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RESEARCH ARTICLE

Impacts of Rising Health Care Costs on Families with Employment-Based Private Insurance: A National Analysis with State Fixed Effects

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Background. Given the rapid growth of health care costs, some experts were concerned with erosion of employment-based private insurance (EBPI). This empirical analysis aims to quantify the concern.

Methods. Using the National Health Account, we generated a cost index to represent state-level annual cost growth. We merged it with the 1996–2003 Medical Expenditure Panel Survey. The unit of analysis is the family. We conducted both bivariate and multivariate logistic analyses.

Results. The bivariate analysis found a significant inverse association between the cost index and the proportion of families receiving an offer of EBPI. The multivariate analysis showed that the cost index was significantly negatively associated with the likelihood of receiving an EBPI offer for the entire sample and for families in the first, second, and third quartiles of income distribution. The cost index was also significantly negatively associated with the proportion of families with EBPI for the entire year for each family member (EBPI-EYEM). The multivariate analysis confirmed significance of the relationship for the entire sample, and for families in the second and third quartiles of income distribution. Among the families with EBPI-EYEM, there was a positive relationship between the cost index and this group's likelihood of having out-of-pocket expenditures exceeding 10 percent of family income. The multivariate analysis confirmed significance of the relationship for the entire group and for families in the second and third quartiles of income distribution.

Conclusions. Rising health costs reduce EBPI availability and enrollment, and the financial protection provided by it, especially for middle-class families.

Key Words. Private insurance, health care costs, financial risk

Despite a temporary reprieve in the 1990s, growth in health care costs accelerated again in the early 2000s (Strunk, Ginsburg et al. 2002). Although many studies have examined trends in the growth of health care costs (Glied 2003),

reasons for the growth (Bodenheimer 2005), and the associations among cost growth, health care access (Lesser and Ginsburg 2003; Collins, Kriss et al. 2006), and quality (Bodenheimer and Fernandez 2005), the literature offers weak evidence on the direct impact of rising health care costs on private insurance availability and enrollment and the resulting consequences for the affordability of health care. Two recent studies have shown that out-of-pocket (OOP) medical expenditures are placing a higher strain on family incomes than they have in the past (Waters, Anderson et al. 2004; Banthin and Bernard 2006). One new CMS report confirmed the continuous growth of OOP expenditures per capita in the United States, which increased from \$547 per capita in 1990 to \$974 in 2009, an increase of 78 percent from 1990 (CMS 2011). Another recent article describes trends in underinsurance and the affordability of employer coverage (Gabel, McDevitt et al. 2009). Although the authors of these papers mentioned high and rapidly rising health costs, they did not examine the direct impact of rising costs on enrollment in employment-based private insurance (EBPI) or the financial protection afforded to those with EBPI, nor whether these relationships differed substantively for families with different incomes.

Understanding the consequences of rising health care costs on EBPI is particularly important because the majority of Americans obtain health insurance coverage through employers (Enthoven and Fuchs 2006), and EBPI continues to be at the core of reform efforts that aim to expand insurance and improve access. For example, effective by January 1, 2014, the landmark Patient Protection and Affordable Care Act will impose a \$2,000 per employee tax penalty on employers with over 50 employees who do not offer health insurance to their full-time workers (McNamara 2010). The Act will also affect small employers through health care tax credits and insurance exchanges. According to one national survey, one-third of small employers who have fewer than 50 employees and currently do not offer health insurance to their employees said they would be more likely to because of the tax credits and the insurance exchange (Small Business Majority 2010).

The EBPI system, however, could be threatened by rapid growth in health care costs. A number of national experts have recently raised concerns about the erosion of EBPI (Enthoven and Fuchs 2006; Robinson 2006), though none of them conducted empirical studies. Thus, the extent to which

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high and rising health care costs lead to reductions in EBPI availability and enrollment or to increases in OOP expenditures remains an unsettled question.

To identify the strongest evidence about the relationship between rising health care costs and the erosion of EBPI, this paper focuses on families in which every member has EBPI for the entire year (EBPI-EYEM). These are the families in the private marketplace that are thought to be the most protected from financial loss due to medical calamity. We examined three impacts of the rising costs on EBPI, including families' likelihood of receiving an EBPI offer, families' enrollment in EBPI-EYEM, and OOP expenditures among those families who retain their EBPI-EYEM coverage. Our findings of reduced offer and enrollment in EBPI-EYEM and increased financial risk among the families with EBPI-EYEM reveal the extent to which the erosion of EBPI is far-reaching.

