the incentives facing employers choosing a single plan for an exogenously determined, heterogeneous workforce have proposed that the single level of coverage chosen by the employer is a weighted average of the preferences of different types of employees (Goldstein and Pauly, 1976; Danzon, 1989). Individuals with strong preferences for health insurance receive a plan that is less generous than their preferred plan,

[1] Although the quantity of health insurance chosen by the employer for workers would be inefficient due to its tax treatment (Pauly, 1968), it would be optimal in the sense that it represents the plan, or allocation between cash wages and health insurance, that employees would have chosen for themselves if they could have purchased coverage at the price available to the employer.

and individuals with weak preferences for coverage receive a plan more generous than their preferred plan, although the preferences of some types of workers may be weighted more heavily than those of others in the employer's decision.[2] Offering an allocation between cash wages and fringe benefits that differs from the employee's optimal allocation, however, is costly to employers competing in the labor market for workers (Danzon, 1989).[3]

Employers may reduce the costs associated with heterogeneous worker preferences for coverage by offering multiple plans and requiring workers to contribute toward the benefit out of taxable income (Jensen, 1986). However, employers offering multiple plans, with each plan enrolling a smaller number of individuals, may forego economies of scale in loading and may also bear higher administrative costs from contracting with multiple suppliers, educating employees about their options, and collecting employee premium contributions. Employers have identified the administrative burden as a constraint on the number of plans offered (Thompson et al., 1999). In addition, the favorable tax treatment of fringe benefits is contingent upon satisfying rules intended to guard against discrimination in favor of highly compensated employees (Lassila and Kilpatrick, 1994). These rules generally identify the minimum proportion of employees who must benefit from the employer's plan and limit the extent to which the benefits provided to highly compensated employees can differ from those provided to other workers.[4] Bundorf (2000) finds that the tax treatment of employee contributions, combined with the requirement to offer all plans to all employees, increases the cost to employers of offering multiple plans, with the implication that offering a choice of plans will be limited to the largest and most heterogeneous firms. Thus, employers hiring workers with heterogeneous preferences for health insurance must balance the benefits and costs of the customization of health benefits.[5]

Relatively few studies have examined the relationship between employee preferences for health insurance and employer offerings, most likely due to the difficulty in finding suitable data. In a study using firm level data, Jensen (1986) does not find evidence that dispersion in worker characteristics has statistically significant effects on the tendency of firms to

[2] Danzon (1989) finds that the preferences of high risk workers and workers in high marginal tax brackets receive a disproportionately high weighting in determining the amount of health insurance chosen in a firm offering a single plan.

[3] These models are similar in their treatment of each employee within a firm as being marginal in the employer's decision. More realistically, a subset of employees within a firm is likely to be marginal in the employer's choice of health benefits and employer choices will reflect the preferences of these marginal employees. Assuming heterogeneous employees are marginal in the employer's choice, however, the above results would hold with respect to the set of marginal workers.

[4] Classes of employees that can be excluded for the purpose of determining if the employer's benefit satisfies non-discrimination requirements include those who have not completed 3 years of service, employees under the age of 25, part-time or seasonal workers, workers covered by a collective bargaining plan, and non-resident aliens.

[5] An alternative is that workers sort themselves across firms based on their preferences for health insurance, and sorting may be based either on the comparative advantage of firms in providing health insurance or a local public good model. The existence of perfect sorting, however, is unlikely for a number of reasons. The health insurance plan offered by an employer is only one of many job characteristics that are important in the employment decisions of workers. Not all workers are perfect substitutes and health insurance preferences may be more highly correlated within than across types of workers. In addition, the extent of sorting may be constrained by the supply of labor available to an individual firm. Finally, the fixed costs of offering multiple plans may not be prohibitive to all firms. Empirical evidence exists consistent with the existence of some, but not complete, sorting behavior on the part of workers based on their preferences for health insurance (Monheit and Vistnes, 1999; Scott et al., 1989).

offer multiple plans or to require employee contributions. More recent studies, however, find evidence that differentiation among employees in their demand for health insurance explains the use of employee premium contributions by employers (Levy, 1997; Dranove et al., 2000), suggesting that employers use employee premium contributions to encourage employees with weak demand for health insurance to opt out of coverage.

A recent study examining the impact of preference heterogeneity on plan differentiation finds that variation among workers in their age, wages, and, to a lesser extent, gender is associated with the breadth of employer plan offerings (Moran et al., 2000). This paper addresses similar questions using different empirical methods. First, this study uses a different approach to measure plan diversity. Moran et al. (2000) base their definition of diversity on the number of plans offered and the number of different types of plans offered where types include HMOs, PPOs, and indemnity plans. This study, in contrast, considers variation both within and across plan type by developing a measure of plan generosity based on plan characteristics. In addition, expected health expenditures, rather than age and gender, are used as proxies for worker preferences for coverage. Finally, this study explicitly addresses the potential for sample selection based on whether the firm offers coverage, an issue that the underlying theory suggests may be important in understanding employer choice behavior. In summary, while theory points to the role of employee demand for coverage as a determinant of the plans offered by employers, relatively little empirical evidence exists supporting this hypothesis.

In this study, I examine the relationship between the preferences for health insurance among employees within a firm and the health benefits offered by employers. The study hypotheses are that (1) employers hiring workers with stronger preferences for health insurance relative to cash wages offer more generous health plans, and (2) employers hiring workers characterized by greater variation in their preferences for health insurance relative to cash wages are more likely to offer multiple, differentiated plans.

3. Empirical methods

Let K_i^* represent the set of plans that minimizes labor costs for employer i. The employer chooses the number of plans to offer (N) and the generosity (k_n) and the employee premium contribution (c_n) for each plan:

$$K_i^* \equiv \{(k_1, c_1), (k_2, c_2), \ldots, (k_N, c_N)\} \tag{1}$$

Relating the study hypotheses to Eq. (1), firms hiring workers with stronger preferences for health insurance will offer more generous plans (greater K_i), and firms hiring workers characterized by greater variation in the preferences for coverage will offer more plans ($N > 1$) characterized by greater variation in their generosity (greater variation among the values of k_1 to k_N).

