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Background Paper

The Price Sensitivity of Demand for Nongroup Health Insurance

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Preface

Many recent proposals for reducing the number of people without health insurance focus on the individual, or nongroup, insurance market. The Congressional Budget Office (CBO) is extending its capacity to evaluate how those proposals would affect the number of people with insurance coverage and the cost of such proposals to the federal government. An important aspect of those analyses is the influence of price on the demand for health insurance. In this background paper, CBO estimates the effect of the level of nongroup insurance premiums on the decision to enroll in nongroup insurance by workers who do not have health insurance available to them through their employer. In keeping with CBO's mandate to provide objective, impartial analysis, this paper makes no policy recommendations.

David Auerbach of CBO's Health and Human Resources Division and Sabina Ohri, a former summer intern at CBO from the University of California at Irvine, prepared this paper under the supervision of James Baumgardner and Bruce Vavrichek. Stuart Hagen, Chapin White, and Tom Bradley provided useful comments throughout the project, as did Thomas Buchmueller of the University of California at Irvine and Jonathan Gruber of the Massachusetts Institute of Technology. (The assistance of external reviewers implies no responsibility for the final product, which rests solely with CBO.)

Janey Cohen edited the paper, and Loretta Lettner proofread it. Maureen Costantino prepared the paper for publication and designed the cover, Lenny Skutnik produced the printed copies, and Annette Kalicki and Simone Thomas prepared the electronic version for CBO's Web site (www.cbo.gov).

Douglas Holtz-Eakin
Director

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Contents

Tables

Introduction and Summary

This paper examines the sensitivity of decisions to purchase insurance in the individual, or "nongroup," insurance market to the price of that insurance—a central aspect of tax credits and other price-based incentives to stimulate the purchase of private health insurance. The paper focuses on those without access to group insurance through an employer—in other words, those for whom nongroup insurance may be the only coverage option. Surveys by the Census Bureau and others help identify such people and allow an examination of their economic and demographic characteristics. However, those surveys do not contain information on the potential premium (or price) of insurance for those who do not purchase it.

This paper uses two alternative methods to estimate that premium for single workers partly on the basis of information about their health status. It then uses exogenous differences in insurance premiums attributable to (1) the tax deductibility of premiums for self-employed individuals and (2) the effect of state-level premium compression and community rating regulations to estimate the responsiveness of otherwise similar people to different levels of price. Using a reduced-form ordinary least squares (OLS) regression model, this analysis estimates a price elasticity of demand for health insurance of -0.57. For example, a 10 percent reduction in insurance premiums is estimated to result in a 5.7 percent increase in health insurance coverage in the nongroup market in our sample of single workers, 16 percent of whom had nongroup coverage at the time of the survey in 2002. Analyses of poor and less-healthy subgroups find largely insignificant results, though the less-healthy appear to be less responsive to premium changes than the more-healthy.

Background

Many recent proposals for reducing the number of uninsured people in the United States have focused on the nongroup insurance market (Pauly and Herring, 2001; and McClellan and Baicker, 2002). For example, in its 2006 budget, the Administration proposed tax credits for the purchase of insurance in the nongroup insurance market as a means of reducing the number of uninsured Americans (Office of Management and Budget, 2005). To evaluate the impact of those policy proposals, it is necessary to understand the influence of price on the demand for health insurance. If individuals are insensitive to price in their insurance purchases, subsidies will have a limited effect on the number of uninsured, although such subsidies may still prove costly if they are simultaneously available to those who have already purchased nongroup coverage in the past (Gruber, 2004).

In this paper, the Congressional Budget Office (CBO) estimates the effect of the level of nongroup insurance premiums on the decision to enroll in nongroup insurance by workers who do not have health insurance available to them through their employer. This analysis has several new features compared with previous efforts. First, it uses a national sample and obtains more recent and generalizable results than do previous studies in this literature.[1] Second, premiums are estimated taking into account individuals' health status, an important determinant of premium offers in the nongroup market. Third, and most important, to properly identify our elasticity estimates, this paper makes use of a powerful source of exogenous variation in nongroup premiums not used in previous studies—the variation in premiums induced by

1. The last published paper to estimate nongroup premium elasticity with a national sample used data from 1987 and 1988 (Marquis and Long, 1995).

state-level rate compression and community rating regulations. Many states in the 1990s sought to reduce the disparity by health status in premiums charged to potential enrollees by restricting underwriting either completely or partially. The direct effect of such policies has been to raise premiums for more-healthy enrollees, to lower them for less-healthy enrollees, and to raise the average premium in those states (Glied and Little, 2003; Nichols, 1999; Buchmueller and DiNardo, 2002; Buntin and others, 2004; Robert Wood Johnson Foundation, 2004; Turnbull and Kane, 2005; and LoSasso and Lurie, 2005). Exogenous variation is a key component in assuring accurate, unbiased estimates of the effect of premiums on decisions to take insurance since it generates premium variation that is independent of both plan and individual characteristics.[2]

CBO finds that individuals are relatively unresponsive (in other words, price inelastic) to changes in nongroup premiums: our estimates are at the low end of the range of earlier studies.

The next section describes the data and our methods. It is followed by sections that present our results and provide a context for those results by including simulations of policy interventions affecting insurance premiums. A final section presents conclusions.

Data and Methods

The individual-level data used in this analysis primarily originate from the Survey of Income and Program Participation (SIPP). That Census Bureau survey is longitudinal, with the most recent five-year panel having begun in 2001. Each wave of respondents is asked a core set of questions about their income, employment, and insurance status, along with some basic demographic questions, every four months. The core data are supplemented in each survey round with a separate set of topical questions. The fifth topical module, administered in July 2002, contains key questions on offers of health insurance and health status, and for that reason, our data set comprises respondents who answered the core questions at approximately the same time.[3] Workers not offered employer-sponsored insurance (ESI) are identified by those questions (individuals who are not eligible for their employer's plan are considered not offered). Those who indicate they are the policyholder of insurance that is privately purchased as opposed to sponsored by a current or former employer are considered as having nongroup coverage.

