Subsidies and the Demand for Individual Health Insurance in California

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Objective. To estimate the effect of changes in premiums for individual insurance on decisions to purchase individual insurance and how this price response varies among subgroups of the population.

Data Source. Survey responses from the Current Population Survey (www.bls.census.gov/cps/cpsmain.htm), the Survey of Income and Program Participation (www.sipp.census.gov/sipp), the National Health Interview Survey (www.cdc.gov/nchs/nhis.htm), and data about premiums and plans offered in the individual insurance market in California, 1996–2001.

Study Design. A logit model was used to estimate the decisions to purchase individual insurance by families without access to group insurance. This was modeled as a function of premiums, controlling for family characteristics and other characteristics of the market. A multinomial model was used to estimate the choice between group coverage, individual coverage, and remaining uninsured for workers offered group coverage as a function of premiums for individual insurance and out-of-pocket costs of group coverage.

Principal Findings. The elasticity of demand for individual insurance by those without access to group insurance is about $-.2$ to $-.4$, as has been found in earlier studies. However, there are substantial differences in price responses among subgroups with low-income, young, and self-employed families showing the greatest response. Among workers offered group insurance, a decrease in individual premiums has very small effects on the choice to purchase individual coverage versus group coverage.

Conclusions. Subsidy programs may make insurance more affordable for some families, but even sizeable subsidies are unlikely to solve the problem of the uninsured. We do not find evidence that subsidies to individual insurance will produce an unraveling of the employer-based health insurance system.

Key Words. Demand for health insurance, safety net, tax credits

More than 40 million Americans are uninsured. Policymakers and analysts widely agree that low incomes and high premiums are a primary cause. Thus, most proposals for reform include subsidies or public program expansions to reduce these barriers (e.g., Pauly 2001; Davis and Schoen 2003). The Bush administration proposed a new tax credit for those who do not have access

to employer-sponsored insurance, which received broad political support (Cunningham 2002b). Because the tax system subsidizes the purchase of employer group coverage, some analysts argue that providing tax subsidies to those who are not offered group plans is an equitable approach to reducing the problem of the uninsured (Kendall 2000; Butler 1999; Pauly and Hoff 2002).

However, others believe that tax credits may lead to an unraveling of the employment-based system for health insurance that could lead to a reduction in overall coverage (Aaron 1999). This would occur if employees found they were better off purchasing in the individual market and dropped their employer plan. Employers' decisions to offer insurance may also be affected if healthy members leaving the group leads to an increase in premiums or an inability to meet group size requirements.

Central to designing a tax credit is information about how a change in the price of individual insurance will affect decisions to purchase it. We need information about the price response and how it varies for different subgroups to determine the necessary size of the tax credit. We also need this information to determine how many workers covered by group plans might switch to the individual market to assess the effects of a tax credit on the employment-based system. Despite the considerable recent interest in tax subsidies and credits, there is relatively little empirical evidence about the price elasticity of demand for individual insurance. Our goal is to help fill this information gap.

Previous Literature

Few studies have specifically examined the effect of price on demand for individual insurance. Estimating this response is hampered by the difficulty in obtaining an appropriate price measure. In the individual market, prices are often based on the individual's characteristics, and so the premium paid by an individual is endogenous (Blumberg and Nichols 2001). Second, a measure of price is often unavailable for those who did not purchase insurance.

Previous studies, summarized in Table 1, have used a variety of approaches to overcome these difficulties. These approaches include: linking a price list

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Table 1: Price Elasticity of Demand for Individual Insurance, Results from the Literature

Study	*Source of Price Variation*	*Population*	*Elasticity of Participation*
Marquis and Long, 1995	Insurer price schedule	Working families without group plan	
Families below 200% poverty			− 0.3 to − 0.6
Families above 200% poverty			− 0.3 to − 0.5
Marquis and Buchanan 1992	Hypothetical offers	All families	− 0.5
Pauly and Herring 2001(a)	Estimated reservation price	Working families	− 0.3 to − 0.4
Long and Marquis 2002	Public subsidy schedule	Low-income persons	− 0.3 to − 0.7
Gruber and Poterba 1994	Tax policy change	Self-employed families	
All			− 0.5 to − 1.0
Single persons			− 1.7 to − 6.0
Married persons			− 0.0 to − 0.8

(a) Based on estimates for a proportional credit and an assumed high disutility for bad debt and charity care.

from a major insurer in the individual market to individuals based on residence, age, and gender (Marquis and Long 1995); responses to hypothetical insurance offers (Marquis and Buchanan 1992); reservation prices based on expected health care spending (Pauly and Herring 2001), and a sliding scale subsidy schedule from the Washington State Basic Health Plan (Long and Marquis 2002). Gruber and Poterba (1994) use the Tax Reform Act of 1986 (PL99–514), which reduced the after-tax price of individual insurance for the self-employed, to measure the price response. Their estimates are sensitive to the specification, but suggest a somewhat greater demand response than found in the other studies.

Several analyses that simulate the effects of tax credits make implicit behavioral assumptions about how employees' decisions to participate in a group plan will be altered by reductions in the price of individual insurance. The simulations suggest that even fairly substantial credits of $1,000 for an individual and $2,000 for families would induce fewer than 5 percent of employees to switch to the individual market (Gruber 2000; Blumberg et. al. 2002). However, we are not aware of any studies that explicitly model how employee decisions about enrolling in an employer group plan are affected by the price of individual insurance.

Estimates of price response from the existing literature are often restricted to certain population groups, such as the self-employed or workers, and not to the full population that may be affected by tax credits. Moreover, heterogeneity in price response may be important in predicting the effectiveness of alternative credits and distributional consequences. Some of the studies, as noted in Table 1, explore differences by income or by marital status. But they seldom explore interactions between price and many of the other variables believed to be important. Our objective is to add to the existing literature by estimating the price elasticity of demand for individual coverage among persons in a market who lack access to group insurance, examining switching behavior of those with group insurance, and exploring heterogeneity in these responses.