The employer's cost minimizing set of plans, however, is observed only for the subset of firms offering coverage. The impact of this censoring depends on the mechanism underlying employer offer decisions, which is described in the following model. The model is based on the proposition that employers offer health insurance if it reduces the total compensation

costs. The employer's total compensation cost when offering K_i^*, the set of plans that minimize compensation costs conditional on offering health insurance, is as follows:

$$C_i^{\mathrm{O}} = \sum_L w_l^{\mathrm{O}} + c(K_i^*) \tag{2}$$

where L represents the number of employees in the firm, w_l^{O} is the cash wage received by employee l when the employer chooses to offer K_i^*, and $c(K_i^*)$ is the cost to the employer of the cost minimizing set of plans. In other words, each employer can be characterized by the set of plans, and the corresponding cash wages, he would have offered if he had chosen to offer health insurance to his employees. Similarly, each employer can be characterized by his total compensation costs assuming he chooses not to offer health benefits, which is defined as follows:

$$C_i^{\mathrm{N}} = \sum_L w_l^{\mathrm{N}}. \tag{3}$$

I assume the employee receives equal utility from either package:

$$U_l(w_l^{\mathrm{N}}) = U_l(w_l^{\mathrm{O}}, K_i^*) \tag{4}$$

Assuming that all employees place a non-negative value on the package of plans offered by the employer, $w_l^{\mathrm{N}} > w_l^{\mathrm{O}}$ for all employees, and employee l's willingness to pay for the health insurance offered by employer i is $v_l(K_i^*) = w_l^{\mathrm{N}} - w_l^{\mathrm{O}}$. The employer will offer health insurance if the total compensation costs are lower when offering than when not offering:

$$C_l^{\mathrm{N}} - C_l^{\mathrm{O}} = \sum_L w_l^{\mathrm{N}} - \left(\sum_L w_l^{\mathrm{O}} + c(K_i^*) \right) > 0 \tag{5}$$

This equation can be rewritten as

$$\left(\sum_L v_l(K_i^*) \right) - c(K_i^*) > 0. \tag{6}$$

In other words, the employer will offer health insurance if the sum of the value that employees in the firm place on the employer's minimum cost health benefit is greater than the cost to the employer of offering the benefit.[6] The equation demonstrates that firms hiring workers with uniformly weak preferences for health insurance and firms in which the costs of providing coverage are higher will be less likely to offer health insurance, consistent with studies finding lower rates of coverage among firms hiring low-wage workers and small firms. It also has interesting implications for the effect of preference heterogeneity among workers on the offer decisions of employers. If some employees place a value on the employer's minimum compensation cost benefit package that is less than the average cost to the employer of providing it and others place a value on the package that exceeds

[6] The minimum cost health benefit is the one that minimizes total compensation costs, not necessarily a minimum level of coverage.

the average cost of providing it, whether the employer offers health insurance will depend on the relative costs of compensating each type of employee for not receiving their most preferred compensation package. If the incremental compensation costs required to retain high demand employees when not offering health insurance exceed those required to retain low demand employees when offering coverage, the employer will offer health insurance. In the reverse situation, the employer will not offer health insurance. The implication is that heterogeneity among employees in their preferences for health insurance may be a barrier to some firms in offering coverage. [7]

When estimating the empirical model, the censoring of K_i^* is based on whether the total cost of providing the employer's minimum cost health benefit is less than the value that employees place on the benefit. Let $d_i^* = \sum_L v_L(K_i^*) - c(K_i^*)$, and the employer's choice of health benefits can be described by the conventional sample selection model (e.g. Vella, 1998):

$$\begin{aligned} &K_i^* = x_i'\beta + \varepsilon_i; \qquad i = 1, \ldots, N \\ &d_i^* = z_i'\gamma + v_i; \qquad i = 1, \ldots, N \\ &d_i = 1, \quad \text{if } d_i^* > 0; \quad d_i = 0 \text{ otherwise} \\ &K_i = K_i^* d_i \end{aligned} \tag{7}$$

The first stage is the employer's decision to offer health insurance and the second stage is the choice of the set of plans offered. Estimating the second stage equation using only the subset of employers offering health insurance will provide estimates of the effects of workforce composition, conditional on the employer offering health insurance. The conditional effects will be biased estimates of the population effects, however, if the offer decision is related through unobservables to the process determining the set of plans offered. In this model, workers are likely to be characterized by unobservable preferences for health insurance, which are correlated with their observable characteristics, and Eq. (6) suggests that these unobservable characteristics are related to both the employer's offer decision and the set of plans offered. For example, the magnitude of the effect of worker income on the generosity of employer offerings would be biased upward in a conditional model if workers in firms offering coverage have stronger unobserved preferences for health insurance, which are positively correlated with wages. In contrast, the effects of variation in worker characteristics may be biased downward in conditional models if firms not offering health insurance are characterized by greater variation in unobservable preferences of workers for coverage than firms offering coverage. This would be the case if many firms with unobserved variation in worker preferences choose not to offer health insurance rather than to offer multiple plans. Thus, the difference between the conditional and population effects provides insight into the mechanisms affecting employer choices.

The use of sample selection models, however, is controversial (Jones, 2000)—primarily due to concerns about identification, which requires that z_i contains at least one variable that is not in x_i in Eq. (7) (Maddala, 1983), and the sensitivity of the estimates to assumptions regarding the distribution of the error terms. Unfortunately, variables satisfying the exclusion conditions are often difficult, if not theoretically impossible, to find (Vella, 1998). As a

[7] This was first observed by Jensen (1986), p. 14.

result, I present the results of both conditional and selection-corrected models. The variables included in the first-stage model for identification are discussed in Section 3.5.

3.1. Data sources

The primary data source is the 1993 Robert Wood Johnson Foundation (RWJF) employer health insurance survey (Long and Marquis, 1997), which includes establishment level data for 22,890 public and private employers in 10 states. The survey collected information about each plan offered by each establishment, as well as information about the distribution of employees within the firm based on wages and demographic characteristics. Descriptive statistics and more information on sampling methods and survey design can be found in Cantor et al. (1995).

3.2. Measuring health benefit generosity

The study hypotheses relate the preferences of workers within a firm to the generosity of the health plans offered by employers. To measure plan generosity, I collapse multiple dimensions of plans that contribute to their generosity into a scalar measure, using scaling factors describing how various plan characteristics affect the plan's level of covered benefits for an individual with the average level of health expenditures. I then apply these scaling factors to an estimate of the average covered health expenditures for an individual with employer-sponsored health insurance. I consider how patient cost sharing, restricted provider networks, mechanisms used to manage the delivery of care, and covered benefits affect plan generosity using the following formula:

$$\text{Plan generosity} = (X_{\mathrm{R}} M\, C\, \mathrm{AV}_{\mathrm{R}} + X_{\mathrm{U}}\, \mathrm{AV}_{\mathrm{U}})\mathrm{ACE} \tag{8}$$

The formula conceptualizes a health plan as the weighted average of two separate plans, a managed component (R) and an unmanaged component (U). The managed component of a plan controls utilization by either limiting the network of providers from which enrollees can obtain covered services (C), implementing controls on utilization (M), such as utilization review or by providing financial incentives to change provider behavior, or both. The measure also incorporates differences in patient cost sharing (AV_i) between the managed and unmanaged components of the plan. The X_i scaling factors represent the weight that the average enrollee places on each component of the plan, with $X_{\mathrm{R}} + X_{\mathrm{U}} = 1$, and ACE is the average covered expenditure for an individual with employer sponsored coverage. In the Sections 3.2.1 through 3.2.4, I discuss each component of the plan generosity index.