Premium Imputation

The most critical variable for the analysis is the premium measure. Since it is not possible to discern directly in the data the premium individuals would face for nongroup coverage, premiums are imputed to all sampled individuals. This paper essentially follows underwriting practices to arrive at an estimate of the premium, defined as the lowest-offered price at which a given individual could purchase typical, unrestricted coverage in the nongroup market with a $1,000 deductible in mid-2002.

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2. LoSasso and Lurie (2005) have convincingly shown that those state laws were *not* endogenous—that is, passed in response to idiosyncratic conditions in the state with regard to the nongroup market or premiums.

3. The difference in time between responses to the core questions and the topical module questions is not more than few months and is not expected to affect the results substantially. Although the data set is used primarily as a cross section, income and employment information about individuals from previous survey rounds was sometimes used in constructing their present income and employment status.

For the sake of simplicity, the premium is constructed first as if the individual resided in a state with no restrictions on underwriting practices. Then, the premium is modified according to prevailing regulations or practices in the individual's actual state of residence.

Without Effects of State Rating Restrictions. A national rate schedule obtained from a large insurer in the nongroup market serves as the starting point for the premium imputation. The schedule specifies annual premiums at every level of age and gender as of April 1, 2003.[4] Those premiums are adjusted by a factor on the basis of health care costs in the individuals' state of residence.[5]

Next, premiums are adjusted on the basis of individuals' health status using two alternative methods. The first attempts to match current insurer underwriting practices as closely as possible, using published documentation of such practices. For example, one study of the practice of a single insurer found that 57 percent of applicants were offered standard coverage, 21 percent in slightly worse health status were offered coverage at a price 25 percent higher, 6 percent in still-worse health status were offered coverage at a price 77 percent above standard coverage, and 16 percent were denied coverage altogether or charged an unknown higher price (Pauly and Nichols, 2002). Another broad survey of insurer practices found that roughly 70 percent of individuals were offered coverage at the standard price, 20 percent were offered insurance either at higher prices or with coverage limitations or both, and 10 percent were denied coverage (Merlis, 2005). Finally, in a survey of premium quotes for hypothetical applicants with health problems (Pollitz and others, 2001) and in a General Accounting Office study (GAO, 1996), applicants with the greatest health risks were charged not more than twice the age-standardized rate (or were denied coverage altogether). Summarizing those results, it appears that roughly two-thirds of applicants to a given insurer are quoted the standard rates, roughly one-fourth are charged a small surcharge, and the remainder are either charged a higher rate not exceeding twice the standard rate or are denied coverage outright.

There are three additional important considerations in deriving multipliers, or factors, for premiums based on health status using observed practices.[6] First, insurer underwriting practices vary widely (Pollitz and others, 2001). Thus, by "shopping around," individuals could obtain better offers than if they had to use a single insurer. That circumstance would lower the factors from the individual's perspective relative to what is observed above for individual insurers. On the other hand, many of those in the surveys cited above who are charged higher rates because of poor health also are offered only limited coverage at those higher rates—for example, riders may be attached to a policy excluding coverage for certain body systems or conditions. For the purposes of this analysis, CBO is interested in deriving health factors (and, ultimately, premiums) for the same standardized insurance product quality, and thus a quality reduction is interpreted as a price increase for standard coverage. Therefore, riders would raise the factors relative to the insurer-based observations that do not account for dif-

4. Premiums are adjusted to 2002 dollars to account for premium inflation using national health expenditures for private health insurance premiums from the Centers for Medicare and Medicaid Services.

5. Per capita state health spending was obtained from the Centers for Medicare and Medicaid Services and adjusted by age and sex.

6. For example, for someone expected to be charged a premium 50 percent higher than the standard premium for another person the same age and living in the same state, the health multiplier, or factor, would be 1.5—the amount by which the premium is multiplied.

ferences in comprehensiveness of coverage. The factors also could rise if the applicant pool for nongroup coverage, from which the above estimates of health ratings are derived, is healthier than the general population. That might be expected if it is costly to be denied coverage.[7] If that is the case, then the observed factors might apply to only the healthiest 90 percent of the general population, for example, and they would have to be expanded to apply to the entire population.

For purposes of deriving health-based rating factors for imputing premiums on the basis of insurer practices, CBO assumes that the effects of the above three considerations are approximately offsetting and uses an approximation based on the observed insurer practices described above. To sort individuals into the observed health-based underwriting groups, self-reported health status serves as a proxy for the information obtained from the underwriting questionnaire. The population reporting "excellent" or "very good" health status corresponds well to the roughly two-thirds who appear to be offered standard coverage. Those who report "good" health status are imputed a premium that is 25 percent higher. Those who report "fair" health are charged 75 percent more than the standard rate, and the remaining individuals reporting "poor" health would probably be denied by many insurers but also would have some probability of obtaining a quote of roughly twice the standard rate (which appears to be the maximum rate charged by most insurers) from at least one insurer if they contacted several insurers. That group is assigned a premium of 3.5 times the standard rate, a figure representing some probability of an offer at twice the standard rate and some probability of not receiving any offers (which, for our purposes, is considered similar to receiving a very high premium offer).[8]

The second method of adjusting premiums on the basis of health status uses realized health expenditures based on self-reported health status as a basis for health-rating factors. That method assumes that insurers assess individuals' health status at the time of application and then charge them a rate based on their expected future cost experience. Toward that end, CBO used a two-year, linked sample of roughly 6,000 individuals from the Medical Expenditure Panel Survey (2000/2001) to estimate full-year realized health expenditures (2001) as a function of previous-year (2000) self-reported health status, which again serves as a proxy for the underwriters' questionnaire.[9] Spending ratios are created for all four health groups ("very good," "good," "fair," and "poor") relative to those with excellent health status and separately for three age groups, 18-34, 35-49, and 50-64, since health multipliers are applied to age-standardized rates. The resulting ratios for each age group are averaged (weighted by total expenditures) to arrive at factors of 1.25 (in other words, a 25 percent higher premium), 1.89, 2.30, and 6.52 for, respectively, "very good," "good," "fair," and "poor" self-reported health status. Those factors are somewhat larger, implying higher premiums for the less-healthy, by

7. Simply the time involved in making an application is costly. In addition, some insurers deny coverage to those who have been denied by other insurers (Pollitz and others, 2001); thus, a denial carries future negative implications. On the other hand, being denied coverage is a prerequisite in some states for admission to high-risk pools (Merlis, 2005).