Data And Methods

Data

Our study focuses on decisions about participation in the individual insurance market by people in California. We limit it to a single state because cooperation from insurers was necessary to obtain detailed information about the benefits and premiums of plans offered. We need to observe decisions among consumers who face different premiums and different options in order to estimate how decisions are affected by these characteristics. Therefore, California is a good state for our study because it is a large state with in-state variation in premiums charged. In addition, changes in the products offered over time, including a revision in the slate of products offered by one participating plan in January 2001, produced variation over time in the premiums facing consumers as well as the extent of choice in the market.

California accounts for nearly 15 percent of all individual insurance products sold. It is also quite competitive; a recent study of markets in 26 states found the California market to be less concentrated than all other states although three carriers account for most individual products sold (Chollet, Kirk, and Ermann 1997). If policies are adopted that lead to a growth in the size of the individual market, markets elsewhere may well become more competitive. Thus the California experience is a good one to study, even if the results currently do not generalize to markets that are now less competitive.

The data for our study come from several sources: the Current Population Survey (CPS) for 1996–2002, the Survey of Income and Program Participation (SIPP) for 1996–1999, the National Health Interview Survey (NHIS)

for 1997–2001, the 1997 Robert Wood Johnson Foundation (RWJF) Employer Health Insurance Survey, data from the three largest carriers selling individual insurance in California, and a number of extant databases that provide information about health care markets in California.

The CPS is a monthly survey of about 50,000 households conducted by the Bureau of the Census for the Bureau of Labor Statistics. A supplement to the CPS administered in March of each year includes questions on health insurance coverage for each family member. The NHIS is a cross-sectional household interview survey conducted by the National Center for Health Statistics to monitor trends in the nation's health. The SIPP is a longitudinal survey conducted by the Bureau of the Census to gather information about the economic and demographic characteristics of the U.S. population. The 1996 panel was a four-year panel. We selected these surveys because they provide information over time, they include a large sample in California, and they measure insurance coverage.

The study team abstracted detailed benefit and premium information about all individual and family health insurance products offered by the three participating carriers over the 1996 to 2002 period using brochures and other documents provided by carriers. About 80 percent of subscribers in the individual market in California enroll in one of the products included in the study. The Actuarial Research Corporation (ARC) used the abstracted data to develop measures of the actuarial value of each plan by simulating what each insurance product would pay for the health care services incurred by each person in a standardized population.[1] The premium data were linked to respondents in the surveys based on the age of the person, time, and the county of residence.

We used the 1997 RWJF Employer Health Insurance survey to measure the price of group coverage for workers offered insurance. We hypothesize that workers will be more likely to purchase individual insurance the lower the price of doing so and the higher the out-of-pocket price of group coverage. To measure the price of group coverage, we synthetically linked workers to business establishments in California that were included in the sample for the RWJF Employer Health Insurance Survey; there were 2,016 California employers in the survey and 1,285 of them offered insurance. The employer survey provides information about industry, group size, and the wage composition of the workforce, as well as information about the premium for insurance, the employee share of that premium, and the actuarial value of the insurance benefits.[2] The CPS, NHIS, and SIPP data provided information about the worker's industry, group size, and wages. We linked workers offered

insurance to businesses that offer it based on the two known characteristics in each dataset—industry and group size—and the probability of belonging to a firm with more or less than two-thirds of employees with an hourly wage below $10 given the individual's wage. The linked data then provided simulated information about the out of-pocket price facing the worker for group coverage.

The identification of whether the worker was offered coverage differed across datasets. The NHIS measures the worker's specific eligibility for coverage. The SIPP and CPS measure is whether the worker is in a business that offers insurance to at least some workers. Workers reporting having insurance through their own group plan were designated as working for an employer offering insurance. The SIPP asks whether the employer offers health insurance coverage in a topical module administered during one wave of the panel. If the worker held this same job at the March cross-section snapshot, the response to the question in the topical module identifies workers in companies that offer insurance. For other workers in the SIPP, and for all workers in the CPS not taking up insurance, we synthetically linked the worker to an employer in the RWJF survey as described above using the pool of all employers and determined if this employer offered insurance.[3]

Premiums for individual coverage and for group plans are adjusted for the actuarial value of benefits. We adjust for the price of medical care in the area, so the premiums measure price per unit of benefit. Premiums are also measured relative to the price of all other goods and services, since economic theory suggests that demand depends on this relative price. The price of medical care is based on the Medicare geographic practice cost index (for cross-section variation) adjusted by the consumer price index for Los Angeles over time.[4] The cost of other goods and services is based on wages (for cross-section variation) adjusted by the consumer price index for Los Angeles over time. The cross-section wage index was based on occupational employment statistics collected by the Bureau of Labor Statistics.[5] Premiums for individual coverage are measured as after-tax prices by taking into account the deductibility of some share of the premium for the self-employed. Marginal tax rates for each family were estimated using the National Bureau of Economic Research TAXSIM model (Feenberg and Coutts 1993).

In addition to premiums, we explored the effect of two other measures describing the plans available in the individual insurance market on consumer participation decisions. These were the number of different plans and the variability in the actuarial value of benefits. These characteristics, however, only vary over time and so may reflect time effects.

We also included a measure of the safety net in the county of residence to see whether the availability of a strong safety net crowds out insurance and leads to an increase in the uninsured. The safety net index was based on four characteristics: the dollar amount of local government spending for health and hospital care; admissions to safety net hospitals; visits to the outpatient departments and emergency rooms of safety net hospitals; and visits to community health centers. Each measure is relative to the population with income below 100 percent of poverty in the county, and varies from year to year. Admission and ambulatory visits to safety net hospitals—including public hospitals and teaching hospitals—are derived from the American Hospital Association Annual Survey. Local government spending for health and hospitals for the year 1997 comes from the Census of Governments. For the other years, the measure is based on the Census Bureau's Annual Survey of State and Local Government Finances.[6] Visits to community health centers come from the Uniform Data System maintained by the Bureau of Primary Health Care (BPHC) of the Health Resources and Services Administration (HRSA). Our index of safety net resources assigns each county a score of 1 to 4 on each characteristic in each year based on cut-off values defined by the quartiles of the characteristic in 1998 period. We summed the scores over all four measures in each year for each county to obtain our summary index, which ranges from 4 to 16. We also fit models with each of the four characteristics entered as separate measures of the safety net.