METHODS

Conceptual Framework

We posit that, when faced with rising health care costs, employers either have to slow wage growth or find methods to contain their share of premium expenditures to prevent significant increases in total compensation for their employees. They may increase premiums and cost-sharing in the policies they offer the following year. For example, one recent report by the Kaiser Family Foundation found that the average annual worker premium contributions for family coverage increased significantly from \$1,543 in 1999 to \$3,997 in 2010 (Kaiser Family Foundation 2010). Some employers may even stop offering health insurance the following year (Gabel, Claxton et al. 2003; Galvin and Delbanco 2006). Consequently, in the following year, employees and their families either may not receive an offer of insurance coverage from their employers, may decline the offer they received from their employers due to increased premium and/or reduced benefits, or may be expected to spend a larger share of their incomes on their medical care bills if they accept the offer.

The effect of rising health care costs on EBPI availability and enrollment could differ by family income if, for example, low-income families are less likely to receive EBPI offer, and more likely to forgo insurance. Similarly, the effect of rising costs on OOP expenditures could differ by family income if the low-income workers are more likely to be offered or to select high-deductible or low-benefit plans.

Data

Since our primary motivation is to quantify the relationship between rising health costs and the erosion of EBPI, we generated a key independent variable—the cost index—to reflect the labor market pressures generated by increasing health costs. We did not use the Medical Care Consumer Price Index because of its problems as identified by economists (Phelps 2003). In particular, it aims to indicate increases in prices (inflation). The cost pressure imposed on the health care system, however, is not only a matter of price but also the total amount of health care expenditures, which are the product of health care price and the total volume of health care services used. Our cost index below reflects the overall financial strain on the health care system. We also did not use the health care costs for the privately insured only, but the total amount of health care expenditures, including all sources of payment, such as public insurance (Medicare, Medicaid, CHIP, VA, TRICARE), private insurance, and OOP expenditures. The reason is that Medicare is a price setter and there is cost shifting to the private sector (Zwanziger, Melnick et al. 2000; Whelan 2011).

We used data on annual growth of health expenditures reported by the National Health Account (Smith, Cowan et al. 2005). We generated our cost index to represent the average annual cost growth for each state and the District of Columbia. This is the most geographically disaggregated level available in the public-use data of the National Health Account. Our study period is 1996–2003, which covers a low-growth period (1996–1999) and a high-growth period (2000–2003).

We then merged the cost index with the Medical Expenditure Panel Survey (MEPS) at the AHRQ Data Center at Rockville, MD. The MEPS is a series of nationally representative surveys of health insurance coverage, health care use, and expenditures in America (Agency for Healthcare Research and Quality 2003).

In accordance with the 2002 Institute of Medicine report, “Health Insurance Is A Family Matter” (Institute of Medicine 2002), the unit of analysis is the family. Among the families surveyed by the MEPS in 1996–2003, we identified 72,609 families whose annual income were greater than zero because the purpose of our study is to examine how the rising costs affect families with different incomes, especially OOP expenditures as percentage of family income. Among these families, a weighted proportion of 47 percent, or 30,608, had EBPI-EYEM, which was defined in this study through a series of steps. First, we examined the monthly insurance coverage for each family member. We

used specific MEPS variables about private employer/union group health insurance during each month of the year, including 12 variables (i.e., PEGJA–PEGDE in MEPS), each of which indicated EBPI coverage for a month of the year. If a family member answered “Yes” to the monthly MEPS questions of having private employer/union group insurance in each of the 12 months in the year (i.e., answering “Yes” to all the 12 variables [PEGJA–PEGDE] in MEPS), the member will be considered as having EBPI for the entire year. Second, if each family member had EBPI, then the family had EBPI-EYEM.

We also used the MEPS information to construct a dichotomous variable of families’ receiving an offer of EBPI. If a family had any family members who were at least 16 years old at the time of the MEPS interview and reported on receiving an EBPI offer during the year (Agency for Healthcare Research and Quality 2003), then the family is considered to receive an offer of EBPI.