8. Since it is unclear how to convert coverage denials into a price, that choice is somewhat arbitrary. The final results are not sensitive to that choice. When a factor twice as large is used (7.0 for poor health), the price elasticity changes by less than 5 percent.

9. Although in principle, it would be most relevant to use the Medical Expenditure Panel Survey's measure of privately insured expenditures among the insured population (because those would be the expenditures of concern to the underwriter), that measure appeared to be significantly underestimated. Thus, total annual expenditures from all sources for all individuals were used.

comparison with the 1.25, 1.75, and 3.5 (for "good," "fair," and "poor," respectively, relative to "excellent" or "very good") that were derived from observed practices.[10]

The premium is calculated as the product of the age-sex standard rate, the state cost factor, and the health factor (which, for each of the above alternatives, is re-normalized to 1.0 on the basis of a national distribution of health status). Because of the greater uncertainty and arbitrary nature of assigning factors on the basis of observations from several insurers, the results in this paper are based on the health factors derived from health expenditures, although full regression results are shown for both methods.

Accounting for the Effects of State Rating Restrictions. The premium estimates used in this analysis are then modified in several important respects according to prevailing state regulations concerning the nongroup market. Information on state rating regulations is collected from the Georgetown Health Policy Center (www.healthinsuranceinfo.net), which performs a state-by-state survey of state rating regulations relevant to the nongroup market.[11] This analysis supplements the center's largely qualitative information with a survey obtained from the National Association of Health Underwriters (NAHU, 2004). That survey provides details on states with rating bands.[12] (See Appendix A for a summary of the assumptions made about prevailing state nongroup market regulations in 2002.)

The first premium adjustment using the state rating information involves applying the rating restrictions in the state to the appropriate (health or age) factors. For example, someone with poor health status in a state with health status rating bands of +/- 30 percent (meaning premiums cannot vary by more than 30 percent above or below the average for someone of the same age and sex) would have a normalized health factor equal to 1.3.[13] Someone with good health status would not be affected by that rule since that person would be charged a premium within the rating bands even without the restriction.

Second, states with community rating laws are modeled to have slightly higher premiums because of adverse selection. Because underwriters in those states are limited in their ability to charge higher premiums to those expected to incur higher medical expenditures, the unhealthy people would have more to gain from purchasing a policy in those states than would healthy people, since they are likely to incur costs greater than the premiums they are charged. That fact is expected to prompt insurers to raise the overall level of premiums (Glied and Little, 2003; and Merlis, 2005) to account for the expected worse mix of applicants in terms of

10. There are several reasons insurers may not "rate up" unhealthy individuals as much as their predicted expenditures may imply. Insurers may explicitly cross-subsidize their sicker applicants for public relations or "fairness" reasons. Also, the information on questionnaires may be less predictive of future spending than self-reported health status, and there may be significant regression to the mean in terms of realized expenditures over the course of the policyholding term. Finally, the possibility of denying coverage to the worst risks and of explicit or implicit re-underwriting at a future date may dampen the effect of a less accurate initial health-based rating.

11. Although that information is routinely updated, summaries with data governing regulations in place in 2002 were obtained from the authors for the purpose of this paper.

12. For example, a state may not allow premiums to vary by more than 30 percent above or below the average, for a given age, on the basis of health-status-related reasons.

13. In other words, the health factors are truncated—someone in poor health status would have a much higher health factor in an unregulated state.

risk. To account for that, a 30 percent adverse-selection-based additional premium surcharge is applied in states with pure community rating (where all applicants are offered the same premium)—and that surcharge is reduced proportionally for states with weaker rating restrictions.[14]

Third, a price ceiling is placed on the individual premium in states that have high-risk pools. According to Frakt and others (2004-2005), 29 states have active high-risk pools, covering roughly 150,000 individuals who are denied coverage in the nongroup market. Premiums charged to individuals in those subsidized pools are generally between one-and-a-half and two times higher than standard rates, with several states offering reduced premiums for low-income applicants. In this analysis, the impact of those high-risk pools is implemented as a premium cap of $6,000 in those states, affecting less than 1 percent of the sample.[15]

Finally, regardless of the state's regulatory environment, the premium is converted to an after-tax premium for the self-employed to account for the fact that members of this subgroup can deduct their entire premium from their taxable income. Tax rates are estimated using personal characteristics from the SIPP in conjunction with the National Bureau of Economic Research's TAXSIM model.[16] The variation in the premium attributable to the tax deduction offered to the self-employed has been used in previous studies (Marquis and Long, 1995; and Marquis and others, 2004).

Sample Selection

To minimize potential bias resulting from omitted variables, our sample includes only individuals who should have, for the most part, no insurance options available to them other than single nongroup coverage. The unemployed are excluded because they may be eligible for coverage under COBRA (the Consolidated Omnibus Budget Reconciliation Act) or public assistance programs and would be less likely to have some regular income available to pay for the premiums. People with families also are excluded because the family purchase decision is much more complex. Spouses or children may have other insurance options, such as employer offers or Medicaid/State Children's Health Insurance Program that are not fully captured in the data, and adult members of families may choose either family coverage or single coverage for themselves only. Demand for family coverage also is a function of characteristics of the family members, which are difficult to summarize in a single statistic. In addition, it would be more difficult to impute family premiums since insurers may use various methods to account for the characteristics of the multiple individuals who would be covered.[17]

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14. This figure is based partly on regressions performed by Glied (2003) and partly on other evidence such as LoSasso (2005) indicating that community rating leads to healthier individuals disproportionately dropping coverage. Other choices of that parameter, including no surcharge, have only minimal effects on the basic results.