3.2.1. Average covered expenditures (ACE)

The average of total covered health expenditures [8] for individuals with active employer-sponsored health insurance was US $1018 in 1987 (AHCPR, 1996), or US $1578 in 1993, adjusted by the medical care CPI.

[8] Average covered expenditures is defined as the sum of private health insurance and out of pocket spending for hospital physician, prescription drugs, and other health professionals.

3.2.2. Patient cost sharing

The 1987 National Medical Expenditure Survey (NMES) contains a score, called the actuarial value, for each plan in the data set that represents the proportion of total covered expenditures paid for by the plan based on its patient cost sharing (AHCPR, 1996). Using this data, I estimate the following model using ordinary least squares:

$$\mathrm{AV} = \alpha + \beta_1 D + \beta_2 D^2 + \beta_3 D^3 + \beta_3 C + \beta_3 S + \varepsilon \tag{9}$$

where AV stands for the actuarial value, D, the deductible value, C, the coinsurance rate, and S, the stop loss. I use the model to predict an actuarial value for each plan in the RWJF survey. As expected, plans characterized by higher deductibles, higher coinsurance rates, and higher stop losses have lower actuarial values. [9]

Patient cost sharing by plan type and the corresponding actuarial values used in the analysis are presented in Table 1. HMOs have lower patient cost sharing (0.89) than other types of plans. In PPOs and POS plans, cost sharing is lower for services obtained from providers within the plan's network than from providers outside the plan's network. In addition, patient cost sharing is generally higher in PPOs than in POS plans for both types of providers.

3.2.3. Covered benefits

Using binary indicators of whether a plan offered prescription drug coverage, I scale the average expenditure by 0.9135 for plans not offering this coverage. In 1987, expenditures on prescription drugs represented 8.165% of covered health expenditures for the average individual with employer-sponsored coverage (AHCPR, 1996). Although most plans covered prescription drugs, indemnity plans are less likely to offer this benefit than managed care plans (Table 1).

3.2.4. Characteristics of managed care plans

I use a hedonic approach based on the plan data available in the RWJF survey to derive the scaling factors representing the impact of the characteristics of managed care plans on covered expenditures. I classify plans as one of four types: indemnity, PPO, POS plan, and HMO. The plan types were defined in the RWJF survey, with the exception of the POS plan, which I defined as an HMO that covers out of network providers. Using Eq. (8), I characterize an indemnity plan as an unmanaged plan ($X_\mathrm{R} = 0$, $X_\mathrm{U} = 1$), and an HMO as an entirely managed plan ($X_\mathrm{R} = 1$, $X_\mathrm{U} = 0$). POS plans and PPOs are a weighted average of the two components. The managed component of the POS plan and the HMO are characterized as both restricting utilization and restricting provider choice. The PPO, in contrast, limits access to providers in the managed component, but does not manage utilization (Scanlon et al., in press). Using the RWJF plan data, I estimate the independent effect of plan type on premiums, controlling for other plan and firm characteristics, and based on the assumptions outlined above, I derive the values for X_R, X_U, M, and C in Eq. (8). I substitute these values into Eq. (8) to derive X_R (0.47), X_U (0.53), M (0.89), and C (0.91) (see Appendix A for greater detail).

[9] Many plans in both datasets are missing information on the stop loss. As a result, I estimate separate models for plans with and without information on the stop loss. For greater detail, see Bundorf (2000).

Table 1
Plan descriptive statistics[a]

	Plan type							
	HMO (4808, 0.21)[b]		POS (1135, 0.05)[b]		PPO (6840, 0.30)[b]		Indemnity (9682, 0.40)	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Plan generosity index	1133.03	77.34	1219.96	121.62	1171.74	120.37	1218.20	152.24
Patient cost sharing								
Deductible (restricted provider network)	46.73	170.59	103.80	274.59	247.51	293.62	Not applicable	–
Coinsurance rate (restricted provider network)	13.68	9.08	15.16	11.12	15.86	9.70	Not applicable	–
Offer access to unrestricted provider network? (0, 1)	0.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Deductible (unrestricted provider network)	Not applicable	–	140.98	359.02	331.81	350.08	340.16	401.24
Coinsurance rate (unrestricted provider network)	Not applicable	–	23.37	15.77	27.18	11.79	16.92	10.47
Actuarial value (restricted provider network)	0.89	0.06	0.87	0.08	0.81	0.08	Not applicable	–
Actuarial value (unrestricted provider network)	Not applicable	–	0.84	0.09	0.76	0.09	0.78	0.09
Benefits								
Offers prescription drug coverage (0, 1)	0.91	0.28	0.92	0.27	0.92	0.27	0.86	0.35
Managed care scaling factors								
Managed component weight (X_R)	1.00	–	0.47	–	0.47	–	0.00	–
Unmanaged component weight (X_U)	0.00	–	0.53	–	0.53	–	1.00	–
Utilization controls (M)	0.89	–	0.89	–	1.00	–	0.00	–
Restricted provider network (C)	0.91	–	0.91	–	0.91	–	0.00	–

[a] Source: 1993 RWJF employer health insurance survey; actuarial values and plan values calculated by the author using additional data from the 1987 NMES.
[b] The values in the parentheses represent the number and proportion of plans, respectively.

Using this methodology, HMOs are, on average, the least generous plans, followed by PPOs (Table 1). Interestingly, POS plans are similar in generosity to indemnity plans. Lower cost sharing in the restricted provider network, combined with access to providers outside the network, albeit at a higher out-of-pocket cost, makes these plans as generous on average as indemnity plans using this methodology. The standard deviation of the plan values by plan type, however, demonstrates that variation exists in the generosity of plans within plan type. I tested the sensitivity of the results of model estimation to the derivation of the scaling factors by varying both the utilization (M) and choice (C) scaling factors from 0.70 to 1.00 and the weight on the managed component of the plan (X_R) from 0.20 to 0.80.

3.3. Dependent variables

The dependent variables are the average generosity and variation in the generosity of the health plans offered by each establishment. Average plan generosity is the sum of the plan generosity index for each plan offered by an employer, weighted by plan enrollment. I use three measures of variation in plan generosity. The first, a binary indicator of whether the firm offers a choice of plans, indicates the availability of choice. The second, the difference between the most and least generous plan offered, measures the range in the generosity of the plans offered by the employer. Finally, the standard deviation of plan generosity incorporates both differences among the plans offered by employers and the extent to which employees enroll in different plans. [10] For example, a firm in which 90% of covered employees enroll in a generous indemnity plan and 10% enroll in an HMO would be characterized as less heterogeneous than a firm in which the proportion enrolling in each plan were equal. Considering enrollment patterns in developing the measure of variation is consistent with the theory that employers choose health plans and corresponding employee premium contributions to induce employees to select particular levels of coverage. Descriptive statistics for the dependent variables are presented in Table 2.

