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Employee Responses to Health Insurance Premium Increases

Dana P. Goldman, PhD; Arleen A. Leibowitz, PhD; and David A. Robalino, PhD

Objective: To determine the sensitivity of employees' health insurance decisions—including the decision to not choose health maintenance organization or fee-for-service coverage—during periods of rapidly escalating healthcare costs.

Study Design: A retrospective cohort study of employee plan choices at a single large firm with a "cafeteria-style" benefits plan wherein employees paid all the additional cost of purchasing more generous insurance.

Methods: We modeled the probability that an employee would drop coverage or switch plans in response to employee premium increases using data from a single large US company with employees across 47 states during the 3-year period of 1989 through 1991, a time of large premium increases within and across plans.

Results: Premium increases induced substantial plan switching. Single employees were more likely to respond to premium increases by dropping coverage, whereas families tended to switch to another plan. Premium increases of 10% induced 7% of single employees to drop or severely cut back on coverage; 13% to switch to another plan; and 80% to remain in their existing plan. Similar figures for those with family coverage were 11%, 12%, and 77%, respectively. Simulation results that control for known covariates show similar increases. When faced with a dramatic increase in premiums—on the order of 20%—nearly one fifth of the single employees dropped coverage compared with 10% of those with family coverage.

Conclusions: Employee coverage decisions are sensitive to rapidly increasing premiums, and single employees may be likely to drop coverage. This finding suggests that sustained premium increases could induce substantial increases in the number of uninsured individuals.

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The rapid rise in health insurance premiums over the last 2 years raises questions about what will happen to the employer-provided insurance market. Because most Americans obtain health insurance through the workplace, a concern is that employees and their dependents will end up without coverage or with much less adequate coverage. Whereas some small firms will almost certainly respond to rapid premium increases by dropping coverage for all employees, large firms are unlikely to do so because virtually all offer coverage and have been doing so for years. Rather, large firms are likely to require employees to pay a larger portion of their health insurance premiums. The percentage of covered workers whose employers pay the full cost of single coverage declined from 30% in 2001 to just 23% 1 year later.[1] This fact raises the question of how employees respond to these price changes—will they switch to less generous coverage or forego coverage completely?

Previous studies have examined the demand response to premium-sharing arrangements.[2-5] For example, in a 1984 study of the health plan choices made by employees in 20 Minneapolis firms, Feldman and colleagues[2] estimated nested logit models of insurance coverage in firms offering health maintenance organization (HMO) and fee-for-service (FFS) insurance. They found that employee choices were sensitive to out-of-pocket premiums and that employees choosing HMOs were more sensitive to price. This result may reflect the status quo in 1984, when HMOs were generally the lower cost option. Today, HMOs are not necessarily the least expensive option; more recent work by Feldman and associates[6] indicated that firms that offer HMOs do not have lower healthcare costs than companies that do not.

Our goal was to examine health plan choices within a flexible benefit plan. Firms offering these plans give employees a fixed benefit allocation. Employees then decide how to allocate these "credits" between health benefits, pensions, life insurance, or other benefits. Funds not spent on health insurance can be used to purchase other benefits or increase take-home earnings; thus, employees pay the full marginal cost of electing a more expensive health plan. Such cafeteria-style plans cover 13% of workers in medium and large firms, and

From RAND, Santa Monica, Calif (DPG); UCLA School of Public Policy and Social Research, Los Angeles, Calif (AAL); and the World Bank, Washington, DC (DAR).

Address correspondence to: Dana P. Goldman, PhD, RAND, 1700 Main Street, Santa Monica, CA 90407-2138. E-mail: dgoldman@rand.org.

the proportion is growing; thus these plans are interesting to study in their own right.[7]

Our analysis was similar in spirit to that of Buchmueller and Feldstein,[8] who had examined a policy change by the University of California that capped employer contributions at the cost of the least expensive health plan offered. They found that premium increases induced high rates of plan switching. Buchmueller and Feldstein speculated that the well-publicized policy switch may have influenced their results. Cutler and Reber[9] also examined demand response to a substantial benefits policy change at Harvard University and found similar large effects. Our work complemented findings from both studies by confirming this price sensitivity using multiyear data, although the firm in question did not experience any dramatic change in its compensation policy.