15. The imputed nongroup premium itself is used as a proxy for who would be denied coverage (and therefore, eligible for high-risk pools), since the premium is a function of expected health costs, and it is those with the highest expected costs that insurers would be most likely to avoid. The $6,000 cap is roughly two to three times the age-standardized premium for the average individual. The results are not sensitive to the level of the cap and are qualitatively unchanged but of somewhat reduced magnitude when the cap is removed entirely.

16. Sixteen self-employed individuals in the sample did not have data that were complete enough to fully use the TAXSIM calculator and were therefore assigned marginal tax rates based on the sample mean.

In order to exclude other individuals in our data set with outside insurance options, the following groups also are eliminated: students under age 23; all individuals under age 18 or over age 64; and those who have military, public, or some form of other coverage as identified in the SIPP. Single adults who might be eligible for, but are not enrolled in, Medicaid are not removed; rather, we control for poverty status within the sample. We also exclude those who have offers of ESI since we do not have a good measure of the ESI premium, and further, it is likely that the presence of those offers affects demand for nongroup coverage.[18] Finally, we exclude individuals residing in North Dakota, South Dakota, Wyoming, Maine, and Vermont because those states are not individually identified in the SIPP.

Descriptive Statistics

Our final sample has 1,718 individuals (see Table 1 for information on their observable characteristics). Individuals who are covered by nongroup insurance comprise 16 percent of the sample. A simple descriptive analysis indicates that individuals purchasing nongroup insurance are more likely to be older, more educated, white, female, in good health, self-employed, and living in a Metropolitan Statistical Area (MSA). A majority of individuals in the sample have an income of less than 200 percent of the federal poverty line, reflecting the fact that workers not offered (or eligible for) coverage by their employers are more likely to be poor (Kaiser Family Foundation, 2004).[19] Only 8 percent of the uninsured are between the ages of 55 and 64, whereas that age category comprises 22 percent of those who have nongroup coverage.

Individuals with nongroup insurance face effective premiums that are 10 percent to 25 percent lower than those for uninsured people of a similar age (see Table 2). That suggests that those with lower prices may be more likely to take up insurance. Further, the proportion of individuals with fair or poor health status that are insured in the nongroup market is 34 percent greater in states with rating restrictions—15.3 percent—compared with states with no restrictions—11.5 percent (see Table 3).[20] That finding is consistent with the observation that those individuals face lower premiums in states with rating restrictions. However, healthy individuals also are slightly more likely to be covered in states with rating restrictions, despite a higher average premium. Still, those results do not control for other differences among individuals or states in demand for coverage, and a binary grouping of states according to the presence of rating regulations is rather crude and arbitrary; thus, the results remain only suggestive.

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17. A side investigation of elasticity of take-up of family nongroup insurance was performed; however, the results were too sensitive to assumptions about the construction of the family and its premium, so they are not presented. In constructing premiums for families, the individual family members' premiums were summed, with a 5 percent discount representing administrative savings for each additional family member. In general, it appeared that families were less price elastic than singles.

18. Marquis and others (2004) have shown that individuals with ESI offers have a much smaller demand for nongroup coverage.

19. Federal poverty lines are defined on the basis of guidelines from the Department of Health and Human Services. See http://aspe.hhs.gov/poverty/figures-fed-reg.shtml.

20. That difference is more pronounced (18 percent compared with 11 percent) if two states with restrictions so weak that they are essentially not binding (Idaho and Nevada) are changed from "restrictions" to "no restrictions."

Table 1.

Percentage of Sample, by Insurance Status

	Full Sample	Insured	Uninsured
Household Income as a Percentage of the Federal Poverty Level[a]			
< = 200 percent	53.1	34.1	56.9
200 percent to 300 percent	21.4	21.3	21.4
Age			
25 to 34	31.3	24.6	32.6
35 to 44	18.8	19.8	18.6
45 to 54	18.5	25.1	17.3
55 to 64	10.6	22.2	8.3
Fair or Poor Health Status	6.5	4.9	6.8
Male	66.7	63.9	67.3
Black	10.6	3.7	11.9
Hispanic	21.4	4.5	24.7
Education			
High school graduate	32.0	23.4	33.6
Some college	32.0	38.3	30.7
College degree	16.4	31.6	13.4
Resides in a Metropolitan Statistical Area	77.6	80.6	77.1
Region of Residence			
South	37.6	31.5	38.8
West	27.7	25.5	28.2
Midwest	19.0	25.2	17.8
On Employer's "Waiting Period"	8.1	1.5	9.4
Self-Employed	27.3	53.5	22.2
Memorandum:			
Number of Observations	1,718	272	1,446

Source: Congressional Budget Office based on analysis of selected single workers from Department of Commerce, Bureau of the Census, *2001 Survey of Income and Program Participation.*

Note: Premiums account for health status rating based on expenditures, the value of the self-employed tax deduction, and state rating regulations.

a. Poverty levels are based on U.S. Department of Health and Human Services, *The 2002 HHS Poverty Guidelines.*

Table 2.

Average Imputed Premium by Age and Insurance Status, 2002

(Dollars)

Age	Full Sample	Insured	Uninsured
18 to 24	1,487	1,146	1,511
25 to 34	1,579	1,284	1,622
35 to 44	2,040	1,752	2,100
45 to 54	2,885	2,330	3,043
55 to 64	3,889	3,621	4,030

Source: Congressional Budget Office based on imputations as described in the text.

Note: Premiums account for health status rating based on expenditures, the value of the self-employed tax deduction, and state rating regulations.

