Employers' health insurance cost burden, 1996–2005

Data from the Employment Cost Index show that health insurance costs relative to payroll increased 34 percent between 1996 and 2005 and that the increase was largest for businesses paying low wages; simultaneously, data from the Employee Benefits Survey show that benefit packages became less generous, yet cost growth was not paralleled by a commensurate decrease in employer offers

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In 2005, 62 percent of nonelderly Americans obtained health insurance coverage through employer-sponsored health insurance plans.[1] Many recent proposals to expand health insurance coverage build on the employer-based system. Both the Massachusetts health reform plan and the California Governor's health care reform proposal include mandates requiring employers either to offer health insurance or pay a fee. Yet, simultaneously, concerns over increasing health care costs have raised questions about the sustainability of the employer-based system.[2] One source cites figures which imply that total health spending in the United States increased by 93 or 94 percent between 1996 and 2005, compared with a 51-percent rise in gross domestic product.[3] Most economists believe that health insurance premium costs are ultimately passed back to employees in the form of reduced wages, so long-run compensation costs for employers are not affected by rising health care prices. But in the short run, if employers are unable to shift costs fully to workers, the increased cost of health insurance may cause labor market distortions, such as the hiring of more part-time workers who do not qualify for health benefits.[4] In addition, employers may be unable to shift health care costs to employees who are at or near the minimum wage.

As an alternative to shifting costs to work-

ers through reduced wages, employers may pass increased costs along directly, either through requiring workers to contribute higher premiums or by providing less generous benefits. In either case, employer spending on health insurance may then remain unchanged despite rising health prices. Recent work by Jessica S. Banthin and Didem M. Bernard shows that individual out-of-pocket spending on health care increased substantially between 1996 and 2003, suggesting that some direct cost shifting may have occurred during that time.[5] Further, to the extent that workers drop coverage in response to rising prices, employer costs may remain relatively stable even if costs per worker increase. Several studies show that higher health insurance prices lead to lower employee takeup rates, even for individuals with access to employer-sponsored benefits.[6]

Because takeup rates have declined, it is not clear how employer spending on health insurance has changed in response to health care cost growth. This article explores trends in employers' health insurance cost burden, measured as the ratio of health insurance costs to total payroll, where payroll includes all wages and salaries paid to employees, including straight-time earnings, overtime pay, and pay for vacation and other leave. Evaluating trends in employers' health care cost burden and differences in the distribution

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of that burden across various types of businesses can lead to a better understanding of which businesses and workers are most vulnerable to erosion of their coverage and to labor market distortions in response to higher prices. Such an analysis also will shed light on the types of businesses and workers that may bear the greatest burden of employer responses to increased health care costs. For example, one researcher points out that if firms respond to higher health insurance costs by reducing wage increases, younger and less skilled workers may be at high risk for declining wages if businesses are required to offer health insurance.[7] More generally, a better understanding of the distribution of health insurance costs across employers over time will provide an insight into the long-term viability of employer health insurance mandates.

The analysis that follows is conducted in three parts. First, trends are explored in offer rates overall and for particular types of businesses (for example, small businesses and low-wage businesses). Then, the change over time in health insurance costs relative to payroll is evaluated for those firms which offer health insurance to employees. Finally, the issue of how benefit generosity has changed over time for workers enrolled in health insurance plans is examined. Data come from the Employment Cost Index (ECI) and the Employee Benefits Survey (EBS), both conducted by the U.S. Bureau of Labor Statistics.

Methods

Data.   Data from the ECI—a quarterly survey of compensation costs for U.S. workers—are used to develop estimates of offer rates and employer health insurance costs relative to total payroll. The ECI is fielded to a nationally representative sample of establishments, and compensation costs for wage and nonwage benefits are collected for a randomly selected group of occupations within each establishment. In this article, ECI data are converted to an establishment-level file by computing average compensation costs per worker across all sampled occupations. Also, ECI weights, originally designed to represent all U.S. workers, are converted to establishment-level weights by summing the weights over all occupations in an establishment and then dividing by the number of employees in the establishment. Finally, the weights are multiplied by an adjustment factor to ensure that they reflect employment counts tallied in the BLS Current Employment Statistics (CES) data. Because establishments can remain in the ECI sample for several quarters, the sample is restricted to one observation per establishment per year by choosing the last data point for each establishment in a calendar year. The full sample used spans the years 1995 through 2005 and includes 80,990 establishment-year observations. State and local government employers, as well as agricultural employers, are excluded from the sample.

A concern about the ECI data is that the sampling strategy for the survey changed gradually over the period analyzed, switching from an industry-based to an area-based sample. The BLS does not describe this change as a "break in series," suggesting that results generated by analyzing ECI data over time should be valid.[8] However, to ensure that this gradual switch did not have unintended effects on the comparability of the sample over time, two tests were conducted of potential changes in the sample over time. Chart 1 shows that the mean number of occupations sampled was quite stable across the years, ranging from 4.24 to 4.54. Similarly, chart 2 reveals that the composition of occupations was also quite stable: administrative support constitutes the largest share of sampled occupations, and technical and related occupations represent the smallest share, in all of the years examined. Thus, both the number and the composition of the occupations (that is, major occupation groups) sampled varied little over the period of study, suggesting that it is reasonable to use the ECI sample to analyze trends in employer benefits despite the change in sample design.

Because the ECI does not directly ask whether a business offers insurance, offer rates must be constructed on the basis of whether or not the establishment reports positive health insurance spending. This approach implies that some businesses offering health insurance may be improperly coded as not offering health insurance if no workers in any of the occupations sampled accept coverage. Although the spending-based offer measure to be presented reproduces the 2005 establishment-level health insurance offer rate published by the Agency for Health Care Research and Quality using the Medical Expenditure Panel Survey (MEPS),[9] it underestimates the 2005 offer rate reported in earlier BLS publications.[10] (See the "Results" section of this article and Appendix A for a more detailed discussion of this issue.)

The analysis explores trends in benefit generosity with the use of data from the EBS, a survey of employee benefits collected periodically with the same sampling frame as the ECI. Like the ECI, the EBS is an occupation-based survey; establishments are asked to report information on health plans available to selected occupations. Historically, the group of establishments represented in the EBS has varied from year to year, with some years focused on small establishments and some years focused on State and local governments. Start-

Chart 1. **Average number of occupations sampled at each establishment, 1995–2005**

Number of occupations

Number of occupations
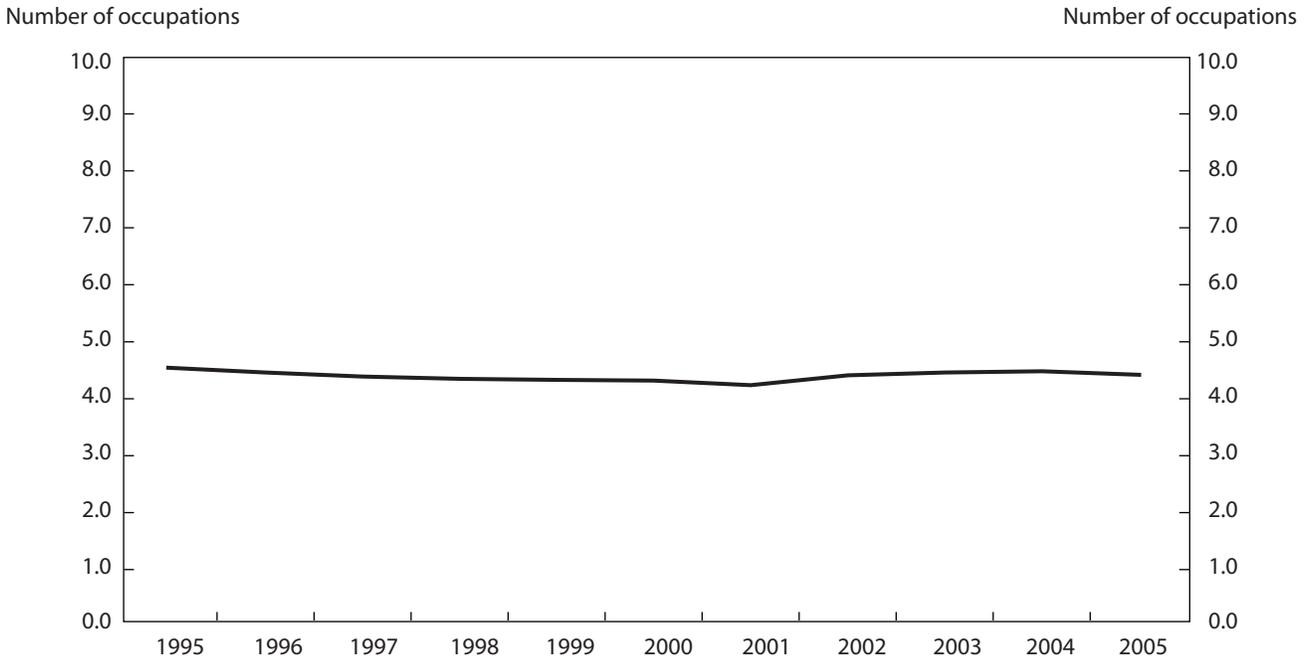
SOURCE: Based on data from Employment Cost Index, Bureau of Labor Statistics.