Methods

Our analysis looks at the decision to purchase individual insurance by families that do not have access to group insurance and the decision to purchase group insurance, individual insurance, or remain uninsured by workers who are offered group coverage. Families are defined to include a person, his or her spouse, and their children age 18 or younger, or under 23 if the child is a student. A family has access to group coverage if either the head or spouse has access. We exclude from our analyses those who are on public coverage.[7] Table 2 shows the size of the samples used in each analysis.

A key methodological issue for our analysis was how to define the offer price of individual insurance among the set of all possible prices. We tried several approaches. One approach randomly selected an actuarially adjusted premium from among the individual products that were available to the person with probability equal to the rate of enrollment among new enrollees. For those who choose to be uninsured, the expected utility of any plan is lower

Table 2: Sample Sizes for Decision Models

		Number of Cases			
		Census Data			
Decision	*Sample*	*Total*	*CPS, 1996–2002*	*SIPP, 1996–1999*	*NHIS, 1997–2001*
Purchase individual insurance vs. uninsured	Families without access to group plan	12,603	8,910	3,693	11,154
Group insurance vs. individual insurance vs. uninsured	Workers with access to group coverage	33,873	22,957	10,916	16,857

than the expected utility of being uninsured. For the insured, the utility of the chosen plan is superior to being uninsured. Though we do not know the specific plan selected, by using enrollment weights to select the plan we are using the expected plan chosen. Furthermore, with high search costs, an individual may base their decision to purchase based on the first bit of information they receive (the random plan); if that bit yielded a purchase decision, the person might then engage in some more search.

As an alternative, we looked at the actuarially adjusted minimum premium among the available plans.[8] With complete search, or low search costs, we expect the person will search until they find a plan that is priced lower than the reservation price, or they determine there is not one. Thus, we think the minimum premium among actuarially equivalent plans is relevant in a model with full information, and is closer to the uninsured reservation price. In practice, the two approaches gave similar results, though we obtained somewhat higher price responses based on the minimum price specification. We will focus on the results from that specification.

As noted earlier, actual prices paid are inherently endogenous. The benefit package offered to a potential subscriber is endogenous as well, because insurers may choose not to sell some or all policies to subscribers. To capture the linkages among these endogenous variables would require a structural system of equations for the price offered, the benefits offered, and the decision to purchase (Blumberg and Nichols 2001). However, we do not have variables that identify offers and prices and describe insurer practices but not individual demand preferences.

Our empirical solution, which is the one typically adopted in the literature, is to use a premium and benefit package that is exogenous to the individual purchaser; it is based on an expected or minimum price for a standardized benefit package for similar purchasers given residence, age, and time. This solution should produce unbiased estimates of the price response if the assumption that these prices are exogenous is valid. However, we acknowledge that price variation across areas may be endogenous if high demand for coverage leads to higher prices, which may bias our estimates.

Offer premiums also may vary by health status; insurers set different prices depending on the health status of applicants and, in some cases, may refuse to accept applicants for coverage. Poor health status can lead to a markup of the premium, and this markup is not in our empirical measure. Pauly and Nichols (2002) report data on actual premium offers to prospective buyers that suggest the majority of potential purchasers in the individual insurance market can obtain coverage at moderate premiums. Moreover, the participating carriers provided us information about the pricing tier for actual enrollees—and the vast majority of enrollees pay the base price for coverage. This suggests that many potential purchasers can find coverage at the base price for a policy. Nonetheless, it is possible that those who do not purchase are offered higher-tiered prices. For these individuals, health status may be correlated with the difference between the actual offer price and our proxy measure. This could impart a bias to our estimation of price response. To control for this, we include a measure for health status, and investigate whether there are interactions between our estimates of price response and health status to account for a dependence of premium offers on health. For these analyses of participation, we use the price that the subscriber would face in choosing to enroll. This is the price for a single subscriber, given the age of the subscriber.

We fit a logit model to explore factors affecting the decision to purchase individual coverage by those without access to group coverage, and a multinomial logit model of choices made by workers offered group insurance. In addition to prices, other variables in each model included: indicators for year, indicators for the type of family (single person, couple, family is omitted category), indicators for age of subscriber (25–34, 35–44, 45–54, 55–64, under 25 omitted), indicator if self-employed, log of the poverty ratio (family income relative to the federal poverty standard), health status of the subscriber (very good, good, fair or poor, excellent is omitted), an indicator if the subscriber is disabled, indicators for education (less than high school, high school, some college, college degree or more is omitted) and indicators for race/ethnicity (white Hispanic, black, Asian/other, white non-Hispanic is omitted), our

measures of the safety net, the number of individual insurance plans and the variability in benefits. In the model of the family decision to purchase individual coverage we also included an indicator of whether any other family member was in fair or poor health and an indicator if anyone in the family had public insurance. We explored interactions of premiums with poverty status, self-employment status, age, health status, and whether the price response depended on the level of premiums. Our test statistics take into account correlation over time in decisions of one family in the SIPP. (Since our SIPP data are four cross-sections taken from a panel survey, some families will appear in the analytic samples in multiple cross-sections.)

We required information on county of residence to construct the price variables, which is not available on the public use files. To merge in the price data by county, we were required to access restricted files at the data centers for the National Center for Health Statistics and the Census. This restriction means that we cannot pool the data for estimation. In our analysis we pooled the SIPP and CPS data available at the Census data center. We tested whether the estimated responses to prices and other variables varied between the datasets. We fit separate models for the NHIS data, and tested whether selected important coefficients differed from the point estimates obtained from analyzing the Census databases.