Given the fact that there is no consensus among researchers on definition of financial risk caused by medical expenditures (Xu, Evans et al. 2003), we follow prior studies by defining measures of financial risk as the probability that a family’s OOP expenditures exceed 10 or 20 percent of family income (Xu, Evans et al. 2003; Gabel, McDevitt et al. 2009). The 10 percent level is included because it has been used as an indicator for underinsurance by previous studies. We did not examine OOP expenditures beyond the 20 percent level because fewer than 3 percent of the study families had OOP expenditures exceeding that level. Our measure of the OOP expenditures includes any medical expenses paid by the family OOP, such as copayment, deductibles, co-insurance, and any expenses not covered by the family’s health insurance. It does not include insurance premium contributions by the families because the MEPS does not provide reliable premium data before 2001 (Collins, Kriss et al. 2006).

Statistical Analysis

In addition to descriptive analyses, we estimate multivariate logistic regression models. The model on families receiving an EBPI offer includes the following independent variables: (1) family characteristics, including number of children, number of adults, residence in metropolitan statistical area, and quartiles of family income in each year; (2) characteristics of family heads, such as age, gender, race/ethnicity, education, marital status, and status of union member; (3) a vector of calendar year variables to control for trends; (4) dummy variables for 50 states and the District of Columbia; and (5) the state-level

health care cost index with 1-year lag. We estimated alternative specifications that included higher order terms in the lagged cost index but found that did not improve model fit. To show how the EBPI offer changes with the cost growth, we use the model to predict a family's probability of receiving an EBPI offer by setting the cost index to 0, 5, and 15 percent, respectively.

We estimate a similar model on families' EBPI-EYEM enrollment. In our model of family financial risk, we control for a family's total expenditures in addition to the above independent variables. By including a family's total expenditures, we control for different levels of services utilization. A positive coefficient of the cost index, then, would indicate that financial risk increased with rising health care costs, even though a family's total health care use remained unchanged.¹ To show the impact of rising costs, we use the model to predict a family's financial risk using alternative values of the cost index (0, 5, and 15 percent).

We first run the above models on the entire sample and then run them by quartiles of the family income distribution to test the hypothesis that rising health care costs have a bigger impact on families with low or middle income. We summarized information about the sample and the variables in the Supporting Information, Appendix S1.

RESULTS

Bivariate Analyses

We found a significantly inverse relationship between the proportion of families receiving an offer of EBPI and the medical cost index (χ^2 test, $p < .05$). Figure 1A shows that as the cost index went down in the late-1990s, there was an increase in the proportion of families receiving an EBPI offer. Then, as the cost index increased in the early 2000s, the number of families receiving an EBPI offer decreased.

Similarly, there is a significantly inverse relationship between the proportion of families with EBPI-EYEM and the medical cost index (χ^2 test, $p < .05$). Figure 1B shows that as the cost index went down in the late-1990s, there was an increase in the proportion of families covered by EBPI-EYEM. Then, as the cost index increased in the early 2000s, the number of families with EBPI-EYEM decreased.

Among the families with EBPI-EYEM, we found a significantly positive relationship between the cost index and this group's likelihood of having OOP expenditures exceeding 10 percent of family income (χ^2 test, $p < .05$).

Figure 1: (a) An Inverse Association between the Observed Proportion of Families Receiving an Employment-Based Private Insurance (EBPI) Offer and the Medical Cost Index. (b) An Inverse Association between the Observed Proportion of Families with EBPI-EYEM and the Medical Cost Index. (c) A Positive Association between the Observed Financial Risk for Families with EBPI-EYEM and the Medical Cost Index

As Figure 1C shows, the positive relationship between the curves is evident both in the low-growth period (1996–1999) and in the high-growth period (2000–2003).

The bivariate analyses also indicated significant differences in trends of the study outcomes among the families with different incomes. As shown in Figure 2A, families in the four quartiles of income distribution display different trends in receiving an EBPI offer. Although the proportion of families receiving an offer of EBPI had been relatively stable for the fourth quartile over the study period (over 90 percent for each year in the period), the

Figure 2: (a) Observed Trends in the Proposition of Families Receiving an Employment-Based Private Insurance (EBPI) Offer by Quartile of Family Income. (b) Observed Trends in the Proposition of Families Having an EBPI-EYEM by Quartile of Family Income. (c) Observed Trends in the Proposition of Families with EBPI-EYEM and Having OOP Expenditures Exceeding 10 Percent of Family Income by Quartile of Family Income

proportion had changed considerably for each of the other three quartiles. For example, the proportion of the second quartile families receiving EBPI offer first increased significantly in the low-growth period (72 percent in 1996 versus 77 percent in 1999, χ^2 test, $p < .05$), and then decreased significantly in the high-growth period (77 percent in 1999 versus 65 percent in 2003, χ^2 test, $p < .05$). Figure 2A also reveals that the proportion of families receiving an offer of EBPI increased with family income as less than 40 percent of families in the first quartile received an EBPI offer in any year of the study period, substantially below the proportion for other three quartiles.