Chart 2. **Average share of the establishment's workforce in each occupational category, 1996–2005**

Percent

Percent

- Administrative support
- Sales occupations
- Handlers, equipment cleaners, helpers, and laborers
- Transportation and material moving
- Professional occupations
- Service occupations
- Production, craft, and repair
- Executive, administrative, and managerial
- Machine operators, assemblers, and inspectors
- Technical and related occupations
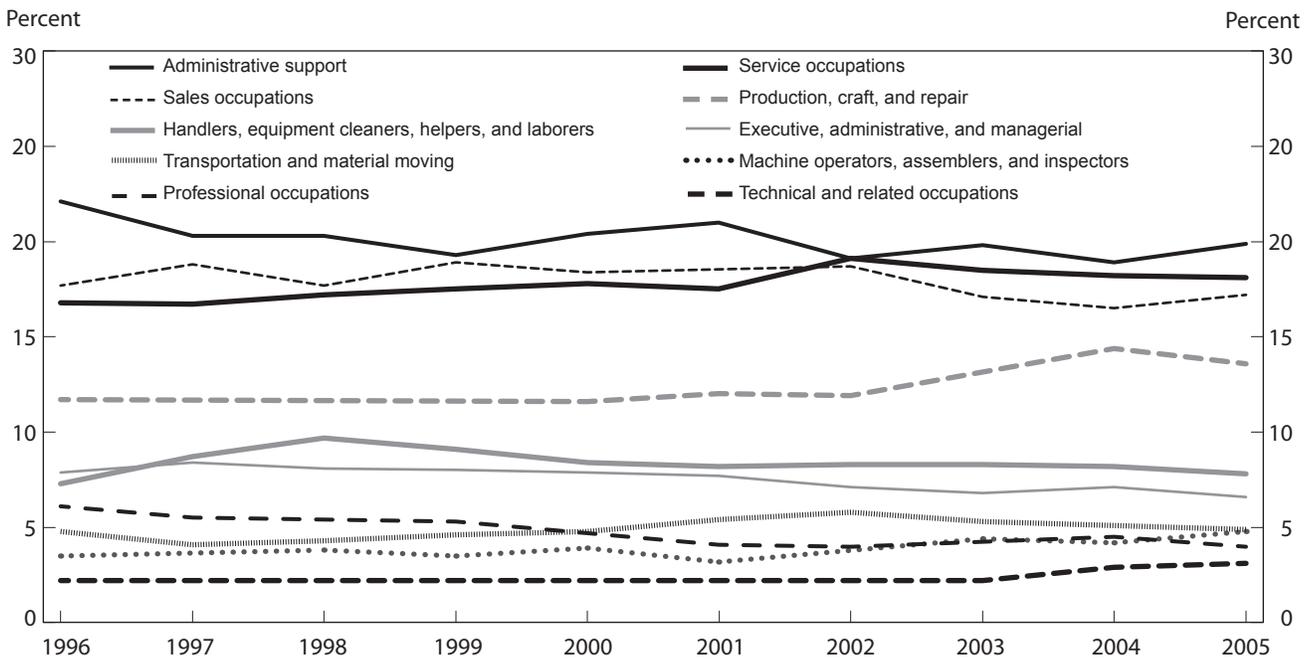
SOURCE: Based on data from Employment Cost Index, Bureau of Labor Statistics.

ing in 2000, the EBS and the ECI were integrated into the National Compensation Survey (NCS), yielding more consistency between the two surveys.[11] The data used in what follows are from 4 years of the EBS: 1995, 1996, 2000, and 2003. Because the 1995 survey was limited to medium-sized and large establishments (with 100 or more workers) and the 1996 survey was limited to small establishments (with fewer than 100 workers), these two surveys are combined to get a nationally representative picture of the workforce in those years. Further, because the 2003 survey was fielded from December 2001 until April 2003, it is more accurately thought of as yielding 2002–03 data. In total, 55,289 plan-level observations from the EBS are used. The data are weighted to represent all workers covered by employer-sponsored health insurance plans nationwide. Because the scale of the EBS weights varies from year to year, the weights are normalized to the number of observations in each EBS survey year.

The information collected in the EBS varies by type of plan. Although information on copayments is available for all plans, information on other plan characteristics (deductibles, coinsurance rates, and out-of-pocket maximums) is not available for prepaid, health maintenance organization (HMO) plans. As a result, results are reported separately for prepaid plans and for other plans (that is, fee-for-service (FFS), point-of-service (POS), and preferred provider organization (PPO) plans). These categorizations ensure that the descriptive statistics presented herein align with published statistics reported by the BLS.[12]

Because data on plan premium amounts were not collected in the 1995, 1996, or 2000 EBS, the analysis is supplemented with information on average total single premiums and employee contributions from the Medical Expenditure Panel Survey, Insurance Component (MEPS-IC), for the years 1996 through 2004.[13]

Finally, data from the 1997 Robert Wood Johnson Foundation Employer Health Insurance Survey are used to estimate actuarial values of plans. The survey was designed with an eye toward gaining a better understanding of employer and employee behavior with respect to health insurance coverage,[14] and the data contain information on 17,858 plans offered by 13,726 employers in 1997 and include the overall actuarial value of the plan. Because insurance typically covers large medical bills more generously than small medical bills, actuarial values for workers grouped into 4 health expenditure categories also are analyzed: the upper 50 percent, bottom 50 percent, upper 20 percent, and bottom 20 percent of health spending. Actuarial values for workers grouped by spending category were estimated by Actuarial Research Corporation, using data from the Medical Expenditure Panel Survey, Household Component (MEPS-HC).[15]

Analytic framework. The aim in what follows is to describe changes in offers, health insurance costs relative to payroll, and benefit generosity over time. Because some types of businesses (for example, larger businesses and unionized businesses) are more likely to offer health insurance and may tend to have more generous benefits, shifts in employer characteristics over time might account for part of any observed trend in offer rates. Thus, rather than simply reporting annual means or descriptive statistics summarizing trends over time in the variables of interest, a multivariate regression is used to predict outcomes of interest, holding business characteristics constant. This approach promotes an understanding of trends in offers, economic burdens, and benefit generosity that cannot be explained by changes in the composition of businesses.

Two sets of regressions are estimated with the ECI data: a logit model for the probability that a business offers health insurance, and, with the sample limited to establishments that provide health insurance, an ordinary least-squares model in which the ratio of health insurance costs to total payroll is the dependent variable. Each model includes a full set of interactions between each covariate and year. Specifically, the model estimates equations of the form

$$y_{it} = \beta_0 + X_{it}\Gamma + \delta T + X_{it}TB + \varepsilon_{it}, \qquad (1)$$

where y_{it} represents health insurance costs relative to payroll for establishment i at time t; X_{it} is a vector of covariates that includes establishment size (fewer than 25 workers, 25–49 workers, 50–99 workers, 100–499 workers, and 500 or more workers), industry (construction and mining; manufacturing; trade, transportation, and utilities; and service), the wage quartile of the establishment (based on the wage of the average worker), the share of workers in the business who are part time, an indicator for union presence at the establishment, and an indicator for whether the business is located in California.[16] The term δ is a set of coefficients associated with a vector T of dummy variables representing years. An analogous logit model estimates the offer regressions.

In what follows, a single regression based on equation (1) is fitted to each outcome analyzed, and offer rates and health insurance costs relative to payroll for each year between 1996 and 2005 are predicted under two sets of assumptions. First, establishment and worker characteristics are allowed to vary over time, but the year dummy variable is held constant at 1996. As a result, the predicted values illustrate changes in offer rates and relative compensation costs that were due solely to changes in the composition of businesses over time (net of any general time trend).

Second, outcomes are predicted with establishment and worker characteristics held constant at 1996 levels, but with year dummy variables allowed to vary over time. Decomposing the predictions in this manner allows the model to determine how much of the change in offer rates and cost burden was due to changes in observable characteristics of businesses and how much was due to year-specific effects.