RESULTS

Purchase of Individual Coverage by Families Not Offered Group Plan

Price Elasticity. Estimates of the price elasticity of demand for individual insurance by families in California who do not have access to group coverage are given in Table 3.[9] (The parameter estimates and their standard errors are shown in online-only Appendix Table 1 [see www.blackwell-synergy.com]). Our overall elasticity estimate of -0.2 to -0.4 is similar to those found in earlier studies. But we find significant differences in the price elasticities between younger and older families ($\chi^2(1) = 4.2$, $p < .05$ in Census data, $\chi^2(1) = 10.7$, $p < .05$ in NHIS data), the self-employed and others ($\chi^2(1) = 2.9$, $p < .10$ in Census data, $\chi^2(1) = 3.3$, $p < .10$ in NHIS data), and by poverty group($\chi^2(2) = 117.03$, $p < .05$ in Census data, $\chi^2(2) = 136.81$, $p < .05$ in NHIS data). The price elasticities and the income elasticity estimates did not differ significantly between the CPS and SIPP data ($\chi^2(7) = 4.8$, $p > .10$), so we present the pooled estimate. The elasticity estimates for some of the subgroups were statistically higher from the NHIS data than the point

Table 3: Price Elasiticities of Demand for Individual Coverage by Families without Access to Group Insurance

	Census Data Estimates		*NHIS Data Estimates*		
Group	*Semi-elasticity (a)*	*Elasticity (b)*	*Semi-elasticity (a)*	*Elasticity (b)*	*% of Study Population (c)*
Poor: Family income below 200 percent poverty					
Under age 35, self-employed	−0.141	−0.706*	−0.243	−1.214*	1.7
Under age 35, not self-employed	−0.104	−0.521*	−0.205	−1.026*	32.3
Over age 35, self-employed	−0.059	−0.297**	−0.100	−0.498*	4.9
Over age 35, not self-employed	−0.022	−0.111	−0.062	−0.310	25.8
Middle-income: Family income 200–400 percent poverty					
Under age 35, self-employed	−0.162	−0.810*	−0.216	−1.082*	1.4
Under age 35, not self-employed	−0.125	−0.624*	−0.179	−0.893*	8.0
Over age 35, self-employed	−0.080	−0.400*	−0.073	−0.366*	4.2
Over age 35, not self-employed	−0.043	−0.214	−0.035	−0.177*	7.2
High income: Family income over 400 percent poverty					
Under age 35, self-employed	−0.126	−0.628*	−0.195	−0.975*	0.8
Under age 35, not self-employed	−0.088	−0.442*	−0.157	−0.786*	3.5
Over age 35, self-employed	−0.044	−0.218	−0.052	−0.259	5.1
Over age 35, not self-employed	−0.007	−0.033	−0.014	−0.070	5.1
Overall	−0.041	−0.203*	−0.088	−0.438*	100.0

(a) Percentage point change in probability for percent change in price, evaluated at overall participation rate of .2, the average participation rate in our data.

(b) Percent change in probability for percent change in price, evaluated at overall participation rate of .2.

(c) In 2001, from CPS and NHIS.

*Significantly different from 0, $p<.05$.

**Significantly different from 0, $p<.10$.

estimates made from the Census data, but the general pattern of results was very similar.[10]

We also explored whether price response differs when premiums are high or low. We found a statistically significant greater response when the minimum offer premium was less than $45 per month (the lowest quartile of the distribution of minimum actuarially adjusted offer premiums) than at higher premiums in all datasets. However, the effect was very small. The elasticities shown in Table 3 are estimates at higher premium levels; at lower premium levels, the overall elasticity increases from −.20 to −.25 in the Census data; the increase in the NHIS data is from −.44 to −.46 and was not statistically significant.

The implications of these results for alternative subsidy schemes are given in Table 4, which shows predicted purchase rates for California families without access to coverage and with the distribution of characteristics observed in the 2001 CPS. Even a fairly substantial subsidy of 50 percent to all persons would have limited effect on the number of families without access to group coverage that would purchase insurance, increasing purchase rates by about 4 to 6 percentage points.[11] Despite the finding of statistically greater price response among the poor and the young, who are more likely to be uninsured, the magnitude of the differences in the effect of subsidies among subgroups is quite small.

The table also demonstrates that there are substantial differences in purchase rates among different subgroups of the population. At current premiums, only about 12 percent of poor families that do not have access to group coverage and are not enrolled in public plans would purchase individual insurance, with almost 90 percent remaining uninsured.[12] Our predictions suggest that a 50 percent subsidy does not overcome the affordability problem. In contrast, more than 40 percent of nonpoor families purchase individual insurance at current premiums. Families with a family head over age 35 are about twice as likely to purchase individual insurance as younger families.

Other Factors. We find a statistically significant, but small, income elasticity of demand. Our income elasticity estimate of .03 (NHIS data) to .04 (Census data) is in the range found by most other studies; that range is about .01 to .15 (Marquis and Long 1995).[13] (The full set of parameter estimates and their standard errors are available in online-only Appendix Table 1 [see www.blackwell-synergy.com]).

The likelihood of purchasing individual insurance decreases with decreasing self-reported health status. There is a 10-percentage-point lower

Table 4: Purchase of Individual Insurance with Various Subsidy Schemes, 2001

	Census Model			*NHIS Model*		
Group	*Current Premiums*	*50% Subsidy to All*	*50% Subsidy to Poor*	*Current Premiums*	*50% Subsidy to All*	*50% Subsidy to Poor*
All families without access to group plan	23.4	26.4	25.4	23.4	29.2	26.7
Poor	12.2	15.0	15.0	12.1	17.5	17.5
Nonpoor	42.1	45.4	42.8	42.2	48.9	42.2
Self-employed	44.8	49.8	46.6	51.0	58.7	53.9
Not self-employed	17.6	20.1	19.7	15.9	21.3	19.4
Under age 35	14.1	17.2	16.5	14.7	23.9	20.1
Over age 35	30.9	33.8	32.6	30.3	33.6	32.1

Note: Predictions are to a population with characteristics observed in the 2001 CPS.

likelihood of purchasing coverage by potential subscribers in fair or poor health than by those in excellent health using the CPS data. The effect is somewhat smaller in the SIPP and NHIS data (7 percentage points).[14] This result would be consistent with underwriting in the individual market. However, in contrast, we find that families with a disabled head are more likely to purchase individual insurance; the difference ranges from 3 to 8 percentage points.[15] Pauly and Nichols (2002) report a similar result using data from the Community Tracking Survey; poor self-reported health status is associated with a lower likelihood of having individual insurance, but having a chronic illness is positively associated with it. They suggest that lack of health insurance may lower perceived health status, whereas chronic conditions are a better measure of health status at the time of the decision.