3.4. Workforce composition

I examine two characteristics of employees that are proxies for individual preferences for health insurance: health risk and income. Health risk may be associated with preferences for the extent to which a health plan limits moral hazard in the utilization of services if, for example, low risks benefit more than high risks from enrolling in a more tightly managed plan or one with a high deductible (Pauly and Herring, 2000), or the less healthy place a greater value on choice among providers than those who are more healthy (Cutler and Reber, 1998). Thus, health risk is hypothesized to be positively correlated with demand for more generous plans. [11]

[10] I also tested the models using the coefficient of variation of plan generosity. The qualitative results are the same.

[11] This measure of health risk is unlikely to reveal the presence of adverse selection within employment-based purchasing groups (Cutler and Reber, 1998; Summers, 1989) because the demographic characteristics of workers I use in the measure of health risk are those that have been shown to result in wage offsets based on predicted health expenditures in other studies (Gruber, 1994; Pauly and Herring, 1999; Sheiner, 1999).

Table 2
Descriptive statistics for dependent study variables[a]

	Firms not offering health insurance ($n = 6992$)		Firms offering health insurance ($n = 13466$)	
	Mean	S.D.	Mean	S.D.
Plan offerings				
Average plan value	Not applicable		1166.304	188.580
Employer offers a choice of plans	Not applicable		0.213	0.410
Difference between most and least generous plan	Not applicable		30.106	82.498
S.D. of plan generosity	Not applicable		10.225	33.239
Workforce composition				
Mean health risk (US$ × 100)	13.332	2.590	13.090	2.105
Variation in health risk	101.382	100.064	103.825	71.038
Proportion workers less than US $10,000	0.272	0.345	0.112	0.217
Proportion workers US $10,000–14,000	0.264	0.299	0.204	0.242
Proportion workers US $14,000–20,000	0.220	0.274	0.246	0.233
Proportion workers greater than US $20,000	0.244	0.312	0.439	0.336
Variation in worker wages	7.130	6.409	9.033	5.178

[a] Source: 1993 RWJF employer health insurance survey.

I use average predicted health expenditures and the standard deviation of predicted health expenditures among workers in the firm to measure average and variation in health risk, respectively.[12] The survey identifies the proportion of workers in the firm, by gender, falling into three age categories: under 25 years, between 25 and 54 years, and 55 years or older. I estimate health care expenditures for each demographic group based on a model of predicted expenditures using data from the 1987 NMES,[13] and calculate average predicted health expenditures and the standard deviation of predicted health expenditures based on the demographic distribution of workers in each establishment.

I hypothesize that higher wage workers will prefer more generous health plans. Higher income employees may have greater demand for medical care as an input to the production of health (Grossman, 1972), and, as a result, prefer more generous plans. Empirical studies of individual demand for health insurance have found that higher income workers are more likely to choose less restrictive plans (Barringer and Mitchell, 1994; Royalty and Solomon, 1999) and lower income families are more sensitive to price than higher income families (Marquis and Long, 1995). The survey data identifies the proportion of workers in four wage categories: less than US $10,000, US $10,000–14,000, US $14,000–20,000, and greater than US $20,000 annually. The proportion of employees in each wage category measures the level of income among the firm's employees. The measure of income variation

[12] I also tested the coefficient of variation of predicted expenditures and wages. The results were the same unless noted.

[13] The model was based on work Pauly and Herring (1999) and customized for the RWJF survey data by Brad Herring.

is the standard deviation of wages using the data on the distribution of workers by wage category. [14]

3.5. Control variables

In each model, I control for exogenous establishment and market characteristics that may affect the health plans offered by employers. Establishment control variables include a binary indicator of retiree eligibility for the health plans offered by the employer, establishment size dummy variables, [15] an indicator that the number of employees nationwide is greater than the number of employees in the establishment, establishment size interacted with the binary firm size indicator, the proportion of employees belonging to a union, the proportion of workers who were seasonal or temporary employees, the proportion of employees working full-time, employee turnover, [16] and a binary indicator of for-profit status. Market control variables include the county population in 1000s, the number of HMOs serving the county from the 1993 Area Resource File (ARF), and the 1993 county level unemployment rate from the Bureau of Labor Statistics. Each model also includes state and industry fixed effects. Table 3 presents summary statistics for control variables.

I use variables measuring access to uncompensated care in the employer's local market to identify estimates in the second stage model. [17] The ability of those without health insurance to receive uncompensated care from providers in the event of an illness creates economic incentives for individuals to forgo coverage (Coate, 1995), and evidence exists that market-level variations in access to uncompensated care increase the number of uninsured individuals (Rask and Rask, 2000; Herring, 2001). Based on these results, I hypothesize that, by reducing the cost of foregoing coverage for all employees within an establishment, access to uncompensated care reduces offer rates but does not affect the set of plans offered by employers choosing to offer health insurance. [18]

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[14] The midpoints of the range were used as the dollar values for the two middle wage categories. For the highest and lowest wage categories, the dollar value used in the analysis was the average among workers nationwide in that wage category by industry using data from the Current Population Survey.

[15] Categories include, 1–9, 25–49, 50–99, 100–249, and 250 or more employees, with 10–24 employees as the omitted category.

[16] Turnover is the sum of the number of employees leaving and joining the firm in the prior year divided by the number of employees.

[17] I also explored the use of variables measuring the distribution of employees within a market by firm size based on the hypothesis that employees working in small firms in markets with many large firms may have lower demand for coverage due to the availability of health insurance through a spouse or other family member. I tested this hypothesis using a variety of variables measuring the distribution of workers across firms based on firm size in the establishment's county. Unfortunately, these variables did not have the hypothesized effect on employer offer decisions.

[18] This is a strong assumption. On one hand, individuals with insurance are unlikely to consume uncompensated care, suggesting that access to uncompensated care will not affect the plan generosity. On the other hand, individual preferences for certain types of plans may be correlated with greater access to uncompensated care. However, little empirical evidence exists that supports the either proposition, although Herring (2001) provides evidence that market level variations in the amount of charity provided to those without insurance affects the likelihood that an individual is offered health insurance by their employer, but does not affect the take-up rates among those offered health insurance.