The model also predicts values for employers of specific types. For example, to predict offer rates for low-wage establishments, the same regressions are used, but predictions are generated with the use of data only from establishments in the bottom quartile of the average-worker wage distribution. Bootstrapping methods are used to determine whether differences in predicted values are statistically significant. (Specifically, 250 samples of 8,990 observations each are drawn, and then *t*-tests are used to determine whether the means of the predicted values in the bootstrapped samples are statistically different from each other.[17])

To predict changes in benefit generosity, regressions were fitted using the EBS data, and the following outcomes were considered: plan type (prepaid or "other"), individual deductible amount, copayment amount, coinsurance amount, and out-of-pocket maximum. The equation for the EBS regressions is

$$y_{it} = \beta_0 + \sum_{t=2000}^{2002-03} \delta_t + X_{it}\Gamma + \varepsilon_{it}, \qquad (2)$$

where y_{it} is the generosity outcome for plan i, δ_t is a set of dummy variables for the three periods available in the data (1995–96, 2000, and 2002–03), and X_{it} is a vector of covariates that includes establishment size (fewer than 25, 25–99, and 100 or more workers), Census Bureau region,[18] industry (construction and mining; manufacturing; trade, transportation, and utilities; and service), a variable indicating whether the covered worker is unionized, and a variable indicating whether the covered worker works full time. In the EBS models, year is not interacted with the other covariates. This simplification affords a determination of the statistical significance of trends in benefit generosity through an evaluation of the *t*-statistic on the year dummy variables in the regression (and thus saves considerable computational time relative to the bootstrap method). Dependent variables include both continuous and binary outcomes. When the outcome is binary, equation (2) is estimated with a logistic regression, and when the outcome is continuous, equation (2) is estimated by ordinary least squares. The unit of observation in the EBS models is the establishment-occupation-plan, weighted to represent the national distribution of covered workers. Standard errors are corrected for clustering at the estab-lishment level.

Finally, actuarial values for prepaid and other plans are estimated by fitting plan-level regressions using the Robert Wood Johnson Foundation file. (Details on the actuarial value regressions are given in Appendix B.) After these regressions are fitted, the actuarial value for an average plan in the EBS database is calculated on the basis of the plan characteristics estimated in equation (2). To estimate changes in plan generosity over time, the predicted actuarial value in 1995–96 is compared with the predicted actuarial value in 2002–03.

Results

Descriptive statistics. Tables 1 and 2 report weighted descriptive statistics from the ECI and EBS samples. ECI data (table 1) are weighted to represent the national distribution of establishments, and EBS data (table 2) are weighted to represent the national distribution of covered workers. Table 1 shows that the probability that an employer offered health insurance increased from 1996 to 2005, peaking in 2000 and then diminishing slightly. According to the table, in 2005 the probability that a business offered health insurance was 56.4 percent, a figure similar to the U.S. establishment-level health insurance offer rate of 56.3 percent reported in the 2005 MEPS-IC,[19] but substantially smaller than the 63-percent offer rate reported in published NCS statistics.[20] It is unclear why the MEPS and NCS figures are so different, but one possible explanation is that the NCS data (and hence the data used in the analysis presented here) do not include businesses in the agricultural, forestry, and fishing industries; according to the MEPS, these industries tend to have lower offer rates. Although the NCS estimate is based on the data used here, there are several reasons for the discrepancy between the figures in table 1 and the NCS published offer rates. First, published NCS statistics are based on a subset of observations used in the analysis presented here. Second, that analysis identifies offering businesses with the use of cost data reported for selected occupations; that is, if the establishment reports positive health insurance spending for any of the selected occupations, it is classified as an offering establishment. In some cases, an offering firm may have no health insurance spending for any of the selected occupations due to zero takeup. (That is, no worker within any of the selected occupational groups accepts insurance.) In contrast, the sample used to generate the 2005 NCS statistics has a general indicator for whether or not the establishment offers insurance. Finally, the weights used in the analysis presented in this article

Table 1.	Descriptive statistics for establishment characteristics, ECI (weighted by establishment), 1996, 2000, 2003, and 2005				
Characteristic	Overall	1996	2000	2003	2005
Share of establishments offering health plans	0.566 (.496)	0.512 (.500)	0.592 (.491)	0.560 (.496)	0.564 (.496)
Ratio of health insurance to payroll	.048 (.067)	.040 (.063)	.046 (.061)	.053 (.071)	.057 (.075)
Ratio of health insurance to payroll, conditional on offer	.088 (.068)	.080 (.068)	.080 (.060)	.098 (.070)	.107 (.071)
Share of workers who work full time	.711 (.381)	.698 (.391)	.713 (.378)	.700 (.387)	.699 (.380)
Average hourly wage (in constant 2002 dollars)	$13.27 ($8.76)	$12.48 ($7.39)	$13.57 ($10.85)	$13.64 ($9.32)	$13.59 ($8.24)
Share with union presence	.045	.042	.045	.050	.049
Establishment size (percent of workers):					
Fewer than 25	84.9	84.5	83.7	85.8	85.2
25–49	8.3	8.1	9.1	7.8	8.3
50–99	3.7	4.0	3.9	3.5	3.6
99–499	2.7	3.1	2.9	2.5	2.6
500 or more	.4	.4	.4	.3	.3
Industry (percent of workers):					
Construction and mining	10.2	9.3	10.2	10.4	11.7
Manufacturing	5.6	5.1	6.0	5.9	5.7
Trade, transport, utilities	39.4	37.0	40.4	37.9	37.9
Service	44.8	48.7	43.4	45.9	44.7
N	80,990	4,673	9,382	9,843	9,552

NOTE: Standard deviations are in parentheses.

differ from the weights used in the NCS estimate. (Appendix B provides a more thorough discussion of these issues, along with some supporting analysis.)

Table 1 also shows that health insurance costs relative to payroll, both overall and conditional on the establishment's offering health insurance, increased over time. Among establishments offering health insurance, health insurance costs relative to total payroll grew by 34 percent, from 0.080 to 0.107, between 1996 and 2005. These ratios suggest that the health insurance burden faced by employers has increased over time, but the changes are difficult to interpret, given that several characteristics of sampled employees have changed over time as well. Real average hourly wages, for example, increased by a statistically significant 9 percent over the 1996–2005 period, from $12.48 to $13.59 ($t$ = 8.04). The EBS data also show a decrease in the share of establishments with more than 50 workers and an increase in the share of establishments with fewer than 50 workers. These changes could reflect either real changes in the characteristics of businesses over time or sampling issues not fully captured in the weights, including the fact that in this article EBS data from 1995 and 1996 are combined. To adjust for these factors, sample weights are used in all of the analyses and observable characteristics such as

industry and firm size are controlled for.

Table 2, which uses the EBS data to focus on benefit generosity, shows an increase between 1995–96 and 2000, and then a decrease between 2000 and 2002–03, in the probability that a worker was covered by a prepaid plan. Copayment amounts (both for prepaid and nonprepaid plans) increased, and coinsurance rates either declined modestly or remained about the same, over the 1995–96 to 2002–03 time span. However, as with table 1, it is unclear whether these changes are due to changes in the characteristics of offering employers, sampling issues not fully captured in the weights, or other time-specific factors such as rising health care costs. Table 2, for example, also shows an increase in the share of covered workers employed in establishments with fewer than 25 employees and a decline in the share of covered workers who are unionized. It may be that changes in these business and workforce characteristics, rather than external trends related to costs or changes in the health care delivery system, are driving changes in the mix of plans reported.

Multivariate adjusted trends, offers, and relative costs. Table 3 uses the statistical techniques described earlier to differentiate between trends in offer rates and in relative health insurance costs due to changes in employer char-

Table 2.	Descriptive statistics for benefit characteristics, EBS (weighted by workers covered), 1995–96, 2000, and 2002–03		
Characteristic	**1995–96**	**2000**	**2002–03**
Percent of covered workers with prepaid plans	27.4	38.5	32.9
Copayment amounts (in constant 2003 dollars):			
Prepaid plans	$8.69 ($4,61)	$10.44 ($4.72)	$11.88 ($4.89)
Nonprepaid plans	$4.03 ($7.90)	$9.30 ($8.77)	$10.30 ($8.23)
Other coverage features (nonprepaid plans only):			
Percent with deductible	76.1	71.8	68.4
Average individual deductible, conditional on any			
deductible (in constant 2003 dollars)	$316 ($326)	$361 ($419)	$343 ($299)
Percent with coinsurance	84.3	75.3	79.0
Average coinsurance rate, conditional on any coinsurance	18.5 (6.09)	16.0 (5.60)	16.3 (5.85)
Percent with out-of-pocket maximum	81.7	79.5	82.0
Average individual out-of-pocket maximum, conditional			
on any out-of-pocket maximum (in constant 2003 dollars)	$1,694 ($1,506)	$1,553 ($1,625)	$1,681 ($1,403)
Occupation is unionized	22.6	14.3	12.0
Occupation is full time	95.4	94.6	95.3
Establishment size (percent of workers):			
Fewer than 25 workers	14.1	35.6	29.4
25–99 workers	6.7	12.2	14.0
100 or more workers	79.2	52.2	56.6
Industry (percent of workers):			
Construction and mining	4.6	6.2	6.6
Manufacturing	31.8	22.2	23.4
Trade, transport, and utilities	24.5	30.4	28.0
Service	39.2	41.2	42.0
N	28,042	9,051	18,196

NOTE: Standard deviations are in parentheses.

acteristics and trends due to year-specific effects that are unexplained by business characteristics observed in the ECI data. Results listed in the column headed "Predicted value holding year constant at 1996" show trends holding year effects constant, but allowing business characteristics to vary, and results listed in the column headed "Predicted value holding business characteristics constant as in 1996" illustrate trends due to year-specific effects that are unexplained by changes in the composition of businesses. The percent change in the predicted outcome from 1996 to 2005 appears in the second-to-last row of each panel, and below the percent change is the bootstrapped *t*-statistic testing the hypothesis that the predicted value in 1996 is equal to the predicted value in 2005.