Higher education is consistently associated with an increased likelihood of purchasing coverage. Based on the Census data there is about a 22-percentage-point difference in the predicted probability of purchasing health insurance between a population with less than a high school education and a population with a college degree or more, whereas this difference is about 13 percentage points using the NHIS model.[16] Hispanics are 13 to 18 percentage points less likely to purchase coverage than white non-Hispanics; blacks are 7 to 12 percentage points less likely to purchase than whites.

We did not find evidence to support a hypothesis that the safety net crowds out the purchase of individual insurance. The index of the safety net

was not statistically significant in the Census data and was opposite in sign from the hypothesized crowd-out effect in the NHIS data. Interacting the safety net and income, we did not find evidence of crowd-out for persons with income below 200 percent of poverty in the Census data or the NHIS data. We also fit models that include the components of the index instead of the index itself. These were not significant in the Census data, but we found a small but statistically significant negative effect of the number of admissions to public hospitals in the NHIS data. The results implied that a 10 percent increase in the admissions to public hospitals in the county is associated with a 0.4 percentage point increase in the probability of being uninsured, or about a 2 percent increase in probability. However, the safety net may be endogenous; we would expect safety net providers to locate in areas with high uninsured populations. Other safety net components were not significant or were opposite in sign of the hypothesized crowd-out effect.

Indicators for year are statistically significant. We explored whether the time effects could be accounted for by differences in the nature of products in the individual insurance market offered over time. Specifically, we tested whether offer decisions are related to two measures of the extent of choice in the market: the number of products offered at the time and the variability among products offered in their actuarial value. These factors were not significant.

Purchase Decisions of Workers Offered Group Insurance

Individual Premium Elasticity. Changes in premiums for individual coverage have little effect on the choices of workers. The elasticities of demand with respect to changes in individual premiums are shown in Table 5.[17] Although small, the effect of premiums on choices was statistically significant in the census data. We also found a small, significant interaction between premiums and income in these data ($\chi^2(4) = 112.16$, $p < .05$). The elasticity of demand for individual coverage for workers with low and high income was $-.31$ versus $-.28$ for those with income between 200 and 400 percent of poverty.[18] Premiums were not statistically significant in explaining choices in the NHIS data. This result is somewhat surprising because of the difference in the measurement of the outcome, discussed earlier. In the NHIS data, we are measuring the effect of price on take-up among those eligible for coverage; in the Census data we are measuring the effect of price on take-up among those in businesses offering coverage. If eligibility status is not related to price, then we would expect the Census estimate to be slightly smaller than the NHIS

Table 5: Price Elasticities of Demand for Coverage by Workers with Group Offer for Change in Premium for Individual Coverage

	Census Data Estimates		*NHIS Data Estimates*	
	Semi-elasticity (a)	*Elasticity (b)*	*Semi-elasticity (a)*	*Elasticity (b)*
Poor: Family income below 200 percent poverty				
Individual coverage	− 0.007	− 0.310	0.000	0.017
Own group coverage	0.007	0.006	0.006	0.007
Uninsured	0.000	0.021	− 0.006	− 0.060
Middle-income: Family income 200–400 percent poverty				
Individual coverage	− 0.006	− 0.270	0.002	0.069
Own group coverage	− 0.009	− 0.013	− 0.011	− 0.012
Uninsured	0.015	0.155	0.009	0.084
High income: Family income over 400 percent poverty				
Individual coverage	− 0.001	− 0.313	− 0.001	− 0.034
Own group coverage	0.018	0.018	0.018	0.020
Uninsured	− 0.017	− 0.075	− 0.017	− 0.153

(a) Percentage point change in probaility for percent change in price, evaluated at overall participation rates of .023 individual coverageee, .867 group coverage, .11 uninsured.

(b) Percent change in probability given percent change in price, evaluated at overall participation rates.

estimate.[19] However, the overall conclusion of the estimation is that individual premiums have little effect on worker choices.

Table 6 presents these price responses by predicting choices of workers at current premiums and with a policy that provided a 50 percent subsidy for all workers. These predictions indicate that few workers would shift from the group market to the individual market.[20] Using the predictions from the census model, about 75,000 additional workers would purchase individual insurance in California and about 35,000 of these workers would drop group coverage they held.

Other Factors. The out-of-pocket premiums for self-only group coverage did not have a significant effect on choices.[21] The point estimate of the elasticity of demand for group coverage given a change in out-of-pocket premiums was $-.001$ in the Census data and $-.003$ in the NHIS data.[22] (The full multinomial logit model the standard errors of the parameter estimates are given in online-only Appendix Table 2 [see www.blackwell-synergy.com].) Our data include a large number of employees with a zero contribution

Table 6: Choices of Workers Offered Group Insurance under Various Subsidy Schemes, 2001

	Census Model		*NHIS Model*	
Group	*Current Premiums*	*50% Subsidy to All*	*Current Premiums*	*50% Subsidy to All*
All workers				
Individual coverage	2.9	3.6	2.2	2.3
Group coverage	80.9	80.6	88.4	88.5
Uninsured	16.2	15.8	9.4	9.3
Income below 200 percent poverty				
Individual coverage	1.8	2.3	2.5	2.4
Group coverage	56.3	58.1	76.6	77.7
Uninsured	41.9	39.6	20.9	19.9
Income 200–400 percent poverty				
Individual coverage	2.7	3.3	2.3	2.2
Group coverage	83.6	83.0	90.5	90.2
Uninsured	13.8	13.7	7.2	7.5
Income 400 percent poverty and up				
Individual coverage	3.6	4.5	1.9	2.0
Group coverage	92.0	90.8	95.2	94.8
Uninsured	4.4	4.7	2.9	3.2

Note: Predictions are to a population with characteristics observed in the 2001 CPS.

amount since about 50 percent of workers faced no direct out-of-pocket contribution for self-only coverage. We also fit our models using the contribution for family coverage as the measure of the cost of group coverage, but this variable also was not significantly related to choices.