Table 3
Descriptive statistics for control variables[a]

Variable Variable	Firms not offering health insurance ($n = 6992$)		Firms offering health insurance ($n = 13466$)	
	Mean	S.D.	Mean	S.D.
Retirees eligible for coverage	Not applicable	Not applicable	0.176	0.381
Percent of employees union members	0.005	0.062	0.009	0.078
Proportion employees full-time	0.617	0.369	0.757	0.318
Proportion employees temporary or seasonal	0.119	0.239	0.072	0.177
Turnover rate	0.895	1.455	0.753	1.276
For-profit firm	0.938	0.241	0.890	0.312
Employees (one–nine)	0.741	0.438	0.370	0.483
Employees (10–24)	0.193	0.395	0.291	0.454
Employees (25–49)	0.046	0.210	0.136	0.343
Employees (50–99)	0.014	0.119	0.088	0.284
Employees (100–249)	0.005	0.072	0.074	0.261
Employees (≥250)	0.001	0.024	0.041	0.198
Firm has more employees nationwide	0.107	0.309	0.406	0.491
# HMOs in county	1.339	2.516	1.793	2.609
County population (× 1000)	370.327	513.399	442.426	504.154
County unemployment rate	0.065	0.024	0.063	0.021
Uncompensated care per person in poverty (US$ × 100)	7.482	4.928	7.767	5.373
Poverty rate in county	0.137	0.058	0.128	0.052
Public hospital in county	0.536	0.499	0.565	0.496
Number of residency programs in county	2.005	3.209	2.661	3.536
Medicaid discharges per 1000 residents in county	16.461	10.543	17.609	11.495
CO	0.079	0.270	0.091	0.288
FL	0.103	0.304	0.097	0.296
MN	0.112	0.315	0.094	0.292
NM	0.120	0.324	0.100	0.299
NY	0.090	0.286	0.105	0.307
ND	0.119	0.323	0.097	0.295
OK	0.113	0.317	0.100	0.299
OR	0.099	0.298	0.107	0.309
VT	0.089	0.284	0.104	0.306
WA	0.078	0.269	0.105	0.307
Agriculture/forestry/fisheries	0.064	0.244	0.024	0.154
Construction	0.083	0.275	0.055	0.229
Mining/manufacturing	0.067	0.250	0.132	0.338
Transportation/communications/public utilities	0.032	0.177	0.046	0.209
Wholesale trade	0.050	0.217	0.105	0.306
Retail trade	0.318	0.466	0.204	0.403
Finance/insurance/real estate	0.136	0.343	0.175	0.380
Professional services	0.151	0.358	0.216	0.411
Other services	0.099	0.299	0.043	0.203

[a] Sources: 1993 RWJF Employee Health Insurance Survey, Area Resource File. 1993 AHA Hospital Survey, US Bureau of Labor Statistics.

I use a number of variables to measure access to uncompensated care. Medicaid discharges per 1000 residents, and the number of residency programs in the county from the 1993 ARF are proxies for the supply of uncompensated care. The county level poverty rate, also from the ARF, is a proxy for demand for uncompensated care among the unemployed. Providers may be more willing or accustomed to providing uncompensated care in counties with a higher proportion of very low-income individuals, and individuals living in areas where fewer people have access to health insurance may also obtain less disutility from consuming uncompensated care. Using the American Hospital Association (AHA) 1993 survey of hospitals, I also create an indicator of whether the county has at least one public hospital (Rask and Rask, 2000). Finally, using data from the AHA, I measure the amount of uncompensated care provided by hospitals in the employer's health service area per individual in poverty as a proxy for the generosity of care provided in a particular market (Herring, 2001). I hypothesize that each variable will have a negative effect on the probability of offering health insurance.

3.6. Study sample and model estimation

After excluding observations containing invalid or missing data for study variables ($n = 1471$), establishments in which health benefits were union-negotiated ($n = 951$),[19] and public employers due to missing data on the county of the establishment ($n = 10$), 20,458 establishments remain in the sample, of which, 13,466 offered health insurance.

For models with continuous dependent variables, I estimate models using ordinary least squares to obtain conditional estimates and full information maximum likelihood to obtain selection corrected estimates from Heckman's sample selection model. For models with binary outcomes, I estimate maximum likelihood probit models restricted to the sub-sample of establishments offering health insurance to obtain conditional estimates and maximum likelihood probit models with sample selection (Van de Ven and Van Praag, 1981) on the full sample to obtain selection corrected estimates. In all models, the standard errors are corrected for heteroskedasticity.

4. Results

4.1. Employer offer decision

The results of the first stage model of the employer's offer decision are presented in Table 4. Worker wages and establishment size are both positively correlated with the probability of offering health insurance. With respect to the variables used to identify the selection-corrected models, establishments in counties with a greater proportion of residents living in poverty are less likely to offer health insurance to employees. The amount of uncompensated care per person in poverty provided by hospitals in the establishment's

[19] The RWJF survey data includes an indicator of whether health benefits were chosen by union negotiation. Establishments choosing health benefits through union negotiation may follow a different model (Goldstein and Pauly, 1976).

Table 4
Model of the health insurance offer decision

Independent variables[a]	Coefficient	S.E.[b]
Mean health risk (× 100)	0.013*	0.005
Variation in health risk	0.001***	0.000
Proportion workers US $10000–14000	0.333***	0.052
Proportion workers US $14000–20000	0.735***	0.052
Proportion workers greater than US $20000	1.294***	0.049
Wage variation	0.025***	0.002
Proportion employees union members	−0.014	0.177
Proportion employees temporary or seasonal	0.473***	0.054
Proportion employees full-time	0.524***	0.034
Turnover rate	−0.015	0.008
For-profit firm	−0.241***	0.045
1–9 employees (size 1)	−0.809***	0.028
25–49 employees (size 3)	0.435***	0.048
50–99 employees (size 4)	0.838***	0.072
100–249 employees (size 5)	1.063***	0.103
≥250 employees (size 6)	1.584***	0.316
Firm has more employees nationwide (more)	0.815***	0.053
Size 1 × more interaction term	0.233***	0.064
Size 3 × more interaction term	−0.060	0.097
Size 4 × more interaction term	−0.275*	0.140
Size 5 × more interaction term	0.271	0.233
Size 6 × more interaction term	−0.491	0.430
# HMOs in county	0.025**	0.008
County population (× 10000)	−0.004***	0.000
Poverty rate in county	−0.750*	0.306
Number of residency programs in county	0.043***	0.010
Medicaid discharges per 1000 residents in county	0.000	0.002
Public hospital	0.010	0.027
Uncompensated care per person in poverty (× 100)	−0.008**	0.003
County unemployment rate	−2.187***	0.670
Constant	−0.405***	0.115
N	20,458	
Log likelihood	−9100.425	
Wald-χ^2 (47)	5146.260***	
Pseudo R^2	0.307	

[a] Omitted categories are proportion of workers less than US $10,000, 10–24 employees (size 2). Includes state and industry fixed effects.