A similar pattern appears in Figure 2B, which presents the observed trends in the proportion of families having EBPI-EYEM by quartile of family income distribution. Although the EBPI-EYEM coverage had been relatively stable for the fourth quartile families in the study period (over 60 percent in any study year), the coverage changed significantly for the other three quartile families, each of which first had a significant increase in the coverage in the low-growth period and then a significant decrease in the high-growth period. Less than 20 percent of the first quartile families had EBPI-EYEM coverage in each of the study years, significantly lower than any of the other three quartiles.

A different pattern is revealed in Figure 2C, which shows the trends in the proportion of families with EBPI-EYEM coverage and OOP expenditures exceeding 10 percent of family income by quartile of family income. The only significantly upward trend is for the second quartile families (χ^2 test, $p < .05$). The proportion is volatile for the first quartile families, but the trend is not statistically significant (χ^2 test, $p > .05$) in the study period due to relatively small number of the first quartile families having EBPI-EYEM ($n = 2,823$), compared with 6,566; 9,694; and 11,525 for the second, third, and fourth quartile families, respectively.

Multivariate Analyses

The observed inverse relationship between the proportion of families receiving an offer of EBPI and the medical cost index was confirmed by the multivariate analysis. As Table 1 shows, increases in the previous year's medical cost were associated with significant reductions in families receiving EBPI offer (adjusted odds ratio [OR] = 0.97, $p < .001$). When the model was run by quartiles of family income, we found that the reductions in EBPI offerings were significant for the families in the first (OR = 0.96, $p < .001$), second (OR = 0.97, $p < .1$), and third (OR = 0.95, $p < .001$) quartiles of income distribution.

Table 1: Estimated and Predicted Effects of the Medical Cost Index on Families Receiving an Employment-Based Private Insurance (EBPI) Offer by Income Level

Quartile of Family Income Distribution	Adjusted Odds Ratio of Cost Index	Predicted Proportion (%) of Families Receiving EBPI Offer Given the Cost Index at		N
		5%	15%	
1	0.96 (0.94, 0.99)*	36	29	18,303
2	0.97 (0.95, 0.99)***	71	66	18,083
3	0.95 (0.91, 0.98)*	86	79	18,151
4	0.99 (0.95, 1.03)	91	90	18,049
Entire sample	0.97 (0.95, 0.98)*	71	66	72,609

Note. Odds ratios for the income groups are from the models run on each subsample defined by quartile of family income. Full results of the multivariate analysis are available from the authors upon request.

* $p < .001$;

** $p < .05$;

*** $p < .1$.

We used the model to predict a family's probability of receiving an EBPI offer based on different values of the cost index. With a cost index of 5 percent, indicating a 5 percent increase in health care costs between 1996 and 2003, the model predicts that 71 percent of families nationwide would be receiving an offer of EBPI. With the cost index increased to 15 percent, the share of families receiving an EBPI offer would decrease to 66 percent. Our predictions also show considerable reductions in EBPI offerings for the families in the first, second, and third quartiles of income distribution, but almost no change for the families in the fourth quartile of income distribution. For example, when the cost index increased from 5 to 15 percent, the share of families receiving an EBPI offer would decrease from 36 to 29 percent for the families in the first quartile of income distribution, from 71 to 66 percent for the second quartile families, and from 86 to 79 percent for the third quartile families, compared with from 91 to 90 percent for the fourth quartile families.

As Table 2 shows, increases in the prior year's medical costs were associated with significant reductions in EBPI-EYEM enrollment (adjusted OR = 0.97, $p < .001$). When the model was run by quartiles of family income, we found that the reductions in EBPI-EYEM enrollment were significant for the families in the second quartile (OR = 0.96, $p < .001$) and in the third quartile (OR = 0.99, $p < .05$) of income distribution.