METHODS

Our data came from a single large company in the United States that offered a flexible benefits plan. Employees paid out-of-pocket for the difference in premiums between the chosen plan and a low-cost catastrophic health insurance policy. Employees paid the additional premium cost on a pretax basis. We acquired data on employees' health plan decisions from 1989 through 1991, allowing us to examine how changes in relative prices affected plan choices over 3 years. The advantage of this period was that it was a time when firms experienced premium increases well above the rate of inflation—similar to the rapid premium growth from 2000 through 2002 (for which data were not available).

Modeling Plan Changes

In modeling health insurance choices, we focused on the probability that an individual would choose an alternative in year $t + 1$ that differed from the one chosen in year t. The responsiveness of demand could then be measured by looking at how this probability changed with price changes. Unfortunately, it is not entirely clear in a reduced-form analysis exactly what the appropriate measure of price should be. Economists working with firm-level data have used variation in employer contributions, tax rates, loading fees, or standardized policies to proxy for price changes.[10-13] Because our data was from a single firm, we could not exploit this type of variation. Rather, we hypothesized that the choice of a health plan was a function of the relative premiums within the set of feasible plan alternatives, similar to the assumption of Long and colleagues.[13]

As with many flexible benefits plans, the employer provided a partial subsidy to the purchase of health insurance. In this case, the employer paid the full cost of a catastrophic FFS plan. If employees elected a more generous FFS health plan with a lower deductible or any of the 50 HMOs offered, they were required to pay the additional premium cost either through credits or payroll deductions. We used data from the 3-year period of 1989 through 1991. While these data are old, this period has the advantage that it was a time of large premium increases, both within and across plans. It also is comparable to periods covered in other studies.

Multinomial Logit Model of Choice. The multinomial logit (MNL) model of choice requires the well-known condition of the independence of irrelevant alternatives. The independence of irrelevant alternatives is tantamount to assuming that the stochastic portions of the conditional utility functions are uncorrelated across alternatives, and imposes the restriction that the cross-price elasticities are the same across all alternatives.[14] One alternative to the MNL is the nested MNL. This model allows for correlation across subgroups of alternatives (closer substitutes) so that price elasticities are more elastic within groups than across groups. Unfortunately, the structure of our dataset did not allow for the estimation of such a model, since we did not have any right-hand side variables except premium that varied across choices. The right-hand side variable was actually the "increase or decrease in cost associated with the status quo plan"—ie, the plan chosen in the previous period. Thus our ability to draw certain inferences was limited; for example, we could not infer what would happen if another plan were added to the system.

We first estimated an MNL model in which each employee at time t faced 3 choices: (1) keep the plan that he or she chose in time t–1; (2) switch plans; or (3) choose the free option, which means dropping health insurance or switching to the catastrophic FFS plan. (Although the catastrophic plan with individual coverage was always a free alternative, approximately 11% of the sample chose no insurance. This choice may have been related to coverage through a family member or partner outside the firm. Unfortunately, we did not have any information on alternate sources of insurance. Therefore, we treated the decisions of dropping health insurance or switching to the catastrophic option as equivalent in this report.)

We assumed that the probabilities of undertaking each of these actions was a function of the change in the relative premium, controlling for a limited set of covariates, including total compensation, age, sex, tenure in the job, marital status, plan and state dummies, and possibly some interactions. We included compensation on

the job because higher-income employees may be less responsive to price changes and because the deductible in the catastrophic plan was equal to 5% of salary. We hypothesized that workers with greater job tenure may have had more inertia about changing plans, and that workers with greater expected use of healthcare (older workers, women, or workers with families) may have been less likely to change plans if they had to change providers, as a change between HMO and FFS plans might require. Plan dummies were included to capture the relative attractiveness of individual plans and state dummies were included to account for systematic, unmeasured geographic differences.

Our measure of price was based on relative premiums, defined as the premium of an individual's plan divided by the average for all competing plans in that market. It is useful to note that the actual change in an individual's expenses could deviate from this amount if he or she switched plans; hence, we used the term "incipient premium increase" to describe this variable.

Data

The data consisted of 3 years (1989-1991) of earnings and benefit information for 14 221 employees at a single US company. Not all employees worked all years, so the entire dataset consisted of 31 907 employee-years of data. After eliminating employees aged 65 years or older, and a few observations with inconsistent or incomplete data, the employees were geographically dispersed across 47 states, with most living in California, New Jersey, or Texas. **Table 1** presents descriptive statistics across all employee-years. Employees were on average 37 years old with 6 years of experience with the company; two thirds were female.