[b] Maximum likelihood probit estimates with robust S.E.

* $P \leq 0.05$.

** $P \leq 0.01$.

*** $P \leq 0.001$.

health service area also has a negative effect on the probability of offering health insurance. Although these effects are statistically significant, they are very small in magnitude. An increase in the generosity of hospital-provided uncompensated care from the 10th to the 90th percentile in the sample results in a decrease in the average predicted probability of offering

health insurance from 0.67 to 0.65.[20] The existence of a public hospital in the employer's county and the number of Medicaid discharges per capita have no effect, while the number of residency programs had a positive effect on the probability of offering health insurance. While the results of the first-stage model support the identification strategy, identification may be weak. As a result, the estimates from the selection-corrected models should be interpreted as suggestive.

4.2. Workforce composition and health plan offerings

As hypothesized, establishments with a greater proportion of workers in higher wage categories offer more generous plans. In the conditional model, the proportion of workers in each of the higher wage categories relative to the proportion of workers earning less than US $10,000 is associated with a statistically significant increase in average plan generosity (Table 5). Contrary to the hypothesized relationship, mean health risk has a small, but statistically significant, negative effect on average plan generosity while variation in health risk has a positive effect. One possible explanation is related to the underlying distribution of predicted medical expenditures used in the analysis. For individuals under 55 years of age, predicted health expenditures are higher for women than for men, although the relationship between gender and predicted health expenditures is reversed for older workers. Higher expected health expenditures among women may be correlated with a preference for managed care plans, which are considered less generous in this analysis, but are more likely to offer prenatal and maternity care, benefits likely to be more highly valued by women. Although the errors in the offer and average plan generosity equations are negatively correlated (correlation coefficient $= -0.028$, $P \leq 0.01$), the selection correction does not have a substantive impact on the estimates of the effects of the workforce composition variables.

In Table 6, I divide the sample into establishments with <100 employees and those with 100 employees or more and re-estimate the conditional models.[21] The results suggest that the smaller establishments drive the effects observed in the full sample. In the sample of larger establishments, the coefficients on the variables measuring the proportion of workers in higher wage categories are small in magnitude or negative and are not statistically significant. A possible explanation for the difference between the two sub-samples is that low-wage workers with strong preferences for health insurance self select into larger establishments, diminishing the effect of worker wages in large firms.

Variation in worker characteristics is associated with the decision of employers to offer workers a choice of plans. In the conditional model, in Table 7, variation in health risk among workers in a firm is associated with a higher probability of offering a choice of plans. Because the health risk variable is constructed from information on the demographic characteristics of workers, it may also be capturing differences in worker preferences associated with

[20] This is calculated by setting the variables measuring uncompensated care provided by hospitals at 10th and 90th percentile for the entire sample, calculating the predicted probability for each observation and averaging over the entire sample.

[21] Because the selection-correction had virtually no effect on the estimates, as seen in the full sample, I only present results for the conditional models.

Table 5
Average plan generosity

Independent variables[a]	Conditional		Selection Corrected	
	Coefficient	S.E.[b]	Coefficient	S.E.[b]
Mean health risk (× 100)	−2.783*	1.164	−2.794*	1.163
Variation in health risk	0.105***	0.029	0.103***	0.029
Proportion workers US $10000–14000	41.454**	13.271	40.456**	13.239
Proportion workers US $14000–20000	38.423**	12.328	36.701**	12.269
Proportion workers greater than US $20000	56.236***	11.498	53.465***	11.394
Wage variation	0.776*	0.389	0.718	0.388
Retirees eligible for coverage	0.419	4.405	0.492	4.397
Proportion employees unionized	−4.715	20.257	−4.504	20.229
Proportion employees full-time	21.223***	6.127	20.278***	6.089
Proportion employees temporary or seasonal	−19.397	11.772	−18.464	11.739
Turnover rate	−3.789	2.004	−3.765	2.000
For-profit firm	−17.530**	6.220	−17.206**	6.198
1–9 employees (size 1)	−35.189***	4.788	−33.082***	4.843
25–49 employees (size 3)	8.400	5.475	7.568	5.466
50–99 employees (size 4)	28.041***	5.831	26.624***	5.810
100–249 employees (size 5)	37.021***	6.502	35.355***	6.487
≥250 Employees (size 6)	22.050**	8.361	20.307*	8.361
More employees nationwide (more)	9.649	5.795	8.329	5.758
Size 1 × more interaction term	−13.337	9.875	−14.579	9.888
Size 3 × more interaction term	19.754*	8.338	20.167*	8.320
Size 4 × more interaction term	1.395	9.192	2.212	9.167
Size 5 × more interaction term	−8.587	9.318	−7.807	9.281
Size 6 × more interaction term	7.068	10.383	8.281	10.349
# HMOS in county	1.725	1.016	1.661	1.012
County population (× 1000)	−0.010	0.006	−0.010	0.006
County unemployment rate	−8.291	95.545	−1.554	95.376
Constant	1125.596***	21.105	1130.377***	21.017
N	13,466		13,466	
Uncensored *N*	17,440***		20,458	
R^2	0.059			
F (43, 13422)	17.440***			
Wald-χ^2 (43)			742.280***	
ρ			−0.028**	

[a] Omitted categories are percentage workers less than US $10,000, 10–24 employees (size 2). Includes state and industry fixed effects.
[b] Robust S.E.
* $P \leq 0.05$.
** $P \leq 0.01$.
*** $P \leq 0.001$.

their age and sex that are correlated with health risk. While wage variation does not have a statistically significant effect in the conditional model, the proportion of workers in the highest wage category does have a large, positive effect. This may reflect the preferences of higher wage workers for greater choice among plans. However, it may also be an artifact of the design of the wage categories in the RWJF survey. In establishments offering health

Table 6
Average plan generosity by establishment size

Independent variable[a]	<100 employees		≥100 employees	
	Coefficient	S.E.[b]	Coefficient	S.E.[b]
Mean health risk (× 100)	−2.561*	1.247	−4.251	2.357
Variation in health risk	0.105***	0.031	0.075	0.059
Proportion workers US $10000–14000	48.113***	14.437	−24.589	20.772
Proportion workers US $14000–20000	41.757**	13.339	5.556	18.813
Proportion workers greater than US $20000	60.990***	12.545	−1.833	16.212
Wage variation	0.909*	0.414	−1.002	0.657
N	11,921	1,545		
R^2	0.055		0.097	
F (39, 11881)	15.910***			
F (35, 1509)			4.690***	

[a] Control variables and estimation procedures are the same as those described in Table 5 conditional models with establishment and establishment and firm size interactions adjusted accordingly.

[b] Robust standard errors

* $P < 0.05$.