The data shown in table 3 indicate that there was no statistically significant change in offer rates over time and that virtually all of the change in health insurance costs relative to payroll was due to year-specific effects that are unrelated to the composition of businesses. The results holding year effects constant show little change over time either in offer rates or in relative costs. In contrast, the results holding business characteristics constant show a slight increase in offer rates between 1996 and 2005, and a statistically significant 34-percent increase in health

insurance costs relative to payroll among offering firms. By 2005, the average health insurance costs at offering businesses exceeded 10 percent of total payroll. Relative to the 4-percent payroll tax suggested in the California Governor's health reform plan or the 7.9-percent cap proposed in the 1994 Health Security Act, these average costs suggest that the health insurance burden currently faced by offering employers is quite large.

Table 4 shows predicted values for health insurance offer rates, and health insurance costs relative to payroll, for particular types of businesses. Because the results shown in table 3 indicate that variation over time in offers is due primarily to variation in year-specific effects, table 4 reports only predictions that hold business characteristics constant as they were in 1996. Thus, the figures presented in table 4 are analogous to those shown in the column headed "Predicted value holding business characteristics constant as in 1996" in table 3. Additional analyses, which are not reported, confirmed that even when the sample is limited to specific types of employers, year-specific effects, and not changes in business characteristics, drive trends. (Note that, to save space, results are shown only for the years 1996, 2000, 2003, and 2005.) As in table 3, the bottom two rows in each panel of table 4 show the percent change in the predicted outcome from 1996 to

Table 3.	Predicted values of offers, and health insurance costs relative to payroll (ECI, weighted by establishment), 1996–2005		
Year	N^1	Predicted value holding year constant at 1996	Predicted value holding business characteristics constant as in 1996
Offer rates, logit model			
1996	4,673	0.512	0.512
1997	4,298	.517	.542
1998	4,646	.518	.561
1999	7,596	.519	.585
2000	9,382	.516	.585
2001	7,544	.512	.580
2002	7,163	.511	.587
2003	9,843	.501	.566
2004	11,189	.504	.582
2005	9,552	.504	.568
Percent change, 1996–2005...................	—	−1.6	10.9
t-test (H_0: $P_{1996} = P_{2005}$)[2].................	—	−.25	−1.15
Health insurance cost relative to payroll, ordinary least squares model			
1996	3,973	.080	.080
1997	3,681	.080	.075
1998	3,970	.080	.076
1999	6,547	.081	.078
2000	8,076	.080	.080
2001	6,506	.080	.086
2002	6,172	.080	.092
2003	8,506	.080	.097
2004	9,777	.081	.102
2005	8,350	.081	.107
Percent change, 1996–2005...................	—	1.3	33.8
t-test (H_0: $P_{1996} = P_{2005}$)[2].................	—	.00	2.33

[1] Total N used for the regression analysis, which incorporated data from 1995 to 2005, was 89,900 (offer regression) and 69,904 (health insurance/payroll regression).

[2] t-statistics were calculated with the use of bootstrapping methods.

2005, together with the bootstrapped t-statistic indicating whether the change was statistically significant.

The top panel of table 4, "Offer rates, logit model," indicates that virtually all types of employers experienced increases in offer rates between 1996 and 2005, although none of the changes were statistically significant. Overall, these results suggest that offer rates were relatively stable between 1996 and 2005. However, the bottom panel of the table, "Health insurance cost relative to payroll, ordinary least squares model," shows that all types of offering employers had quantitatively large increases in health insurance costs relative to payroll between 1996 and 2005. The smallest businesses (with fewer than 25 workers), as well as businesses without a union presence, experienced increases in health insurance costs relative to payroll that were both statistically significant and large relative to increases for other types of employers. Specifically, the smallest businesses experienced a 35.4-percent increase, and businesses without a union presence experienced a 34-percent

increase, in health insurance costs relative to payroll. Interestingly, although the growth in costs was most pronounced for low-wage businesses, which experienced a 56-percent increase, the figure was not statistically significant. A possible explanation for the lack of statistical significance is that this article calculates the average wage in the firm by averaging wages reported by all sampled occupations; because sampled occupations represent only a subset of total occupations, the measure may be relatively "noisy."

The pattern indicated in the bottom panel of table 4 suggests that small-business employers and employers with the most disadvantaged workers (workers with low wages and workers who are less likely to be unionized) had the highest growth in health care costs relative to payroll over the period studied. Trends in health care cost growth relative to payroll for the smallest businesses (with fewer than 25 workers) paralleled trends for higher wage businesses (with 500 or more workers), while midsized businesses (with 25–100 workers)

Table 4. Predicted values with business characteristics held constant as in 1996: offer rates and health insurance costs relative to payroll (ECI, weighted by establishment), 1996, 2000, 2003, and 2005

Parameter	Wage quartile		Establishment size					Union presence		Industry			
	First	Fourth	1–24	25–49	50–99	100–499	500+	Yes	No	Construction/ mining	Manu-fac-turing	Trade, trans-porta-tion, and utilities	Services
Offer rates, logit model													
1996	0.189	0.786	0.457	0.765	0.854	0.874	0.940	0.881	0.496	0.444	0.707	0.509	0.507
2000	.269	.836	.539	.799	.852	.896	.939	.911	.570	.522	.747	.611	.559
2003	.260	.799	.517	.794	.866	.894	.965	.959	.549	.560	.795	.571	.540
2005	.268	.768	.521	.784	.856	.903	.942	.956	.551	.558	.785	.581	.538
Percent change, 1996–2005	41.8	−2.3	14.0	2.5	.2	3.3	.2	8.5	11.1	25.7	11.0	14.1	6.1
t-test[1]	−1.20	−.06	−1.12	−.17	−.18	−.67	−.23	−.36	−1.07	−.47	−.40	−.55	−.38
Health insurance cost relative to payroll, ordinary least squares model													
1996	.063	.081	.082	.073	.074	.081	.086	.116	.074	.084	.093	.079	.080
2000	.072	.075	.082	.071	.076	.080	.085	.111	.075	.085	.080	.077	.082
2003	.094	.078	.098	.090	.089	.103	.103	.133	.089	.097	.115	.097	.094
2005	.098	.095	.111	.088	.098	.108	.111	.142	.099	.103	.110	.113	.102
Percent change, 1996–2005	55.6	17.3	35.4	20.5	32.4	33.3	29.1	22.4	33.8	22.6	18.3	43.0	27.5
t-test[1]	−.78	−1.11	−1.92	−1.05	−1.77	−2.42	−2.16	−1.08	−2.20	−.34	−.38	−1.53	−1.66

[1] The t-test indicates whether the bootstrapped predicted value for 1996 was statistically different from the bootstrapped predicted value for 2005 $(H_0: P_{1996} = P_{2005})$.

consistently had lower costs relative to payroll. Although the rate of growth in health care costs relative to payroll for non-unionized businesses exceeded that for unionized businesses, unionized businesses had the higher health care costs relative to payroll in absolute terms. For example, in 2005, health insurance costs relative to payroll were 14 percent for unionized businesses and 10 percent for nonunionized businesses.

The large increase in health insurance costs relative to payroll for businesses that might have less advantaged workers raises the question of whether the increase was driven by changes in worker earnings or changes in health insurance spending. To answer this question, note that at businesses offering low wages, workers' annual earnings declined from $15,437 to $12,975 (in inflation-adjusted 2005 dollars) between 1996 and 2005. In contrast, real worker earnings at offering businesses in the top quartile increased by 14 percent, from $49,859 to $56,102. Growth in real annual earnings also was higher at offering businesses with a union presence (14.4-percent growth) than at offering businesses without a union (4.5-percent growth), and at offering businesses with 25 or more workers (8.5-percent growth) than at offering businesses with fewer than 25 workers (5.2-percent growth). These

figures are consistent with a large economic literature documenting a widening of the wage gap between skilled and unskilled workers since the late 1980s,[21] suggesting that increasing health insurance costs relative to payroll at businesses with less advantaged workers could be associated, at least in part, with growing wage inequality.