The company offered 2 types of health insurance plans: FFS plans and HMOs. Nearly all the employees (89%) enrolled in the employer's health insurance plan. **Table 2** shows that within the FFS class, 3 types of plans were available: a catastrophic plan with a deductible of 5% of salary, a low option plan with deductibles of $300 for individuals and $600 for families, and a high option plan with deductibles of $150 and $300. The other options consisted of 43 HMOs nationwide, with each employee's available choices depending on geographic residence and year. Each plan offered 3 coverage levels: employee only (individual), employee plus 1 dependent (couple), and family.

As with most employers, this company contributed toward the purchase of these plans. Unlike many employers, however, the amount did not vary by plan choice, but depended only on the number of beneficiaries (**Table 3**). By not contributing more generously to more expensive plans, the employer avoided subsidizing expensive plans and ensured that employees faced the full marginal cost of more generous coverage (on a pretax basis). In general, the size of the employer contribution was equal to the premium for the catastrophic plan. The employer contribution was always equal to the premium on the catastrophic plan for individual coverage, but in 1991 the employer instituted modest copremiums for catastrophic coverage of families and couples.

To construct a dataset to evaluate employee insurance choices, we needed to account for several data

Table 1. Descriptive Statistics, 1989 to 1991

Variable	Mean	SD	Minimum	Maximum
Age (years)	37.48	10.25	18	64
Tenure (years)	6.39	6.14	0	44
Income ($)	31 551.81	18 964.19	6630	428 532
Benefits ($)	1339.43	1036.53	0	11 132
Total compensation ($)	32 262.41	19 165.42	7145	433 342
Credit allocation ($)	710.60	220.29	500	4810
Female	0.67	0.47	0	1
Single	0.33	0.47	0	1
Couple	0.29	0.45	0	1
Single parent	0.06	0.24	0	1
Family	0.31	0.46	0	1
Have health insurance	0.89	0.31	0	1
Enrolled in HMO	0.28	0.45	0	1
Enrolled in FFS	0.61	0.49	0	1
Year	1989.97	0.82	1989	1991

N = 31 907. Total compensation is equal to income plus credit allocations.
FFS indicates fee for service; HMO, health maintenance organization.

Table 2. Employee Insurance Choices, 1989 Through 1991

Plan Type	Deductible	Percent Choosing Plan in 1989	1990	1991
FFS				
Catastrophic	5% of salary	11.5	13.9	20.3
High deductible	$300/$600	7.6	9.2	13.5
Low deductible	$150/$450	40.3	37.5	30.4
HMO*		30.8	28.4	24.4
No insurance		9.8	11.0	11.4
Number of employees		11 199	10 479	10 232

*A total of 43 different HMOs were offered—we did not break out enrollment by each plan as we do for FFS.
FFS indicates fee for service; HMO, health maintenance organization.

Table 3. Employer Contributions to Plan Premiums

Coverage	1989	1990	1991
Individual	$506	$600	$700
Couple	$906	$1000	$1100
Family	$1256	$1349	$1450

issues, as noted below. The results did not appear unduly sensitive to these steps:

1. We did not have precise information concerning other sources of coverage through family members. Several pieces of information suggested such coverage existed. For instance, some eligible employees did not sign up for any health plan, including the free catastrophic plan. We chose to restrict our attention to employees enrolled in noncatastrophic health insurance plans during the previous year. These employees were paying some sort of copremium, so we knew they assigned a nontrivial value to health insurance through this employer. This tactic reduced the sample by approximately 11% and, in some respects, limits our inferences to the sizable majority of employees who are currently paying a copremium for insurance.
2. In the case of single employees, we excluded 95 employees who switched from a single policy to a couple or family plan. We did so because these employees appeared to have had substantial lifestyle changes (eg, they got married or had children). It could be assumed that employees might change dependent status in response to a rise in copremiums. Among married employees who switched dependent status, however, about the same proportion reduced their premium as increased or maintained their premium (46% and 54%, respectively), suggesting prima facie that these changes were largely unrelated to the premium increases. We assumed that married employees who changed the number of dependents only did not switch plans.
3. Ten health plans ceased to exist during the period of observation. We excluded the affected employees from our analysis because we were interested only in voluntary switching behavior. Thus we excluded 137 single employees and 200 employees with families.

Consequently, our final subsample contained 12 936 observations of employee plan decisions, of which 4491 were for single workers and 8445 were for married workers. Table 2 shows a distinct downward trend in HMO enrollment—from 31% in 1989 to 24% in 1991. This decline might be explained in part by premium changes during the study period.