Our result is similar to the $-.0025$ estimate obtained by Blumberg, Nichols, and Banthin (2001) using data from the MEPS, though their estimate was statistically significant. Chernew, Frick, and McLaughlin (1997) also found a small elasticity of take-up, but their estimate of $-.03$ is somewhat larger than what we obtained. Although our results are consistent with the literature, our imputation of the group premium may produce a downward bias in our estimate. Those who select individual coverage or who go uninsured might face higher group premiums than other employees with similar wages, or in a similar industry or group size. Our imputation does not take this selection into account because of data limitations.

Income is significantly related to worker choices. This is illustrated in Table 6, which shows that participation in a group coverage plan and purchase

of individual coverage increase with income, and the rate of uninsurance falls. The income elasticity of demand for individual coverage is .17 in the Census data and .09 in the NHIS data and the elasticity of demand for group coverage is .09 and .03, respectively. As discussed in the methods section, the identification of workers offered coverage differs between the Census data and the NHIS data; the former included workers in businesses that offer coverage whereas the NHIS data is likely to exclude those in businesses that offer insurance if the workers are ineligible. Ineligible workers in businesses offering insurance will encompass more low-income workers and we believe this is a factor in the somewhat higher income elasticity from the Census data.

Similar to the findings for those without a group offer, the likelihood of purchasing insurance significantly decreases with decreasing health status while having a disability is associated with a significant increase in the probabilities of purchasing insurance. The predicted likelihood of having group or individual insurance for a population that is all in excellent health from the CPS model is 82.5 percent, but falls to 79.9 percent for those in fair or poor health. Using the SIPP parameter estimates, the predicted probabilities are respectively 82.5 and 80.4, while they are 93.1 and 90.6 based on the NHIS data. In contrast, the predicted likelihood of purchasing some individual or group coverage is 2 to 4 percentage points higher for a disabled population than an otherwise similar population without a disability.

The probability of purchasing coverage increases with age; predicted purchase rates for those over age 55 are 8 to 11 percentage points higher than for persons under age 25. Based on the Census models, persons with a college degree have a purchase probability that is about 12 percentage points higher than those with less than a high school education; the difference based on the NHIS parameter estimates is about 4 percentage points. Non-Hispanic whites are more likely to purchase insurance than other racial and ethnic groups.

Overall, the results concerning the role of the safety net paralleled the finding in the model of individual insurance choice for those without group coverage. The safety net index was not significant, or of small magnitude and inconsistent with the hypothesis of crowd-out. However, the number of public hospital admissions on the uninsured rate was significant. In the Census data, a 10 percent increase in public hospital admissions is associated with a 2 percent in the uninsured rate, and a .2 percentage point fall in the number of workers taking group coverage. The NHIS estimates are about half this large. Other safety net components are not statistically significant or are not consistent with crowd-out.

DISCUSSION

Our estimates suggest that even substantial subsidies for individual insurance would have modest effects on the number of uninsured and little effect on the employment-based system in California. These results accord with other recent analyses of the effects of tax credits. Polzer and Gruber (2003) examine the effect of a state tax credit in California similar to the tax credit proposed by the Bush administration. This credit would cover about 50 percent of the cost of insurance for a typical family (Young and Wildsmith 2002; Hadley and Reschovsky 2002; McClellan and Baicker 2002). According to Polzer and Gruber's analysis, this credit would decrease the number of uninsured in California by about 10 percent and decrease the number purchasing employer group coverage by about 3 percent. Our analysis also suggests that responses would be small. We estimate that a 50 percent subsidy would reduce the number of uninsured families by about 4 to 8 percent (Table 4), and the number of workers participating in their own group plan of less than 1 percent (Table 6).

Investment in the safety net can ensure that health care is available to those who are uninsured and would be unable to obtain private care. But policymakers are concerned that the availability of free care may affect individuals' incentives to purchase private health insurance and thwart programs, such as subsidies, intended to encourage the voluntary purchase of coverage. We found a positive association between the number of admissions to public hospitals and the number of uninsured, as have others (Cunningham 2002a; Rask and Rask 2000). However, there many not be a causal link because public hospitals are likely to be located where there is the greatest need—that is where there are the most uninsured. Moreover, other components of the safety net and our overall index of the safety net were not related to purchase decisions or were contrary to the hypothesis of crowd-out. Therefore, we conclude that there is little evidence that an expansion of the safety net leads to a crowd-out of private insurance.

Though we predict that tax subsidies of the magnitude that have recently been discussed would produce only modest improvements in the rate of uninsured, some circumstances may alter that conclusion. Little is known about how the individual insurance market itself would respond if substantial tax credits were adopted. Insurers might respond by introducing new products with premiums geared to the size of the tax credit. Some argue that growth in the individual market will lower administrative costs and that an inflow of more healthy persons to the market may also lower real premiums. These

actions could further reduce the cost of purchasing coverage and expand demand for insurance; however, it is out of the range of our data to predict responses as price approaches zero. Moreover, research has not investigated how characteristics of products offered in the market, other than the price, affects decisions to buy insurance. We found no effect of two such characteristics—the number of plans offered and the variability in the actuarial value of benefits. There was a broad range of choice available in all of the study years, and so this is not strong evidence that the type of plans available do not factor into participation decisions. More research is needed to understand how the characteristics of available plans affect decisions and to predict how the introduction of new plans might alter decisions. Finally, our results pertain to the California market. We have limited information about how the nature of the health delivery and insurance markets affects these outcomes. Regulatory protections in the individual insurance market in California for those entering without previous group coverage are limited to preexisting conditions exclusions and guaranteed renewability; carriers are free to deny coverage and are not limited in the premiums they may charge. Our results may not generalize to states with different market characteristics.

In addition, policies that help eliminate other barriers to purchasing insurance might increase participation in the individual market, even without subsidies. Analysis of a variety of public programs has indicated that nonfinancial barriers—such as lack of information and administrative complexity—do play a role in participation in such programs (Remler and Glied 2003). Some cite lack of consumer awareness of insurance options and an intimidating application process as important obstacles to coverage (Patel 2002). Policies to eliminate the awareness barrier and other barriers to purchase may be needed to complement policies to overcome the affordability barriers. Finally, underwriting and coverage denials remain important barriers to access to individual coverage for some. Along with subsidies, expanding the availability of coverage for the high-risk population is necessary. Programs to ensure access and policies that limit incentives of insurers to exclude high-risk populations, such as reinsurance or risk-adjustment, are examples.