Distribution of costs. A concern about analyses that focus on average health insurance costs relative to payroll is that averages may be heavily influenced by the extremes of the distribution. Also, averages might mask inequities—for example, if some employers had very high cost growth while others had stable costs. Chart 3 shows predicted changes in the percentage of offering businesses with health insurance costs exceeding 5, 10, 15, and 20 percent of total payroll. The predicted values were calculated with the use of a logit model. Specifically, a binary indicator for whether or not a business' health insurance costs exceeded the relevant threshold was regressed on the same set of covariates included in equation (1). The predictions hold employer characteristics constant at 1996 levels. The results indicate that costs grew throughout the distribution, with an increase in the share of offering employers with

Chart 3. Predicted share of businesses with premium contributions exceeding 5, 10, 15, and 20 percent of payroll (ECI, establishment weighted), 1996–2005

Percent

- ≥ 5 percent
- ≥ 10 percent
- ≥ 15 percent
- ≥ 20 percent
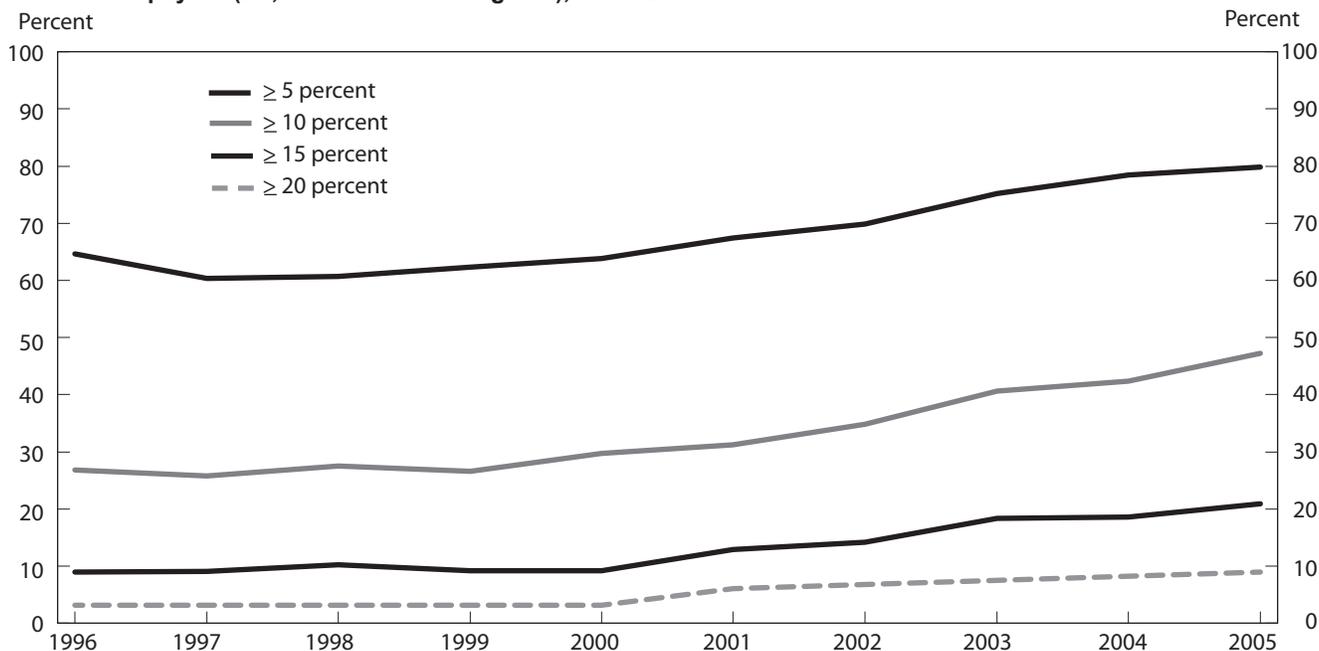
SOURCE: Based on data from Employment cost Index, Bureau of Labor Statistics.

costs exceeding each threshold. The share of businesses with health insurance costs exceeding 5 percent of payroll grew by 24 percent, from 65 percent of all businesses to 80 percent of all businesses ($t = 1.69$), and the share of businesses with health insurance costs exceeding 10 percent of payroll grew by 77 percent, from 27 percent to 47 percent of businesses ($t = 2.24$). At the extremes, the share of businesses with health insurance costs exceeding 15 percent of payroll more than doubled (increasing from 9 percent to 21 percent, $t = 2.11$), and the share of businesses with costs exceeding 20 percent of payroll nearly tripled, although this result was of borderline statistical significance ($t = 1.64$). t-values testing the difference between 1996 and 2005 predictions were calculated with the bootstrapping methods described earlier.

Multivariate adjusted trends, benefit generosity. The results just discussed indicate that, among offering establishments, health insurance costs relative to payroll rose substantially between 1996 and 2005. Employers may have responded to this increase in costs by raising employee contribution requirements, reducing benefit generosity, or otherwise discouraging participation in plans. Chart 4 plots employer health insurance contribution rates derived from published MEPS-IC statistics on total employer premiums and worker contribution amounts. According

to the chart, employer contribution rates varied between 82 percent and 84 percent of the total premium for individual plans and between 74 percent and 77 percent of the total premium for family plans, with no clear trend toward lower contribution requirements over time. These results suggest that employers did not require workers to pay an increasing share of the total premium, although employee contributions rose in proportion to overall cost growth. Two publications, one by David M. Cutler and the other by the State Health Access Data Assistance Center and the Urban Institute, indicate that takeup rates have declined over time,[22] suggesting that increases in costs might have been larger if takeup had remained stable.

Table 5 uses the EBS data to analyze trends in benefit generosity. Results are estimated from equation (2). Predicted values are reported for each of the generosity measures, with business and worker characteristics held constant as in 1996, but allowing year-specific effects to vary. Results are weighted to reflect the distribution of covered workers. The top panel, "Type of plan," lists changes in the share of workers enrolled in prepaid plans over the period examined. Worker participation in prepaid plans increased from the mid-1990s to 2000 and then declined. However, coverage in prepaid plans was still 18 percent higher in 2002–03 than it was in 1995–96. The middle panel of the table, "Limitations on coverage," shows changes over time

Chart 4. Employer contribution rates, individual and family plans, Medical Expenditure Panel Survey, Insurance Component (MEPS-IC), 1996–2004
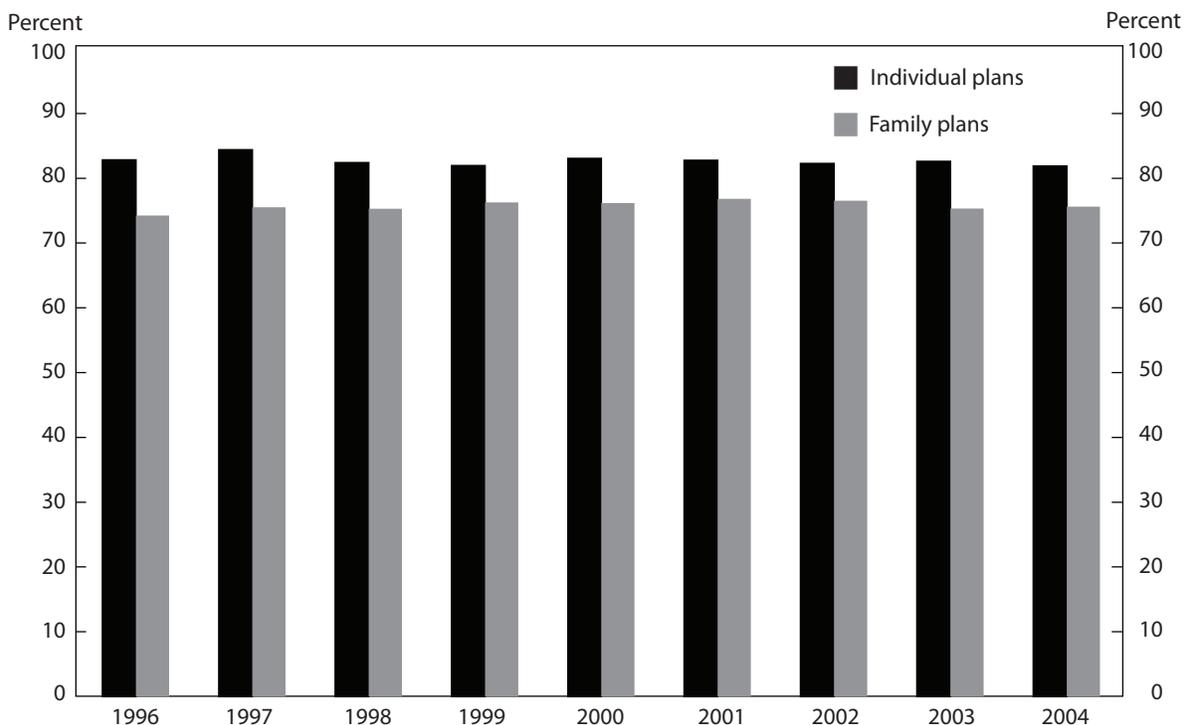
SOURCE: Derived from (MEPS-IC) online tables.