RESULTS

Changes in Health Plans

Table 4 displays the different types of transitions in insurance for single and married employees. Most employees kept their plan. In both 1990 and 1991, about 7% of the singles and 10% of the families dropped health insurance or shifted to the catastrophic option. For singles, the percentage of those changing plans was 12% to 13%, about half of whom switched systems (ie, changed from an HMO plan to an FFS plan or vice versa). For families, the percentage of those changing plans (outside and within systems) was 11% to 14%. Families were more likely to switch from an HMO plan to an FFS plan (10%) than vice versa (3%).

Of the singles who switched plans, almost half of the FFS participants switched to HMOs (5.6% of all singles switched to HMOs vs 6.7% who switched within the FFS sector). A similar pattern emerged for those singles in the HMO. Employees with family coverage showed a diminished predilection to switch out of the system.

Among those in the HMO, 9.5% switched within the HMO sector versus 5% who switched to FFS.

Not shown in Table 4 is how premiums changed for those employees. Among singles who switched plans, 78% paid less than they would have paid had they kept the same plan. Among families, that figure was 81%. This finding suggests that many individuals who switched plans did so to reduce their annual premium.

Table 4. Change in Health Plan Choice by Previous System of Care

Type of Insurance in Year *t*-1	n	Percent (%) Taking Action in Year *t*				
		Drop Plan	Move to Catastrophic	Switch to Other System	Switch Within System	Keep Plan
Singles	4491	1.0	6.1	6.0	7.0	79.8
FFS	2530	0.8	6.3	5.6	6.7	80.4
HMO	1961	1.4	5.8	6.3	7.4	79.0
Families	8445	3.3	7.2	5.0	7.3	77.0
FFS	5773	2.5	7.0	3.0	8.4	79.0
HMO	2672	5.0	7.6	9.5	5.0	73.0

FFS indicates fee for service; HMO, health maintenance organization.

Models of Switching Behavior

We estimated our models separately for single individuals and families. **Table 5** presents the parameter estimates, standard errors, and *P* values for the MNL estimates of the probability of either dropping insurance or switching plans relative to keeping the current plan. The crucial parameter in our analysis was the coefficient of the annual relative premium increase. For singles and families, the increase in the relative premium for the plan held in the prior year had a significant positive effect on the probability of switching to the catastrophic plan or dropping plans. An increase in the relative premium also significantly increased the probability of switching to another plan with a nonzero premium. This finding confirmed our previous intuition: that employees would respond to price increases by disenrolling from plans whose relative price increased. In general, single workers were more likely to leave their current plan than families. Older workers and those with more tenure on the job were less likely to change insurance plans.

We initially allowed the continuous variables (age, tenure, and total compensation) to have nonlinear effects on the propensity to switch plans. The coefficients on these interactions were not statistically signif-

Table 5. Results From Multinomial Logit Model of Insurance Decision (Drop, Switch, or Keep)

	Singles			Families		
	Estimate	SE	*P*>|z|	Estimate	SE	*P*>|z|
Dropping coverage						
Intercept	–1.179	0.358	.001	0.307	0.277	.267
Relative premium increase (%)	13.682	1.767	.000	1.927	0.581	.001
Total compensation	–0.001	0.005	.754	–0.018	0.003	.000
Age	–0.034	0.008	.000	–0.046	0.006	.000
Female	–0.200	0.137	.145	0.182	0.118	.122
Tenure	–0.063	0.018	.000	–0.033	0.010	.001
Switching plans						
Intercept	–0.935	0.249	.000	–1.018	0.235	.000
Relative premium increase (%)	4.925	1.180	.000	4.560	0.507	.000
Total compensation	0.012	0.003	.002	0.006	0.0016	.000
Age	–0.030	0.006	.000	–0.032	0.0049	.000
Female	0.127	0.108	.240	–0.058	0.089	.510
Tenure	–0.029	0.010	.005	–0.013	0.007	.073

Table 6. Simulated Probabilities of Changing Coverage

Premium Increase	Single			Family		
	Drop	Switch	Keep	Drop	Switch	Keep
0%	0.076	0.130	0.793	0.082	0.111	0.806
10%	0.126	0.149	0.723	0.090	0.154	0.755
20%	0.200	0.163	0.635	0.097	0.209	0.693
30%	0.296	0.170	0.532	0.102	0.276	0.620

icant, and they did not change the magnitude and significance of the other parameters on prices.