** $P \leq 0.01$.

*** $P \leq 0.001$.

insurance, the average proportion of workers falling into the highest wage category is 0.44 (Table 2). As a result, the data does not capture the variation in the wages of a large portion of workers in establishments offering health insurance, and the proportion of workers in the highest wage category may be acting as a proxy for variation in the wages of high income workers.

Correcting for sample selection bias increases the magnitude of the effects observed in the conditional model of the probability of offering a choice of plans (Table 7). Variation in health risk has a larger effect in the selection-corrected model, and the magnitude of the coefficient of each variable measuring the proportion of workers in higher wage categories increases. In addition, the positive effect of wage variation is statistically significant in this model.[22] The population effects are greater than the conditional effects, suggesting that some employers for whom variation in worker characteristics would have resulted in greater variation in the plans offered chose not to offer health insurance. This is consistent with the model of the employer offer decision presented earlier which suggested that heterogeneity among employees in their preferences for coverage may be a barrier to offering coverage for firms which face higher costs in offering multiple plans.

In the models of average plan generosity and the probability of offering a choice among plans, the effects of the variables measuring workforce composition are generally small in magnitude. For example, shifting the distribution from all workers earning less than US $10,000 to all earning over US $20,000 is associated with an increase in average plan generosity of US $56 or 5% of the average value of plan generosity among estab-

[22] In models using the coefficient of variation of worker wages, the qualitative results were similar with the exception that the effect of wage variation in the selection-corrected model was statistically significant at $P \leq 0.10$.

Table 7
Offers a choice of plans

Independent variables[a]	Conditional		Selection corrected	
	Coefficient	S.E.[b]	Coefficient	S.E.[b]
Mean health risk (× 100)	0.0107	0.0079	0.0109	0.0078
Variation in health risk	0.0004	0.0002	0.0005*	0.0002
Proportion workers US $10000–14000	0.1050	0.0868	0.1498	0.0854
Proportion workers US $14000–20000	0.1172	0.0820	0.19 2*	0.0829
Proportion workers greater than US $20000	0.2035**	0.0728	0.3212***	0.0778
Wage variation	0.0034	0.0027	0.0059*	0.0028
Retirees eligible for coverage	0.4693***	0.0321	0.4617***	0.0321
Proportion employees unionized	−0.0305	0.1528	−0.0405	0.1517
Proportion employees full-time	−0.0151	0.045 I	0.0254	0.0462
Proportion employees temporary or seasonal	−0.1404	0.0777	−0.1787*	0.0776
Turnover rate	0.0575***	0.0097	0.0552***	0.0096
For-profit firm	−0.0832	0.0482	−0.0953*	0.0480
1–9 employees (size 1)	−0.0678	0.0469	−0.1653**	0.0542
25–49 employees (size 3)	0.3565***	0.0595	0.3895***	0.0594
50–99 employees (size 4)	0.5434***	0.0678	0.6008***	0.0687
100–249 employees (size 5)	0.8785***	0.0744	0.9461***	0.0757
≥250 employees (size 6)	1.2117***	0.1003	1.2862***	0.1016
More employees nationwide (more)	0.5599***	0.0512	0.6135***	0.0524
Size 1 × more interaction term	0.2425***	0.0697	−0.1814*	0.0713
Size 3 × more interaction term	0.2965***	0.0835	−0.3111	0.0830
Size 4 × more interaction term	−0.1797	0.0931	−0.2106*	0.0929
Size 5 × more interaction term	−0.3023**	0.0979	−0.3292***	0.0977
Size 6 × more interaction term	−0.2551*	0.1275	−0.3017*	0.1276
# HMOs in county	0.0116	0.0084	0.0142	0.0083
County population (× 1000)	0.0002**	0.0000	0.0001**	0.0000
County unemployment rate	−4.5446***	0.8105	−4.7580***	0.7989
Constant	−1.4684***	0.1524	−1.6733***	0.1614
N	13.466	13.466		
Uncensored *N*		20.485		
Wald-χ^2 (43)	1719.220***		1593.10***	
Psuedo R^2	0.149			
ρ			0.266**	

[a] Omitted categories are proportion workers less than US $10,000, 10–24 employees (size 2). Includes state and industry fixed effects.

[b] Robust standard errors.

* $P \leq 0.05$.

** $P \leq 0.01$.

*** $P < 0.001$.

lishments in the sample. The same change in the distribution of worker wages is associated with an increase in the average predicted probability of offering a choice of plans from 0.19 to 0.23.[23] The effects of the wage variables, however, are most likely biased downward because the proportion of workers in each category may be endogenous with

[23] The average predicted probability for each scenario is the average of the predicted probability for each observation in the dataset, holding the wage distribution constant across observations.

Table 8
Variation in plan generosity conditional on offering a choice of plans

Independent variable[a]	Difference in plan generosity		S.D. of plan generosity	
	Coefficient	S.E.[b]	Coefficient	S.E.[b]
Mean health risk (× 100)	1.699	1.503	1.392	0.023
Variation in health risk	0.017	0.041	0.035	9.547
Proportion workers US $10000–14000	−1.918	19.799	−3.717	8.328
Proportion workers US $14000–20000	3.294	17.061	−2.715	7.576
Proportion workers greater than US $20000	−5.270	15.678	−1.413	0.249
Wage variation	−0.187	0.505	−0.025	
N	2874	2874		
R^2	0.031		0.038	
F (43, 2830)	2.490		2.470***	

[a] Model includes full set of control variables for conditional models (see Table 7).
[b] Robust standard errors.
** $P \leq 0.01$.
*** $P \leq 0.001$.

respect to the generosity of health benefits. For example, workers in establishments offering more generous health benefits may bear the cost of these benefits in the form of lower cash wages, resulting in a downward shift of the wage distribution within the establishment relative to establishments in which workers receive less generous health benefits. [24]

Although preference heterogeneity was associated with the likelihood of offering a choice of plans (Table 7), these variables do not explain variation in the generosity of plans offered, conditional on offering a choice (Table 8). Although these results potentially raise doubts about the measures of plan generosity, the results from the model of average plan generosity suggest that a relationship does exist between the characteristics of workers used in this analysis and the plan generosity index. Another possible explanation is that employers vary in their reasons for offering a choice among plans with worker heterogeneity being a more important factor in some firms than in others.