Table 5. Predicted values with business characteristics held constant as in 1995–96, type of plan and limitations on coverage (EBS, weighted by covered worker), 1995–96, 2000, and 2002–03

Charactertistic	1995–96	2000	2002–03	Percent change, 1995–96 to 2002–03	t-test[1]
Percent prepaid	0.274	0.381	0.324	18.2	3.11
Limitations on coverage					
For prepaid plans:					
Percent with copayment	.849	.907	.946	11.8	4.51
For nonprepaid plans:					
Percent with neither copayment nor					
coinsurance..	.053	.035	.024	−54.7	−3.68
Percent with coinsurance only	.667	.414	.324	−51.4	−14.65
Percent with copayment only	.104	.229	.197	89.4	5.55
Percent with coinsurance and					
copayment	.177	.320	.439	148.0	12.85
Percent with individual deductible	.762	.693	.660	−13.4	−4.81
Percent with individual out-of-pocket					
maximum..	.818	.770	.797	−2.6	−1.25
Limitation amounts (for plans with the relevant limitation)					
For prepaid plans:					
Copayments...	10.01	11.30	12.56	25.5	7.32
For nonprepaid plans:					
Copayments...	14.04	14.46	14.9	6.3	2.38
Coinsurance rates (percent)	18.5	15.8	16.1	−13.0	−8.48
Individual deductibles					
(in constant 2003 dollars).......................	$308.16	$326.16	$4,318.06	3.2	.81
Individual out-of- pocket maximums					
(in constant 2003 dollars)......................	$1,656.58	$1,475.44	$1,630.03	−1.6	−.46

[1] The t-test is taken from the 2002–03 year dummy variable in the regression used to predict the outcome. (The omitted year category is 1995–96.)

in the probability that particular coverage characteristics apply. The probability of having to make a copayment for an office visit increased significantly over time for all types of plans: workers enrolled in prepaid plans were 12 percent more likely to have a copayment in 2002–03 than in 1995–96. For workers enrolled in nonprepaid plans, the probability of having to make a copayment for an office visit and not having to pay any coinsurance increased by 89 percent, and the probability of both having to make a copayment for an office visit and having to pay coinsurance rose by 148 percent, over the period analyzed. Simultaneously, fewer nonprepaid plans required individual deductibles, and fewer nonprepaid plans required coinsurance without copayments. There was no change in the probability that a nonprepaid plan included an out-of-pocket maximum.

The bottom panel of table 5 shows cost-sharing requirements (for example, copayments and deductibles) for plans to which the relevant cost-sharing mechanism applies. Conditional on having to make a copayment, amounts increased 25.5 percent for prepaid plans and 6.3 percent for nonprepaid plans during the period studied. At the same time, coinsurance rates declined by 13 percent. There were no statistically significant changes in either individual deductible amounts or individual out-of-pocket maximum amounts. (Trends in family deductibles and in out-of-pocket maximums are not reported, because it is impossible to ascertain for sure whether plans reported in the EBS data have a family dimension. That is, a reported family deductible of "zero" could mean either that there is no deductible or that family coverage is not offered, and the two cases cannot reliably be distinguished. However, trends in family coverage limitations typically parallel trends in individual coverage limitations.)

Overall, the results presented in table 5 indicate that the prevalence of prepaid plans increased between 1995–96 and 2002–03. Further, nonprepaid plans looked more similar to prepaid plans in 2002–03 than they did in 1995–96. Specifically, more nonprepaid plans required copayments, fewer included deductibles, and coinsurance rates for nonprepaid plans declined. These trends could be due to a change in the mix of nonprepaid plans; Jon Gabel, M. Susan Marquis, and Steven H. Long document a shift away from conventional FFS plans and an increase in enrollment in PPO plans during the period examined.[23] However, this possibility cannot be directly explored in the EBS because the 2002–03 survey does not assess plan types.

Because copayments increased over time while other cost-sharing requirements declined, it is not immediately clear whether overall benefit generosity changed over the period studied. To assess total benefit generosity, the 1997 Robert Wood Johnson Survey of employers was used to predict the actuarial value of a typical plan in 1995–96 and in 2002–03. The actuarial value represents the proportion of health care spending that is covered by the plan. Appendix A gives more details on the regressions used to generate predicted actuarial values. The first row of table 6 reports the predicted average actuarial value of a typical plan in 1995–96 and 2002–03, where typical plans are defined in terms of an average of the characteristics described in table 5. Table 6 implies that the average health insurance plan became less generous between 1995–96 and 2002–03, dropping from an average actuarial value of 0.86 to 0.82. However, previous work demonstrates that, from an enrollee's perspective, the actuarial value of a plan can be quite sensitive to the enrollee's spending level. Table 6 also reports predicted actuarial values for workers based on their placement in the distribution of health care spending. These findings indicate that plans became more generous for low-spending workers and less generous for high-spending workers. For example, the predicted actuarial value of a plan for spenders in the top 50 percent of the distribution decreased from 0.87 to 0.83, while the predicted actuarial value for spenders in the bottom 50 percent of the distribution increased from 0.68 to 0.73.

The biggest driver of the decline in the overall predicted actuarial value was the increase in the probability that a plan required cost sharing in the form of a copayment, coinsurance, or both. When 2002–03 actuarial values were predicted with copayment and coinsurance prevalence rates from 1995–1996, the 2002–03 actuarial value increased to 0.85. The trend toward requiring copayments and coinsurance also explains the decrease in benefit generosity for spenders in the upper half of the distribution: because of the increased probability of having a copayment, high spenders are now more likely to pay out of pocket each time they access the health care system, increasing their total out-of-pocket costs. The increase in

Table 6. Predicted actuarial values of plans in the EBS, 1996 and 2002–03

Category of spending	1996	2002–03
Average actuarial value......................	0.86	0.82
Enrollees with spending in the top 50 percent......................	.87	.83
Enrollees with spending in the bottom 50 percent.............	.68	.73
Enrollees with spending in the top 20 percent......................	.89	.84
Enrollees with spending in the bottom 20 percent.............	.61	.72

benefit generosity for spenders in the lower half of the distribution stems primarily from the decline in the probability of having a deductible: deductibles reduce actuarial values for low spenders because individuals who do not meet the deductible end up funding 100 percent of their health care purchases out of pocket.

Discussion

For businesses that offered health insurance plans, health insurance costs relative to payroll increased by 34 percent between 1996 and 2005, and by 2005 the average offering establishment had health insurance costs in excess of 10 percent of payroll. As mentioned earlier, these costs are high relative to the 4-percent payroll tax proposed for nonoffering businesses in the California Governor's failed health reform plan, and they also exceed the 7.9-percent spending cap suggested under the 1994 Health Security Act. Most economists believe that employer premium contributions are ultimately paid for by workers in the form of reduced wages. But because employer contributions are less visible to workers than employee contributions, large increases in costs over time that have varied substantially for businesses of different types may mask a divergence in the health insurance burden borne by different types of workers. This article finds that workers at small businesses and workers at businesses without a union presence experienced particularly large growth in the share of compensation paid as health benefits. Although low-wage businesses that offered health plans had the highest rate of growth in health insurance spending relative to payroll, this finding was not statistically significant (perhaps reflecting "noise" in the measure of wage used). Nevertheless, the findings presented point to the fact that the most disadvantaged workers may be the most adversely affected by rising health care costs.

Despite the increase in employer health insurance contributions relative to payroll, health insurance offer rates do not appear to have declined over time, and in fact, the point estimates presented suggest that offer rates *increased* by 11 percent between 1996 and 2005 (although this difference was not statistically significant). Stability in offer rates was evident in all types of establishments, including those which experienced particularly high growth in health insurance costs relative to payroll (for example, small businesses, businesses without a union presence, and low-wage businesses). There are several possible explanations for the increase in costs coupled with stability in offer rates. First, the Health Insurance Portability and Accountability Act, enacted in 1996, made health insurance plans available to businesses with higher expected health care

spending, so *average* employer health insurance costs could have increased due to a change in the composition of offering firms, without a *particular* employer seeing its own costs increase. Second, reductions in Medicaid generosity attributable to State financial troubles,[24] as well as policies that expanded Medicaid access at the expense of benefit generosity,[25] may have increased worker demand for employer-sponsored coverage. To the extent that changes in Medicaid affected worker demand, pressure may have been felt most acutely at low-wage businesses, where health insurance costs relative to payroll increased substantially between 1996 and 2005. If workers bear the cost of health insurance through reduced wages, rising health insurance costs relative to payroll at low-wage businesses may mean that workers at these businesses were willing to take an increasing part of their compensation in the form of health insurance benefits. Finally, offer rates might have remained high simply because it may be more difficult for employers to add health insurance as a benefit than to eliminate it.