Econometric Specification

Probit regressions are performed, using sampling weights provided by the SIPP,[21] with the dependent variable set equal to one if the individual is a nongroup insurance policyholder. Independent variables include the imputed premium, an indicator for fair or poor health status, income categories relative to the federal poverty line, age categories, an indicator for male, race indicators for black and Hispanic, indicators for educational level, an indicator for residing in an MSA, categories for U.S. regions, an indicator for whether an employee is under his employer's waiting period for a health insurance offer, and an indicator for self-employment.

Separately, the premium variable is combined with measures of income and health status using interaction terms to test for differences in sensitivity to the premium since Blumberg and others (2001), and Marquis and others (2004), find different premium responses among groups by health status and income.[22]

Regression Results

Marginal effects of the full set of explanatory variables for nongroup insurance status are discussed in the next section.[23] Two different specifications of the premium are presented—one

21. Results are not sensitive to the use of weights.

22. Interaction terms in probit regressions are handled using the "predictnl" command in Stata 8.

23. We performed several checks for robustness to further ensure the validity of the results. One potential concern is that variation in the imputed average premiums across states (arising from our health cost factor and community rating surcharge) also might be associated with differences in state-level demand for nongroup coverage—in which case our specification of quantity as a function of price could suffer from reverse causation (price being a function of quantity). We ran versions of our model both with an indicator variable for each state and with a single base (average) premium that was identical across states, thus eliminating cross-state variation in average premiums while keeping our premium variation as a function of health status, age, and the effect of rating restrictions. Elasticity results differed from the main specification by only 1 percent to 2 percent in those alternative specifications—indicating that potential differences in state-level demand were not driving the results. We also checked whether our sample selection strategy produced bias in the estimates by estimating whether the premium was a predictor of being in our sample. The premium coefficient was close to zero and insignificant, indicating a lack of such bias. Finally, we ran a version of the model where rating restrictions were randomly assigned to states to help ensure that the results were not fortuitous—the premium coefficient was again close to zero and insignificant.

Table 3.

Imputed Premiums and Take-up Rates by Health Status and State Regulatory Regime

	No Rating Restrictions		With Rating Restrictions	
Health Status	Premium (Dollars)	Take-up Rate (Percent)	Premium (Dollars)	Take-up Rate (Percent)
Fair or Poor	4,109	11.5	3,500	15.3
Good, Very Good, or Excellent	1,781	16.2	2,453	17.4

Source: Congressional Budget Office based on premium imputations as described in the text and Department of Commerce, Bureau of the Census, *2001 Survey of Income and Program Participation.*

Note: Premiums account for health status rating based on expenditures, the value of the self-employed tax deduction, and state rating regulations.

using health factors based on observed insurer practices (see the first column of Table 4) and the other using factors based on expenditures (see the second column of Table 4).

The results for the control variables are largely consistent with expectations. Both specifications imply that women, whites, those of older age, those with higher income, and those with more education are significantly more likely to take up nongroup insurance. The results for educational level and race are consistent with Marquis and others (2004), whereas the results for age and income, in addition to education and race, are consistent with LoSasso and Lurie (2005). The self-employed also are more likely to take up nongroup insurance, whereas employees who are waiting to receive health benefits from their employer are much less likely to obtain nongroup coverage. Regional effects are insignificant, implying no geographic variation in the demand for nongroup insurance. That finding mitigates concerns about demographic or state regulations affecting the overall demand for insurance regionally.

The size of the nongroup premium is significantly, negatively associated with taking up coverage in both specifications. Premiums are reported in thousands of dollars; thus, -.028 (in the second column of Table 4) implies a 2.8 percentage point increased likelihood of coverage for a premium reduction of $1,000 for an individual with mean values of all covariates. That translates to a price elasticity of -0.57 for the full sample, implying that a 10 percent decrease in nongroup premiums would result in a 5.7 percent increase in the rate of nongroup coverage (see Table 5). Poor individuals (those whose income falls below 200 percent of the federal poverty level) have a larger elasticity (-0.84, $p < 0.01$), whereas less-healthy individuals are relatively inelastic (-0.39, $p = 0.21$).[24] The findings are not significantly different from the full sample elasticity at conventional levels but are qualitatively similar to those of other researchers (Marquis and others, 2004; and Blumberg and others, 2001).

Comparison with Other Findings and Implications of Results

It is useful to consider these elasticity results in light of previous estimates. CBO's elasticity estimate is larger than in Marquis and Long (1995), who report elasticities for families of -0.4

24. P values in this case reflect the likelihood that the estimate is different from zero.

Table 4.

Marginal Effects of Independent Variables on Nongroup Take-up

	Practice-Based Health Factors	Expenditure-Based Health Factors
Nongroup Premium (Thousands of dollars)	**-0.038 (0.015)**	**-0.028 (0.011)**
Household Income as a Percentage of the Federal Poverty Level[a]		
< = 200 percent	**-0.065 (0.020)**	**-0.063 (0.020)**
200 percent to 300 percent	-0.038 (0.019)	-0.038 (0.019)
Age		
25 to 34	0.044 (0.030)	0.045 (0.030)
35 to 44	**0.083 (0.038)**	**0.081 (0.038)**
45 to 54	**0.142 (0.050)**	**0.133 (0.047)**
55 to 64	**0.374 (0.089)**	**0.341 (0.077)**
Fair or Poor Health Status	-0.004 (0.037)	-0.012 (0.034)
Male	-0.035 (0.020)	-0.033 (0.019)
Black	**-0.088 (0.016)**	**-0.088 (0.016)**
Hispanic	**-0.106 (0.017)**	**-0.106 (0.017)**
Education		
High school graduate	0.044 (0.032)	0.043 (0.032)
Some college	**0.104 (0.035)**	**0.102 (0.035)**
College degree	**0.178 (0.050)**	**0.173 (0.049)**
Metropolitan Statistical Area	0.024 (0.018)	0.025 (0.018)
Region		
South	-0.028 (0.025)	-0.026 (0.025)
West	-0.030 (0.025)	-0.027 (0.025)
Midwest	0.013 (0.028)	0.016 (0.028)
Employer's "Waiting Period"	**-0.090 (0.018)**	**-0.088 (0.019)**
Self-Employed	**0.073 (0.025)**	**0.080 (0.024)**
Number of Observations	1,718	1,718
Log Likelihood	-607.7	-607.5
Pseudo R squared[b]	0.206	0.206

Source: Congressional Budget Office based on regression analysis as described in the text.