Our results also suggest that premium assistance programs, which subsidize the employee's share of group coverage, may have limited effect on take-up of coverage. We found, as have other studies, a very small price elasticity of take-up. In summary, our findings suggest that although subsidies—whether tax credits to purchase individual coverage, publicly subsidized insurance programs, or premium assistance to purchase group

coverage—may make insurance more affordable for some families, they alone are unlikely to solve the problem of the uninsured. On the positive side, however, our results indicating low premium responses in individual market and in group take-up decisions suggest that we may be able to weather the current period of increasing premiums without a significant erosion in coverage.

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NOTES

1. The standardized population was based on privately insured persons under age 65 in the 1997 National Medical Expenditure Panel survey (MEPS); see Buntin et al. (2003), for more details.
2. These actuarial values were also developed by ARC from the employer survey data.
3. The take-up of employer coverage among those offered coverage is higher in the NHIS than the other two surveys as we would expect because the NHIS reflects eligibility for benefits. There is some error in our assignment of who has an offer in the Census data, especially the CPS, but since about 75 percent of people who are offered coverage purchase it, and we observe this decision, we believe the error is

small. Offer rates in the CPS and SIPP were similar even though the CPS required more imputation; this gives us confidence in our imputation procedure.

4. We fit models using the Medicare hospital wage index and the Medicare+Choice capitation rates as alternative indices of the price of Medicare care. We also tried adjusting the cross-section medical price measures for the medical services component of the CPI rather than the local measure of overall prices. Our results were not sensitive to these choices.
5. We used 46 occupations for which statistics were available in all areas in California over our full time period—this accounts for about 50 percent of employees in the state. We applied a constant set of weights, based on the mix of employment within the state within these occupations, for each geographic area to derive the index.
6. These data are from a sample of local governments selected on the basis of expenditures and population, and weights are applied to measure total spending in each county. About 15 percent of counties are not included in the sample. We imputed values to these counties in the non-Census years based on the trend in spending in the closest metropolitan statistical area.
7. Workers who are offered their own group coverage but elect to obtain coverage through a spouse who is also offered group coverage are classified as purchasing group insurance.
8. However, we excluded any plans that averaged fewer than 50 new enrollees per month over the year, since these plans are apparently not among those factored into the choice set of most enrollees.
9. Our elasticity and semi-elasticity estimates are all evaluated at a probability of .2, which was the average participation rate in our data. Thus, we are looking at differences in the price response for individuals with the same likelihood of taking-up coverage. Since elasticities in the nonlinear model depend upon where they are evaluated, this estimate is not the same as the elasticity estimate for a population of individuals alike in all characteristics (or the distribution of characteristics) except for the characteristics that define the subgroup (e.g. self-employed or not), because the subgroup characteristics would produce different probabilities of participation.
10. Specifically, the elasticity estimate for all of the low-income groups, except for those over 35 and not self-employed were higher in the NHIS, as was the estimate for the under age 35, self-employed, middle-income families.
11. We chose a 50 percent subsidy because we do observe variations in the premium that are large, but this is at the limits of the range of our data.
12. These are predicted values for all poor and nonpoor persons with other characteristics observed in the 2001 CPS, and so represent the total effect of income and other factors that vary with it, not the marginal effect. We discuss the latter below.
13. This is the income elasticity evaluated at a take-up of .2; the NHIS and Census estimates do not differ significantly.
14. While we found no difference in price and income effects estimated from the two Census data sources, there were some differences in the relationship with other variables and so the model fit to Census includes an indicator for SIPP observation and interactions between this indicator and all other characteristics in the model (see online-only Appendix Table 1 [available at www.blackwell-synergy.com]).

15. Disability is defined as being unable to work because of health, or being limited in the amount or kind of work because of health.
16. Based on predictions for a population whose characteristics are those of the CPS population in 2001.
17. The elasticities are evaluated at the overall participation rates in our combined datasets.
18. There was also a statistically significant, but small, difference between the SIPP and the CPS in the effect of individual premium on choices for the middle-income group. For example, the elasticity of demand for individual coverage for this group was estimated to be $-.27$ in the CPS data and $-.32$ in the SIPP data versus the pooled estimate of $-.28$. But otherwise, there was no difference in the estimates of the effect of individual prices, group prices, or income from the two data sources and so we have presented results from pooling the data for the price and income estimates.
19. This is because $\delta\Pr(\text{Purchase}|\text{Offer})/\delta\text{Premium} = \Pr(\text{Eligible}|\text{Offer}) * \delta\Pr(\text{Purchase}|\text{Eligible})/\delta\text{Premium} + \Pr(\text{Purchase}|\text{Eligible}) * \delta\Pr(\text{Eligible}|\text{Offer})/\delta\text{Premium}$. If the last term is zero, so that eligibility decisions do not depend on premium then the price response of take-up among those offered is less than the response of take-up among those eligible.
20. This simulation, however, does not account for feedback effects of the group response. Additional workers who would prefer group coverage might be forced to switch if the preferences of the group lead the employer to drop coverage. In contrast, workers who would prefer to switch to the individual market may be constrained to stay with the group plan if they perceive that their wages would continue to be reduced irrespective of their decision.
21. We also fit models using the lesser of the contribution for the worker and the worker's spouse when both are employed and the results were unchanged.
22. The elasticity of outcome j with respect to a change in the premium is: $\partial Pj/(\partial[ln\ Premium] * P_j) = \beta_j - (\Sigma P_k \beta_k)$, where β_j is the coefficient for *ln* Premium in the jth outcome and the Ps are the overall sample participation rates.