The findings presented also point to several cautions about employer mandates requiring all businesses to offer health insurance. First, employer mandates would impose substantial new costs on businesses that do not currently offer health insurance. Many of these newly burdened businesses would be low-wage and smaller businesses, because these firms are currently less likely to offer health insurance than other firms. A viable employer mandate might require substantial subsidies to ensure that such firms could afford to offer coverage and to protect against increasing wage inequality.

Second, although the data indicate that health insurance offer rates remained stable between 1996 and 2005, there is now substantial evidence to suggest that employee takeup declined over that timeframe due to higher premium contribution requirements.[26] Moreover, the proportion of nonelderly Americans with employer-sponsored health insurance declined by 4.6 percentage points between 2000 and 2004.[27] Although data from the MEPS-IC indicate that employee contribution shares remained remarkably stable over the period studied, costs to workers increased in proportion to overall cost growth. So, in spite of the stability in offer rates found herein, the growth in health insurance costs relative to payroll likely contributed to an overall decline in coverage.

Finally, for workers who were able to maintain their coverage despite rising costs, benefit generosity declined over time, particularly for workers with high spending levels. These declines suggest that, unless coupled with generous minimum benefit requirements, employer mandates may be unable to stem the erosion of coverage. However, policies that could be coupled with mandates to

reverse trends in benefit generosity or declines in takeup, such as minimum benefit requirements and individual mandates, would likely lead to even higher cost growth.

The challenge is to find the appropriate balance between preventing the erosion of coverage and imposing an undue burden on businesses and their workers.　□

Notes

[1] Paul Fronstin, *Sources of Health Insurance and Characteristics of the Uninsured: Analysis of the March 2006 Current Population Survey*, Issue Brief No. 298 (Washington, DC, Employee Benefit Research Institute, 2006).

[2] See the following two articles in the November–December 2006 issue of *Health Affairs*: Robert S. Galvin and Suzanne Delbanco, "Between a Rock and a Hard Place: Understanding the Employer Mind-Set," pp. 1548–55; and Alain Enthoven and Victor R. Fuchs, "Employment Based Health Insurance: Past, Present, Future," pp. 1538–47.

[3] Paul B. Ginsburg, Bradley C. Strunk, Michelle I. Banker, and John P. Cookson, "Tracking Health Care Costs: Continued Stability but at High Rates in 2005," *Health Affairs*, November–December 2006, pp. w486–95.

[4] Katherine Baicker and Amitabh Chandra, *The Labor Market Effects of Rising Health Insurance Premiums*, NBER Working Paper No. 111602005 (Cambridge, MA, National Bureau of Economic Research, 2005).

[5] Jessica S. Banthin and Didem M. Bernard, "Changes in Financial Burdens for Health Care: National Estimates for the Population Younger than 65 Years, 1996 to 2003," *Journal of the American Medical Association*, Dec. 13, 2006, pp. 2712–19.

[6] See David M. Cutler, *Employee Costs and the Decline in Health Insurance Coverage*, NBER Working Paper No. 9036 (Cambridge, MA, National Bureau of Economic Research, 2002); Michael Chernew, David M. Cutler, and Patricia S. Keenan, "Increasing Health Insurance Costs and the Decline in Insurance Coverage," *Health Services Research*, August 2005, 1021–39; and State Health Access Data Assistance Center (SHADAC) and the Urban Institute, *Shifting Ground: Changes in Employer–Sponsored Health Insurance* (Princeton, NJ, Robert Wood Johnson Foundation, 2006), on the Internet at **covertheuninsured.org/media/research/ShiftingGround0506.pdf** (visited Apr. 17, 2007). The takeup rate is defined as the ratio of the number of workers in a firm or establishment who accept health insurance coverage to the number of workers in the firm or establishment who are eligible for coverage.

[7] Katherine Swartz, "Why Requiring Employers to Provide Health Insurance Is a Bad Idea," *Journal of Health Politics, Policy, and Law*, winter 1990, pp. 779–92.

[8] See, for example, the discussion of ECI data posted on the BLS Web site at **www.bls.gov/ncs/summary.htm#ECT** (visited June 23, 2008).

[9] See Agency for Health Care Research and Quality, Medical Expenditure Panel Survey Insurance Component, Table I.A.2(2005): Percent of Private Sector Establishments that Offer Health Insurance by Firm Size and Selected Characteristics: United States, 2005, on the Internet at **www.meps.ahrq.gov/mepsweb/data_stats/summ_tables/insr/national/series_1/2005/tia2.htm** (visited Jan. 31, 2008).

[10] *National Compensation Survey: Employee Benefits in Private Industry in the United States, March 2005*, Summary 05–01 (Bureau of Labor Statistics, August 2005).

[11] Allan P. Blostin, "The National Compensation Survey: a wealth of benefits data," *Monthly Labor Review*, August 2004, pp. 3–5.

[12] See *National Compensation Survey: Employer Benefits in Private Industry in the United States, 2000*, Bulletin 2555 (Bureau of Labor Statistics, January 2003); and *National Compensation Survey: Employer Benefits in Private Industry in the United States, 2002–2003*, Bulletin 2573 (Bureau of Labor Statistics, January 2005).

[13] This information comes from summary tables reported by the Agency for Health Care Research and Quality; the tables are on the Internet at **www.meps.ahrq.gov/mepsweb/data_stats/quick_tables_search.jsp?component=2&subcomponent=1**.

[14] For details about the study and a list of related publications, see the Health and Medical Care Archive entry on the Internet at **webapp.icpsr.umich.edu/cocoon/HMCA-STUDY/02935.xml** (visited June 20, 2008).

[15] Jon Gabel, M. Susan Marquis, and Steven H. Long, "Employer-Sponsored Insurance: How Much Financial Protection Does It Provide for the Healthy and Sick?" *Medical Care Research and Review*, Dec. 1, 2002, pp. 440–54.

[16] The last covariate was of interest both because California is a large State and because the source of funds for this article—the California Health Care Foundation—has a specific interest in that State.

[17] Because the observations used to calculate the bootstrapped *t*-statistics are themselves means and not drawn from a sampling distribution, the *t*-statistic is calculated without adjusting for the sample *N* in the denominator. Specifically, $T = (\mu_1 - \mu_2)/\sqrt{\sigma_1^2 + \sigma_2^2}$. (Thanks go to Paul Heaton for clarifying this point.)

[18] The Census Bureau regions are as follows: Northeast—Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont; Midwest—Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin; South—Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, West Virginia; West—Alaska, Arizona,

California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming.

[19] See Agency for Health Care Research and Quality, "Medical Expenditure Panel Survey Insurance Component, Table I.A.2 (2005)."

[20] *National Compensation Survey*, March 2005.

[21] See Chinhui Juhn, Kevin M. Murphy, and Brooks Pierce, "Wage Inequality and the Rise in Returns to Skill," *Journal of Political Economy*, June 1993, pp. 410–42; Brooks Pierce, "Compensation Inequality," *Quarterly Journal of Economics*, November 2001, pp. 1493–1525; David Autor, Lawrence F. Katz, and Melissa S. Kearney, *Trends in U.S. Wage Inequality: Re-Assessing the Revisionists*, NBER Working Paper no. 11627 (National Bureau of Economic Research, 2005); and Thomas Lemieux, "Increasing Residual Wage Inequality: Composition Effects, Noisy Data, or Increasing Demand for Skill?" *American Economic Review,* June 2006, pp. 461–98.

[22] Cutler, *Employee Costs and the Decline in Health Insurance Coverage*; and State Health Access Data Assistance Center and the Urban Institute, S*hifting Ground*.

[23] Gabel, Long, and Marquis, "Employer-Sponsored Insurance."

[24] Teresa A. Coughlin and Stephen Zuckerman, "Three Years of State Fiscal Struggles: How Did Medicaid and SCHIP Fare?" *Health Affairs*, Web Exclusive (W5), Aug. 26, 2005, pp. 385–98.

[25] See Samantha Artiga, David Rousseau, Barbara Lyons, Stephen Smith, and Daniel S. Gaylin, "Can States Stretch the Medicaid Dollar without Passing the Buck? Lessons From Utah," *Health Affairs*, March/April 2006, pp. 532–40; and Samantha Artiga and Molly O'Malley, *Increasing Premiums and Cost Sharing in Medicaid and SCHIP: Recent State Experiences*, Issue Paper No. 7322 (Washington, DC, Kaiser Family Foundation, Kaiser Commission on Medicaid and the Uninsured, 2005).

[26] Cutler, *Employee Costs*; Chernew, Cutler, and Keenan, "Increasing Health Insurance Costs"; and State Health Access Data Assistance Center (SHADAC) and the Urban Institute, *Shifting Ground*.

[27] John Holahan and Allison Cook, "Changes in Economic Conditions and Health Insurance Coverage, 2000–2004," *Health Affairs*, Web Exclusive(W5), Nov. 1, 2005, pp. 498–508.