Because the MNL model does not provide obvious insight as to the quantitative effects of premium changes, we simulated the effects of various across-the-board relative premium increases on switching and disenrollment behavior. The average relative premium for singles was equal to 0.5, whereas for married workers it was equal to 0.9. The fact that the relative premium is lower for single workers means that a disproportionate share of them enrolled in the lower cost plans, as one might expect.

For both groups we simulated the effect of 0%, 10%, 20%, and 30% annual increases in the relative premium. **Table 6** shows the results of these simulations. With no increase in premiums, 7% of single employees would drop their current plan in favor of the catastrophic plan or no coverage; 13% would switch plans (outside and within systems); and 80% would keep the existing plan. For families the percentages are similar. The 7% to 8% probability of dropping plans when premiums do not rise is similar to the 5% rate of switching among employees facing constant premiums found by Buchmueller and Feldstein.[8] When faced with an annual relative premium increase of 10%, the probability of keeping the current plan decreased modestly to 72% for singles and to 76% for families. When faced with a dramatic increase in premiums—on the order of 20%—one fifth of the single employees would drop coverage, as would 10% of those with family coverage.

We observed that a 10% increase in the relative premium reduced the probability of keeping the plan by about 9% for singles and by 6% for families. The probability of dropping health insurance (or going into the catastrophic option) was more responsive for singles than families. One can speculate this may have something to do with a concern about financial protection of spouses and children or that married employees are intrinsically more cautious. The opposite was true for the probability of switching. Switching behavior is very elastic with respect to premium increases for families, but not so for singles. Thus, singles appeared more likely to respond to price increases by dropping insurance, whereas families tended to switch to other plans.

The strong statistical significance and the sizeable estimate for the relative premium suggests that these effects would have persisted even if we had been able to better control for changes in plan characteristics and individuals' perceived benefits. If, for example, insurance companies were trying to improve their bottom lines by reducing benefits and increasing premiums, our parameter estimate would be biased upward. However, the true parameters, although smaller, would have the same sign and likely would still been statistically significant.

CONCLUSIONS

Employees who face the full marginal cost of purchasing more costly health plans were responsive to premium increases. Although many employees displayed inertia in their plan choice, increases in relative premiums induced plan switching. Single employees were more likely than employees with family coverage to adjust to premium rises by dropping insurance. Families appeared more likely to switch to another plan. Among employees who made a change in plans from one year to another, those whose own plan premium rose relative to others in the same system (HMO or FFS) were more likely to switch to another plan within the system. Those whose premium rose relative to plans outside the system were more likely to change systems. The results suggest that employees facing much higher copremiums to renew their current health plan are likely to drop coverage or switch to another plan.

Limitations

Some caveats should be noted. First, premium changes may reflect changes in benefit generosity. In that case, higher premiums reflect more desirable goods and, hence, are not true measures of the price change. If this statement is true, then premium changes are an upper bound on price changes, and will exacerbate any price effect. On the other hand, measurement error in prices could bias the observed responses downward.

Further, the utility of alternative health plans also depends on other characteristics of plans such as quality of providers or flexibility in access to providers, or finan-

cial features such as copayments, deductibles, and cost-sharing policies. Not only do these characteristics change over time, but so does the information that the employee receives about them. The employee learns not only from health plan literature and his or her own experiences, but also through his or her awareness of the experiences of other individuals.[15] Thus, changes in the perceived benefits of alternative plans might also produce shifts that are independent of the premiums. We expected that changes in plan characteristics and individuals' awareness were not important during the relatively short period of analysis. Thus given our dataset we limited ourselves to estimate models with plan-specific fixed effects.

Another bias may have arisen because we did not know the entire set of feasible plan choices. We assumed that all employees had access to each plan, but this assumption holds only for the FFS plans in our data. If the insurance opportunity set is not specified correctly in any given model, a relative premium index might put too much weight on plans that are not close substitutes, and too little weight on those that are close substitutes. In that instance, we might detect an apparent unresponsiveness of employees to changes in the relative premiums (ie, the overall relative price index is changing but the prices of the *feasible* plans do not). To investigate this issue, we examined responsiveness to 2 price indexes in this framework: one for the current plan relative to prices of close substitutes within the system of care (FFS or HMO) and another relative to average prices of plans in the other system of care.

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