The results are not sensitive to the choice of a particular managed care scaling factor. I tested the sensitivity of the results by varying each scaling factor within the range identified in the Section 3.2.4 and re-estimated the models of average plan generosity and variation in plan generosity conditional on offering a choice of plans. While the magnitude of the effects changed, particularly when varying the utilization management factor (*M*), the qualitative results remained the same. In addition, reducing the utilization management factor (*M*) for HMOs and POS plans increased the effect of the proportion of higher wage employees on the average generosity of plans offered. The models of variation of plan generosity, conditional on offering a choice of plans, however, continued to display no relationship

[24] If the dataset provided information on which workers were enrolled in which plans, it would be possible to measure the distribution of workers based on their total compensation rather than wages and eliminate this problem. Unfortunately, this data is not available and the endogenous wage variable represents the next best alternative.

between variation in workforce characteristics and variation in the set of plans offered by employers.

4.3. Control variables

Both establishment and firm size affect employer choices. Larger establishments are more likely to offer health insurance, offer more generous plans, and are more likely to offer a choice among plans (Tables 4–6). Being part of an organization with more workers nationwide, however, primarily affects whether employers offer health insurance and whether they offer a choice among plans (Tables 4 and 6). The effect of being part of a larger organization on the probability of offering health insurance is largest for the smallest establishments (one–nine employees). The effect of being part of larger organization on the probability of offering a choice among plans, however, is largest for establishments with 10–24 employees. The predicted probability of offering a choice of plans is nearly the same for an establishment with 10–24 employees that is part of a larger firm (0.24) as for an establishment for 100–249 employees (0.23). Economies of scale appear to operate through firm as well as establishment size.

Retiree eligibility for the plans offered by employers is associated with a higher likelihood of offering multiple plans (Table 8). Average plan generosity is greater in establishments with a greater proportion of full-time employees. Because part-time employees may be excluded from the health plans offered by employers in determining whether the employer meets nondiscrimination requirement, the proportion of full-time workers may be capturing the effect of higher wages among those eligible for the employer's plan.

5. Conclusions

The empirical results provide some evidence that employers respond to employee preferences for health insurance when choosing their health benefits. The average generosity of the plans offered by employers is higher in firms with a greater proportion of high-wage workers and variation among workers in their health risk and wages is positively associated with the probability of offering a choice of plans, although this last result is sensitive to the sample selection correction. Although the estimates from the selection-corrected models should be interpreted cautiously, they suggest that variation among workers in their demand for plans may be a barrier to employers in offering health insurance. The conditional effects of the workforce composition variables on the probability of offering a choice of plans are smaller than the population effects obtained in the selection corrected model. This implies that variation in worker characteristics would have had a larger effect on the probability of offering a choice of plans in firms choosing not to offer health insurance.

The effects of the variables used as proxies for workers preferences, however, are generally small in magnitude, and not all variables demonstrated the hypothesized relationship. In particular, variation in worker characteristics did not explain variation in the set of plans offered conditional on offering a choice of plans. A number of possible explanations for this exist. First, although the survey is superior to other employer level surveys for the purpose of this study, it offers limited information on individual worker characteristics.

Better data on individual workers within a firm, including variables such as family income, detailed measures of health status, and the availability of coverage from other sources, may generate stronger results. In addition, variation among plans along other dimensions, such as the availability of particular providers, may be related to worker preferences. This is consistent with the findings of Moran et al. (2000), who use an alternative measure of plan diversity and find a positive relationship between preference heterogeneity and plan diversity. Another possibility is that other objectives may also drive the decision of an employer to offer a choice of plans. For example, employers adopting a managed competition approach to designing health benefits would offer multiple plans with standardized benefits in order to create competition among plans for enrollees based on cost and quality (Enthoven, 1989). Finally, many employers may be reluctant to offer multiple plans varying in their generosity due to the potential for generating adverse selection within the firm.

The results, however, have important implications for researchers using data from individuals purchasing coverage in the employer-sponsored market. In particular, the plan or set of plans offered to an employee is endogenous with respect to the characteristics of both the individual employee and the other workers in the employee's firm. The endogeneity of the employee's choice set potentially affects the results of studies of both individual choice among health plans based on data from the employer-sponsored market and the effect of employer benefit design on premiums. Although more precise estimates of the effects of workforce composition on employer choices are necessary to assess the magnitude of the potential bias, these results point to the importance of an issue often overlooked by researchers using data from the employer-sponsored market.

The ultimate objective of developing a greater understanding of employer health benefit choices is to determine how these decisions affect the welfare of employees. Although this study provides evidence supporting the proposition that employers have incentives to respond to worker preferences when choosing health plans, it does not provide strong support for a particular model of employer behavior. For example, not all workers in the firm may be marginal in the employer's decision, with variation in the preferences of the subset of marginal workers driving the employer's choice of plans. In addition, the preferences of some workers may be weighted more heavily than the preferences of others in the employer's decisions. Thus, this study does not allow us to determine whether employers choose health benefits for their workers in a socially optimal fashion. Many important questions remain regarding the relationship between employee preferences for health insurance and the decisions made by employers to evaluate the implications of employer choice for the welfare of workers.

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Appendix A

The RWJF survey data provides premium and plan characteristic information for 22,465 plans offered by the establishments surveyed. I estimated the following empirical model to derive the value of each type of managed care plan relative to an indemnity plan:

$$\ln(\text{premium}_i) = \alpha + \beta_1 \text{HMO} + \beta_2 \text{POS} + \beta_3 \text{PPO} + \beta_4 X_i + \beta_5 Y_i + \varepsilon_i$$

where β_1, β_2, and β_3 represent the independent effect of HMOs, POS plans, and PPOs, respectively, on premiums, controlling for other plan characteristics (X) and establishment and firm characteristics (Y). Other plan characteristics include patient cost sharing and indicators of six different covered benefits. Firm characteristics include the demographic composition of workers and indicators of whether the firm offers a choice of plan to control for the effects of health status on premiums and selection into plans. Indicators of firm size, industry, and state are also included in the model. Based on this model, I predicted the expected premium of each type of managed care plan relative to an indemnity plan (FFS), holding all other variables in the model constant, using the smearing method (Duan, 1983) to retransform the logged dependent variable. The results are as follows:

$$\frac{E(y_{\text{HMO}})}{E(y_{\text{FFS}})} = 0.883; \quad \frac{E(y_{\text{POS}})}{E(y_{\text{FFS}})} = 0.947; \quad \text{and} \quad \frac{E(y_{\text{PPO}})}{E(y_{\text{FFS}})} = 0.996.$$

I substituted these values into Eq. (9) to derive X_{R}, X_{U}, M, and C. Table 1 summarizes the results and the use of the scaling factors. I derived a value of 0.91 for the scaling factor C, which I interpret as consumers valuing US $1.00 of care from restricted provider networks at US $0.91. Consumers place a similar discount on the care provided by plans that more actively manage utilization. The utilization discount (M) derived from the empirical model is 0.89. The results also suggest that consumers place a relatively high value on the ability to access care from an unmanaged plan. Consumers place nearly equal weight on the managed (0.47) and unmanaged (0.53) components of the plan.

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