Notes: Marginal effects are reported. Results are interpretable as the percentage point increase in likelihood of nongroup coverage per unit change in the independent variable, evaluated at the mean of all independent variables simultaneously. Robust standard errors are in parentheses.

Bold indicates statistical significance at 95 percent confidence ($p < 0.05$).

a. Poverty levels are based on U.S. Department of Health and Human Services, *The 2002 HHS Poverty Guidelines.*

b. Indicates the explanatory power of the independent variables, in the aggregate.

Table 5.

Elasticity Results

Sample	Elasticity
Full Sample	**-0.566 (0.220)**
Less than Twice the Federal Poverty Level[a]	**-0.843 (0.295)**
Fair or Poor Health Status	-0.394 (0.312)

Source: Congressional Budget Office based on regression analysis and simulations as described in the text.

Notes: Robust standard errors are in parentheses. Elasticity is calculated over the sample means.

Bold indicates statistical significance at 95 percent confidence ($p < 0.05$).

a. Poverty levels are based on U.S. Department of Health and Human Services, *The 2002 HHS Poverty Guidelines.*

or smaller, but a direct comparison of those elasticity figures may be misleading. First, the result is for single individuals, whereas Marquis and Long investigate the elasticity of families. Elasticities may differ among those groups for many reasons. Gruber and Poterba (1994) find greater price elasticity for singles than for families in each of their specifications. They argue that spouses have a larger set of alternative insurance options, which makes them less responsive to price. Although one could attempt to isolate families in which no other member has another insurance option, it is unknown whether families make insurance choices as a unit or for individual members only (Chernew and others, 1997).

A more mechanical reason elasticity comparisons may be misleading among studies is that samples vary in the initial percentage covered. If a 10 percent price decrease leads to a coverage increase from 10 percent of the initial sample to 20 percent in sample A, but from 40 percent to 50 percent in sample B, the elasticity would be four times as large in sample A.[25] A more policy-relevant statistic to compare among studies may be the percentage of the remaining *uninsured* that would take up coverage for a given price decrease, or a "take-up" elasticity. That is,

$$\varepsilon_t = \frac{\left[\left(\frac{U_f - U_i}{U_i}\right)\right]}{S}$$

where U_f is the final uninsured rate, U_i is the initial uninsured rate (U_f and U_i also can be the total number of uninsured rather than percentages), and S is the subsidy rate. To compute the effect of a premium change on the uninsured on the basis of the characteristics of the SIPP population sampled, simulations are performed in which the premium is reduced by various amounts, and the new coverage rate under each scenario is predicted (see Table 6).[26]

25. Note that the semi-elasticity, or the *percentage point* increase, in coverage divided by the percentage change in premium would be the same in each case. The semi-elasticity would also be a useful metric by which to compare elasticity estimates among studies, although it is not as readily translated into a useful statistic for policy as is a take-up elasticity.

26. The take-up elasticity also could be approximated simply from the elasticity and the initial percentage covered (-0.57*(0.16/(1-0.16)), or 0.11, but that calculation misses important interactive effects of individual covariates resulting from the nonlinear model specification.

Table 6.

Simulation Results

Subsidy Simulations	Take-up Elasticity	Take-up (Percent)
Baseline—No Subsidy	-	16.3
25 Percent Subsidy	-0.080	18.0
50 Percent Subsidy	-0.084	19.8

Source: Congressional Budget Office based on regression analysis and simulations as described in the text.

Note: Take-up elasticity is based on individual-level simulations of premium changes.

The results indicate a take-up elasticity of roughly -0.084; under a 50 percent subsidy, the percentage of our sample with nongroup coverage would rise from 16.3 percent to 19.8 percent, corresponding to a 4.2 percent reduction in the uninsured (-.042/.5 = -.084). Although our results are for singles rather than families, they are within the range of simulation results of Marquis and others (2004), who estimate that a 50 percent premium reduction would raise family coverage rates in California from an initial 23 percent by either 3 or 6 percentage points (depending on the sample used), implying a take-up elasticity of between -0.08 and -0.16. The implied take-up elasticities for families from Marquis and Long (1995) are higher, falling between -0.29 and -0.34, depending on the survey used. However, those larger estimates may partly reflect the much higher overall coverage rates observed in the late 1980s.[27]

Gruber and Poterba's research (1994) on the self-employed implies a take-up elasticity larger than -0.5, but Blumberg and others (2001) argue that this subpopulation may be considerably different from those who are not self-employed.[28]

Generally, our findings are consistent with earlier empirical investigations (Gruber, 2004; Marquis and others, 2004; and Marquis and Long, 1995), which conclude that modest subsidies for nongroup coverage would have a small effect on the uninsurance rate. The larger elasticity we find among those whose incomes are below 200 percent of the federal poverty line actually translates to similar take-up elasticity as that of the full sample because there is a lower initial coverage rate for those whose incomes are below 200 percent of the poverty line (11 percent versus 23 percent for those whose incomes are above 200 percent of the poverty line). Marquis and others (2004), for example, also find a larger traditional elasticity among the poor but smaller take-up elasticity. The poor may have a dampened response to subsidies because of the availability of free care and because of liquidity constraints (Glied and others, 2002). The smaller elasticity we observe among the less-healthy relative to the more-healthy translates to an even smaller take-up elasticity among this group, who are less likely to have nongroup coverage in the observed sample (see Table 5). Attachment to specific providers of care could explain that lack of sensitivity to prices.