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Appendix 1. Logit Model for Purchase of Individual Insurance

Variable	Census Data		NHIS Data	
	Parameter Estimate	Standard Error	Parameter Estimate	Standard Error
Ln minimum price	-0.041	0.157	-0.088	0.173
Interactions of price and other characteristics				
Ln minimum price if income 200-400% poverty	-0.227	0.022	-0.300	0.025
Ln minimum price if income below 200% poverty	-0.097	0.020	-0.133	0.022
Ln minimum price if self employed	-0.232	0.138	-0.236	0.154
Ln minimum price if under age 35	-0.512	0.251	-0.895	0.274
Ln minimum price if low price	-0.063	0.027	-0.026	0.036
Ln poverty ratio	0.053	0.013	0.043	0.027
Family type				
Single	-0.563	0.084	-0.704	0.089
Couple	0.024	0.135	-0.234	0.137
Indicators for age				
25-34	0.240	0.111	0.051	0.119
35-44	-1.396	0.881	-3.110	1.083
45-54	-1.030	0.906	-2.894	1.116
55 and older	-0.441	0.926	-2.019	1.141
Indicator for self employed	1.263	0.602	1.931	0.679
Self-report health status (excellent omitted)				
Very good	-0.285	0.078	-0.249	0.081
Good	-0.531	0.089	-0.633	0.103
Fair or poor	-0.780	0.138	-0.434	0.152
Disabled--limited in amount or kind of work	0.243	0.146	0.184	0.151
Any other family member in fair/poor health	-0.141	0.120	-0.114	0.117
Education (college om+A65itted)				
Less than high school	-1.729	0.128	-1.152	0.161
High school	-1.112	0.093	-0.567	0.093
Some College	-0.470	0.082	-0.177	0.081
Race/ethnicity (white non-hispanic is omitted)				
White, hispanic	-1.010	0.088	-1.595	0.087
Black	-0.494	0.139	-1.145	0.165
Other	-0.474	0.095	1.485	0.115
Any family member with public insurance	-0.279	0.129	-0.323	0.135
Index of Safety net	0.004	0.018	0.049	0.017
Indicators for year (1996 is omitted)				
1997	0.478	0.124		
1998	0.173	0.123	-0.019	0.110
1999	-0.036	0.124	0.156	0.109
2000	0.062	0.123	-0.197	0.108
2001	0.022	0.128	-0.161	0.114
2002	0.276	0.121		
Intercept	2.390	0.974	3.507	1.091
SIPP main effect and interactions				
Indicator for SIPP	0.201	0.537		
SIPP interaction with:				
Family type				
Single	0.084	0.187		
Couple	0.022	0.287		
Indicators for age				
25-34	-0.779	0.243		
35-44	-0.393	0.261		
45-54	-0.250	0.284		
55 and older	-0.748	0.304		
Indicator for self employed	0.419	0.158		
Self-report health status (excellent omitted)				
Very good	0.138	0.176		
Good	0.093	0.207		
Fair or poor	0.232	0.272		
Disabled--limited in amount or kind of work	0.153	0.258		
Any other family member in fair/poor health	0.187	0.218		
Education (college omitted)				

Less than high school	0.034	0.304
High school	-0.128	0.204
Some College	-0.344	0.181
Race/ethnicity (white non-hispanic is omitted)		
White, hispanic	-0.560	0.246
Black	-0.290	0.353
Other	0.322	0.233
Any family member with public insurance	0.529	0.266
Index of Safety net	0.016	0.035
Indicators for year (1996 is omitted)		
1997	-0.537	0.169
1998	-0.333	0.179
1999	-0.060	0.183

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Ln minimum price if self employed	-0.232	0.138	-0.236	0.154
Ln minimum price if under age 35	-0.512	0.251	-0.895	0.274
Ln minimum price if low price	-0.063	0.027	-0.026	0.036
Ln poverty ratio	0.053	0.013	0.043	0.027
Family type				
Single	-0.563	0.084	-0.704	0.089
Couple	0.024	0.135	-0.234	0.137
Indicators for age				
25-34	0.240	0.111	0.051	0.119
35-44	-1.396	0.881	-3.110	1.083
45-54	-1.030	0.906	-2.894	1.116
55 and older	-0.441	0.926	-2.019	1.141
Indicator for self employed	1.263	0.602	1.931	0.679
Self-report health status (excellent omitted)				
Very good	-0.285	0.078	-0.249	0.081
Good	-0.531	0.089	-0.633	0.103
Fair or poor	-0.780	0.138	-0.434	0.152
Disabled--limited in amount or kind of work	0.243	0.146	0.184	0.151
Any other family member in fair/poor health	-0.141	0.120	-0.114	0.117
Education (college om+A65itted)				
Less than high school	-1.729	0.128	-1.152	0.161
High school	-1.112	0.093	-0.567	0.093
Some College	-0.470	0.082	-0.177	0.081
Race/ethnicity (white non-hispanic is omitted)				
White, hispanic	-1.010	0.088	-1.595	0.087
Black	-0.494	0.139	-1.145	0.165
Other	-0.474	0.095	1.485	0.115
Any family member with public insurance	-0.279	0.129	-0.323	0.135
Index of Safety net	0.004	0.018	0.049	0.017
Indicators for year (1996 is omitted)				
1997	0.478	0.124		
1998	0.173	0.123	-0.019	0.110
1999	-0.036	0.124	0.156	0.109
2000	0.062	0.123	-0.197	0.108
2001	0.022	0.128	-0.161	0.114
2002	0.276	0.121		
Intercept	2.390	0.974	3.507	1.091
SIPP main effect and interactions				
Indicator for SIPP	0.201	0.537		
SIPP interaction with:				
Family type				
Single	0.084	0.187		
Couple	0.022	0.287		
Indicators for age				
25-34	-0.779	0.243		
35-44	-0.393	0.261		
45-54	-0.250	0.284		
55 and older	-0.748	0.304		
Indicator for self employed	0.419	0.158		
Self-report health status (excellent omitted)				
Very good	0.138	0.176		
Good	0.093	0.207		
Fair or poor	0.232	0.272		
Disabled--limited in amount or kind of work	0.153	0.258		
Any other family member in fair/poor health	0.187	0.218		
Education (college omitted)				

Less than high school	0.034	0.304
High school	-0.128	0.204
Some College	-0.344	0.181
Race/ethnicity (white non-hispanic is omitted)		
White, hispanic	-0.560	0.246
Black	-0.290	0.353
Other	0.322	0.233
Any family member with public insurance	0.529	0.266
Index of Safety net	0.016	0.035
Indicators for year (1996 is omitted)		
1997	-0.537	0.169
1998	-0.333	0.179
1999	-0.060	0.183