APPENDIX A: Reconciling this article's results with published BLS statistics

As discussed in the text of this article, the percentage of establishments offering insurance in 2005 was 56.4 percent, a rate comparable to statistics reported in the MEPS-IC, but lower than the BLS published offer rate of 63 percent. Given that the figures presented here are drawn from the same sample frame as that used to generate the BLS rate, it is surprising that there is such a large discrepancy in the two estimates. However, the rate, along with a number of other BLS published statistics, is based on a subset of ECI data (the NCS 101 and 102 samples) for which there is a global indicator for whether the firm offers health insurance. In the sample presented in this article, insurance offers are identified on the basis of whether the establishment reports positive spending on health insurance. This method can miss offering businesses in which there is no health insurance takeup in any of the occupations sampled. To analyze this issue further, the indicator variable for health insurance offering (from NCS 101 and 102) was merged into the sample used herein.

Table A–1 shows the offer rates based on the global health insurance indicator and the offer rates derived from the spending-based measure, for all years in which there are observations with an NCS 101–102 match (from 2001 to 2005). Offer rates based on the global offer measure are derived with the use of the subset of firms with a match in the NCS 101–102 sample. In 2001 and 2002, a very small share of businesses had a matching observation in the NCS 101–102 file, and all businesses with a match offered insurance. Over time, the share of observations with a match increased, and by 2005, 72 percent of businesses in the sample had an NCS 101–102 match. The table also reports three estimates of offer rates based on spending: estimates for all establishments, estimates for establishments with a match in the NCS 101–102 subsample, and estimates for establishments without a match in the NCS 101–102 subsample.

Table A–1 shows that offer rates are much higher in the NCS 101–102 subsample: in 2005, for example, 70.4 percent of NCS 101–102 establishments offered insurance, compared with 56.4 percent of all establishments. This difference could

Table A–1.	Comparison of offer rates based on global measure with offer rates based on health spending, 2001–05					
				Offer rate based on health spending		
Year	N	Percent with global offer data	Offer rate based on global measure[1]	All establishments	Establishments with NCS match	Establishments without NCS match
2001	7,587	1.4	1.00	0.581	1.000	0.578
2002	7,175	13.0	1.00	.594	.972	.559
2003	9,843	42.9	.704	.560	.644	.519
2004	11,200	64.6	.717	.578	.643	.506
2005	9,552	72.0	.704	.564	.642	444

[1] Offer rates based on the global offer measures are restricted to the subset of firms with matching data in the NCS 101–102 sample.

indicate that the NCS subsample is picking up offers that were missed in the spending-based variable presented here, but it also could be driven by differences in establishments with and without corresponding NCS offer information. The last two columns of the table suggest that establishments with matching NCS data have higher offer rates than other establishments. Overall, the figures presented suggest that both the difference in the offer indicator and differences in the sample contribute to the discrepancy between the offer rate found in this article and the published BLS offer rate. A third factor that likely contributes to the difference in offer rates is the weighting strategy; however, a detailed investigation of differences in the weights is beyond the scope of the research presented here.

Given these differences, a natural question is, Does the use of the spending-based offer measure—which may understate actual offers—lead to bias in analyses of trends over time? This is not an easy question to answer, given the available information. The global offer measure has been available only since 2001, initially just for a very small share of establishments. As a practical matter, it would not be possible to use this limited information to generate a reliable time series, especially because the global measure did not capture nonoffering businesses in 2001 and 2002. Nonetheless, it is reasonable to use the method presented here for analyses over time both because it reproduces the offer rates found in the MEPS-IC and because data on global offer rates are not available for all establishments in all years. To the extent that the method misses offering businesses with the spending-based measure, what is missed are businesses in which there is no takeup in any of the occupations sampled. The absence of takeup in an establishment is likely an indicator that the establishment's insurance plan is unattractive to employees; from the employees' perspective, this may be no different from working at an establishment that offers no insurance. It also is questionable to include these establishments when costs are calculated, because they would have zero spending and would bias the cost estimates downward.

APPENDIX B: Actuarial value regressions

As stated in the text, the 1997 Robert Wood Johnson Foundation survey, combined with estimated actuarial values (grouped by worker spending categories) calculated by the Actuarial Research Corporation,[1] was used to estimate the relationship between plan characteristics and actuarial values for prepaid and nonprepaid plans. Specifically, actuarial values were regressed on plan characteristics observed in the 1997 Robert Wood Johnson Survey, and the resulting regressions were used to impute actuarial values to plans observed in the EBS. Tables B–1 and B–2 show the regressions used to generate the im- puted actuarial values. After the regression equations were fit- ted, average actuarial values were predicted for the EBS on the basis of the average plan characteristics reported in table 5, plus additional information on the probability that a plan included vision, dental, or drug coverage. (For dummy variables, the coefficients reported in the tables were multiplied by the frac- tion of plans with the particular coverage feature.) A weighted average of the average actuarial values for a prepaid plan and nonprepaid plans was taken to predict the total actuarial value for the year.

Table B–1.	Actuarial value regressions, nonprepaid plans (*N* = 10,313)				
		By worker spending			
Characteristic	**Overall**	**Above median**	**Below median**	**Upper 20 percent**	**Lower 20 percent**
Intercept	0.786 (.003)	0.802 (.003)	0.518 (.006)	0.836 (.003)	0.424 (.007)
Plan has deductible	−.011 (.002)	.0007 (.002)	−.207 (.003)	.005 (.002)	−.384 (.004)
Deductible amount	−.0001 (.00000)	−.0001 (.00000)	−.0002 (.00001)	−.0001 (.00000)	−.0001 (.00001)
Plan has copayment	−.029 (.003)	−.050 (.003)	.334 (.007)	−.074 (.003)	.558 (.008)
Copayment amount	−.002 (.0002)	−.002 (.0002)	−.008 (.0004)	−.001 (.0002)	−.011 (.0005)
Plan has coinsurance	−.079 (.004)	−.089 (.004)	.091 (.007)	−.104 (.004)	.147 (.009)
Coinsurance amount	−.004 (.0001)	−.003 (.0001)	−.006 (.0002)	−.003 (.0001)	−.005 (.0003)
Plan covers drugs	.156 (.002)	.154 (.002)	.196 (.005)	.133 (.002)	.163 (.006)
Plan covers dental	.0005 (.0013)	.0002 (.0013)	.005 (.003)	−.0003 (.001)	−.0002 (.003)
Plan covers vision	.007 (.001)	.007 (.001)	.008 (.003)	.007 (.001)	.006 (.003)
Plan has an out-of- pocket maximum	.084 (.002)	.087 (.002)	.021 (.004)	.102 (.002)	.027 (.005)
Out-of-pocket maximum amount	−.000008 (4.77E-7)	−.000009 (4.80E-7)	−5.50E-7 (9.52E-7)	−.00001 (4.92E-7)	.000002 (.000001)

NOTE: Standard deviations are in parentheses.

Table B–2.	Actuarial value regressions, health maintenance organization (HMO) plans (N = 7,543)				
Characteristic	**Overall**	**By worker spending**			
		Above median	**Below median**	**Upper 20 percent**	**Lower 20 percent**
Intercept..	0.823 (.003)	0.832 (.003)	0.678 (.006)	0.860 (.003)	0.635 (.009)
Plan has deductible...........................	.012 (.002)	.026 (.002)	−.219 (.005)	.028 (.003)	−.465 (.007)
Deductible amount.............................	−.0001 (.00001)	−.0001 (.00001)	−.0004 (.00001)	−.0001 (.00001)	−.0001 (.00002)
Plan has copayment...........................	−.062 (.003)	−.073 (.003)	.115 (.005)	−.091 (.003)	.186 (.007)
Copayment amount............................	−.009 (.0001)	−.008 (.0001)	−.016 (.0003)	−.007 (.0001)	−.017 (.0004)
Plan covers drugs...............................	.133 (.003)	.131 (.003)	.167 (.005)	.111 (.003)	.140 (.007)
Plan covers dental.............................	.002 (.002)	.002 (.002)	−.0004 (.003)	.003 (.002)	.001 (.004)
Plan covers vision..............................	.004 (.001)	.005 (.001)	.001 (.002)	.005 (.001)	.0009 (.003)
Plan has out-of-pocket maximum	.108 (.002)	.114 (.002)	.003 (.004)	.134 (.002)	.003 (.005)
Out-of-pocket maximum amount	−.00002 (8.50E-7)	−.00002 (8.49E-7)	.000003 (.000002)	−.00002 (8.73E-7)	.00001 (.00000)

NOTE: Standard deviations are in parentheses.

Note

[1] Methods used are described in Jon Gabel, Larry Levitt, Erin Holve, Jeremy Pickreign, Heidi Whitmore, Kelly Dhont, Samantha Hawkins, and Diane Rowland, "Job-Based Health Benefits in 2002: Some Important Trends," *Health Affairs*, September–October 2002, pp. 143–51.