Blumberg and others (2001) showed that, in the case of employer-sponsored insurance, using imputed versus actual offered premiums resulted in larger elasticity estimates, which suggests that our estimates may be too large overall. On the other hand, one researcher used a theoret-

27. The rate of nongroup coverage in the U.S. non-elderly population was roughly twice as high in 1990 as in 2000 (Buntin and others, 2004; and LoSasso and Lurie, 2005).

28. In our sample, the self-employed are three times as likely as their counterparts to have nongroup coverage.

ical model based on estimates of risk aversion and reservation prices combined with data from the MEPS to estimate a much larger response to subsidies for nongroup coverage (Pauly and Herring, 2001) than is found in the empirically based studies. Although it is difficult to assess whether the empirical studies' or the theoretical study's results are closer to what would happen under a government subsidy, our result represents a similar response to what has been observed in a small-scale experience with tax credits currently under way. The Trade Act of 2002 provided a Health Coverage Tax Credit (HCTC) valued at 65 percent of the premium for a nongroup policy to some workers displaced by foreign competition. Dorn and others (2005) find that overall take-up rates among those who are eligible have been roughly 6 percent thus far, implying a take-up elasticity of -.09.

Conclusion

Use of a recent, national sample of individual workers without access to employer-sponsored insurance, along with a new source of exogenous premium variation, produces an elasticity of take-up with respect to premiums that is at the low end of the range of the few existing estimates. Given the relatively low initial coverage rate in our sample, our traditional elasticity estimate of -0.57 indicates that modest premium subsidies in the nongroup market would have a small potential impact on reducing the ranks of the uninsured.

That estimate helps inform our modeling of changes in the health insurance market, such as subsidies or regulation changes, which may affect or interact with nongroup premiums. In most scenarios, however, especially those involving very large subsidies that would induce premium changes outside of the range of premium variation observed in this study, CBO also brings to bear other evidence such as that of take-up rates of public programs.

Appendix:
State Restrictions and Prevailing Practices Regarding Underwriting of Nongroup Insurance

Appendix Table 1 summarizes state practices with regard to underwriting of nongroup insurance—for example, "3 to 1" in the Health column means that an insurer may not set a premium for its sickest enrollees that is more than three times the premium for its healthiest enrollees (of the same age and gender) for a given product. In most cases, those ratios approximate limits set by law, but in a few, the limits reflect prevailing practices in 2002.

Appendix Table 1.

Summary of Underwriting Restrictions by State, 2002

State	Rating Restrictions		High-Risk Pool
	Health	Age	
Alabama	None	None	Yes
Alaska	None	None	Yes
Arizona	None	None	No
Arkansas	None	None	Yes
California	None	None	Yes
Colorado	None	None	Yes
Connecticut	None	None	Yes
Delaware	None	None	No
District of Columbia	None	None	No
Florida	None	None	No[a]
Georgia	None	None	No
Hawaii[b]	1.5 to 1	1.5 to 1	No
Idaho	3 to 1	None	No
Illinois	None	None	Yes
Indiana	None	None	Yes
Iowa	2 to 1	None	Yes
Kansas	None	None	Yes
Kentucky	2 to 1	2 to 1	No
Louisiana	None	None	Yes
Maine	CR	1.5 to 1	No
Maryland	None	None	No
Massachusetts	CR	2 to 1	No
Michigan[b]	1.5 to 1	1.5 to 1	No
Minnesota	1.66 to 1	3 to 1	Yes
Mississippi	None	None	Yes
Missouri	None	None	Yes
Montana	None	None	Yes
Nebraska	None	None	Yes
Nevada	3 to 1	None	No
New Hampshire[c]	1.2 to 1	3 to 1	No
New Jersey	CR	CR	No
New Mexico[d]	2 to 1	None	Yes
New York	CR	CR	No
North Carolina	None	None	No
North Dakota	None	2 to 1	Yes
Ohio[e]	2 to 1	3 to 1	No
Oklahoma[e]	2 to 1	3 to 1	Yes
Oregon	CR	None	Yes

Continued

Appendix Table 1.

Continued

State	Rating Restrictions		High-Risk Pool
	Health	Age	
Pennsylvania[b]	1.5 to 1	1.5 to 1	No
Rhode Island	None	None	No
South Carolina	None	None	Yes
South Dakota	2 to 1	2 to 1	No
Tennessee	None	None	No
Texas	None	None	Yes
Utah	2 to 1	None	Yes
Vermont	CR	CR	No
Virginia	None	None	No
Washington[f]	1.2 to 1	2 to 1	Yes
West Virginia	None	None	No
Wyoming	None	None	Yes

Source: Congressional Budget Office based primarily on compilations of data from the Georgetown Health Policy Center and the National Association of Health Underwriters.

Note: CR = pure community rating.

a. Florida's high-risk pool was not accepting new enrollees at the time of this survey.

b. These states are served by a dominant insurer (Blue Cross/Blue Shield in Michigan and Pennsylvania) that uses pure community rating in practice.

c. Rating bands assigned based on the Robert Wood Johnson Foundation (2004).

d. Georgetown (2004) indicates rate bands whereas the National Association for Health Underwriters (2004) does not. Different assignments in this case do not affect results substantially.

e. State has rating restrictions that govern only some products (such as health maintenance organizations).

f. State uses community rating, but individuals who fail a health screening may be denied coverage and recommended to the high-risk pool. Some limits also appear to exist on age rating.

References

Blumberg, Linda, Len Nichols, and Jessica Banthin. 2001. "Worker Decisions to Purchase Health Insurance." *International Journal of Health Care Finance and Economics*, vol. 1, no. 3-4, pp. 305-325.

Buchmueller, Thomas, and John DiNardo. 2002. "Did Community Rating Induce an Adverse Selection Death Spiral? Evidence from New York, Pennsylvania, and Connecticut." *American Economic Review*, vol. 92, no.1, pp. 280-294.

Buntin, Melinda Beeuwkes, M. Susan Marquis, and Jill M.Yegian. 2004. "The Role of the Individual Health Insurance Market and Prospects for Change." *Health Affairs*, vol. 23, no. 6, pp. 79-90.

Chernew, Michael, Kevin Frick, and Catherine McLaughlin. 1997. "The Demand for Health Insurance Coverage by Low-Income Workers: Can Reduced Premiums Achieve Full Coverage?" *Health Services Research*, vol. 32, no. 4, pp. 453-470.

Dorn, Stan, Tanya Alteras, and Jack Meyer. 2005. *Early Implementation of the Health Coverage Tax Credit in Maryland, Michigan, and North Carolina: A Case Study Summary.* The Commonwealth Fund. April. Available at http://www.cmwf.org/usr_doc/806_dorn_earlyimplementationhct.pdf.

Frakt, Austin B., Steven D. Pizer, and Marian W. Wrobel. 2004-2005. "High Risk Pools for Uninsurable Individuals: Recent Growth, Future Prospects." *Health Care Financing Review*, vol. 26, no. 2, pp. 73-87.

Glied, Sherry, Dahlia K. Remler, and Joshua Graff Zivin. 2002. "Inside the Sausage Factory: Improving Estimates of the Effects of Health Insurance Expansion Proposals." *The Milbank Quarterly*, vol. 80, no. 4, pp. 1-21.

Glied, Sherry, and Sarah Little. 2003. *The Price of Health Insurance: Modeling Premiums in Models of Insurance Expansions.* Paper presented at an Academy Health conference on "Determinants of Premiums in the Individual Market." November 12. Washington, D.C.: Robert Wood Johnson Foundation.

Gruber, Jonathan. 2004. *Tax Policy for Health Insurance.* National Bureau of Economic Research Working Paper No. 10977. December. Available at http://www.nber.org/papers/w10977.

Gruber, Jonathan, and James Poterba. 1994. "Tax Incentives and the Decision to Purchase Health Insurance: Evidence from the Self-Employed." *Quarterly Journal of Economics*, vol. 109, no. 3, pp. 701-733.

Kaiser Family Foundation. 2004. *Employer Health Benefits 2004 Annual Survey.* Kaiser Family Foundation and Health Research and Education Trust. September. Available at http://www.kff.org/insurance/7148/index.cfm, exhibit 2.3.

LoSasso, Anthony T., and Ithai Lurie. 2005. *Community Rating and the Market for Private Nongroup Health Insurance.* Forthcoming.

Marquis, M. Susan, and others. 2004. "Subsidies and the Demand for Individual Health Insurance in California." *Health Services Research*, vol. 39, no. 5, pp. 1547-1570.

Marquis, M. Susan, and Stephen H. Long. 1995. "Worker Demand for Health Insurance in the Nongroup Market." *Journal of Health Economics*, vol. 14, no.1, pp. 47-63.

McClellan, Mark, and Katherine Baicker. 2002. "Reducing Uninsurance Through the Nongroup Market: Health Insurance Credits and Purchasing Groups." *Health Affairs*, Web exclusive. W363-6. October 23. Available at http://content.healthaffairs.org/cgi/reprint/hlthaff.w2.363v1.

Merlis, Mark. 2005. *Fundamentals of Underwriting in the Nongroup Health Insurance Market: Access to Coverage and Options for Reform.* National Health Policy Forum background paper. April. Available at http://www.nhpf.org/pdfs_bp/BP_Underwriting_04-13-05.pdf.

National Association of Health Underwriters. 2004. *A Comparison of Individual Market Health Insurance Costs and Individual Health Insurance Market Regulatory Factors for a Low-Income Family Across the United States.* June. Available at http://www.nahu.org/government/Charts/individual%20health%20insurance%20rates%20june%202005.pdf.

Nichols, Len. 1999. *Regulating Nongroup Health Insurance Markets: What Have We Learned So Far?* Paper presented at an Alpha Center conference on "The Evolution of the Individual Insurance Market: Now and In the Future." January 20. Washington, D.C.: Robert Wood Johnson Foundation.

Office of Management and Budget. 2005. *Department of Health and Human Services' FY06 Budget Priorities*. Available at http://www.whitehouse.gov/omb/budget/fy2006/hhs.html.

Pauly, Mark, and Bradley Herring. 2001. "Expanding Coverage Via Tax Credits: Trade-Offs and Options." *Health Affairs*, vol. 20, no. 1, pp. 9-26.

Pauly, Mark, and Len Nichols. 2002. "The Nongroup Insurance Market: Short on Facts, Long on Opinion and Policy Disputes." *Health Affairs* Web exclusive. October 23. Available at http://content.healthaffairs.org/cgi/reprint/hlthaff.w2.325v1.

Pollitz, Karen, Richard Sorian, and Kathy Thomas. 2001. *How Accessible is Individual Health Insurance for Consumers in Less-than-Perfect Health?* Menlo Park, Calif.: Kaiser Family Foundation. June. Available at http://www.kff.org/insurance/3133-index.cfm.

Robert Wood Johnson Foundation. 2004. *Expanding the Individual Health Insurance Market: Lessons from the State Reforms of the 1990s.* Research synthesis report No. 4. June. Available at http://www.rwjf.org/publications/synthesis/reports_and_briefs/issue4.html.

Turnbull, Nancy, and Nancy Kane. 2005. *Insuring the Healthy or Insuring the Sick: The Dilemma of Regulating the Individual Health Insurance Market.* Commonwealth Fund study # 771. New York: The Commonwealth Fund. Available at http://www.cmwf.org/usr_doc/771_Turnbull_insuring_healthy_or_sick_findings.pdf.

U.S. General Accounting Office (GAO). 1996. *Private Health Insurance: Millions Relying on Individual Market Face Cost and Coverage Trade-Offs.* GAO/HEHS-97-8. November.