Table 2: Estimated and Predicted Effects of the Medical Cost Index on Families’ Enrollment in EBPI-EYEM by Income Level

<i>Quartile of Family Income Distribution</i>	<i>Adjusted Odds Ratio of Cost Index</i>	<i>Predicted Proportion (%) of Families with EBPI-EYEM Given the Cost Index at</i>		<i>N</i>
		<i>5%</i>	<i>15%</i>	
1	0.98 (0.94, 1.02)	16	14	18,303
2	0.96 (0.93, 0.99)*	38	31	18,083
3	0.97 (0.94, 0.99)**	55	48	18,151
4	0.98 (0.96, 1.01)	64	61	18,049
Entire sample	0.97 (0.96, 0.98)*	43	41	72,609

Note. Odds ratios for the income groups are from the models run on each subsample defined by quartile of family income. Full results of the multivariate analysis are available from the authors upon request.

* $p < .001$;

** $p < .05$.

We used the model to predict a family’s probability of having EBPI-EYEM based on different values of the cost index. With the cost index increased from 5 to 15 percent, the share of families with EBPI would decrease from 43 to 39 percent for the entire sample. Our predictions also show considerable reductions in EBPI-EYEM coverage for the families in the second and third quartiles of income distribution, but only very small reductions for the families in the first and fourth quartiles of income distribution. For example, when the cost index increased from 5 to 15 percent, the share of families with EBPI would decrease from 38 to 31 percent for the families in the second quartile of income distribution and from 55 percent to 48 percent for the third quartile families, compared with from 16 to 14 percent for the first quartile families and from 64 to 61 percent for the fourth quartile families.

As Table 3 shows, the multivariate analyses confirmed statistical significance of the positive relationship between families’ financial risk and the cost index for the entire group (OR = 1.07, $p < .001$) and for the families in the second quartile (OR = 1.13, $p < .001$) and the third (OR = 1.11, $p < .05$) quartiles of income distribution.

We used the mode to predict the probability of a family with EBPI-EYEM spending more than 10 percent of income on OOP expenditures. We found that when the cost index increases from 5 to 15 percent, the proportion of families with EBPI-EYEM spending more than

Table 3: Estimated and Predicted Effects of the Medical Cost Index on Financial Risk among Families with EBPI-EYEM by Income Level

<i>OOP Expenditures as % of Family Income</i>	<i>Quartile of Family Income Distribution</i>	<i>Adjusted Odds Ratio of Cost Index</i>	<i>Predicted Proportion (%) of Families with EBPI- EYEM and Having OOP Expenditures Exceeding the Cutoff Given the Cost Index at</i>		<i>N</i>
			<i>5%</i>	<i>15%</i>	
≥ 10% of family income	1	1.00 (0.93, 1.08)	34.0	34.3	2,822
	2	1.13 (1.03, 1.23)*	4.5	11.7	6,487
	3	1.11 (1.00, 1.25)**	2.3	5.8	9,231
	4	0.99 (0.81, 1.21)	0.8	0.8	8,446
	Entire sample	1.07 (1.02, 1.12)*	4.9	7.5	30,603
≥ 20% of family income	1	1.03 (0.94, 1.12)	19.6	23.3	2,793
	2	1.06 (0.87, 1.30)	1.2	0.2	5,052
	3	0.91 (0.72, 1.14)	0.7	0.3	5,298
	4	1.54 (0.59, 4.01)	0.3	1.3	2,157
	Entire sample	1.04 (0.96, 1.12)	2.1	2.7	30,463

Note. Odds ratios for the income groups are from the models run on each subsample defined by quartile of family income. Full results of the multivariate analysis are available from the authors upon request.

* $p < .001$;

** $p < .05$.

10 percent of their incomes on OOP expenditure would increase from 4.9 to 7.5 percent. Our predictions also reveal considerable reduction in financial risk for the families in the second and third quartiles of income distribution, but almost no changes for the families in the first and fourth quartiles of income distribution. For example, when the cost index increased from 5 to 15 percent, the share of families with EBPI-EYEM and OOP expenditures exceeding 10 percent of family income would increase from 4.5 to 11.7 percent for the families in the second quartile of income distribution and from 2.3 to 5.8 percent for the third quartile families, compared with from 34.0 to 34.3 percent for the first quartile families and from 0.8 to 0.8 percent for the fourth quartile families.

There was, however, no significant relationship between the cost index and the proportion of families with OOP expenditures exceeding 20 percent of family income.

CONCLUSION AND DISCUSSION

Our analysis provides evidence that rising medical care costs reduce the EBPI availability and enrollment and increase the financial risk for those families retaining EBPI-EYEM. Although these overall impacts are not surprising and the findings are consistent with expectations regarding employer and employee behavior (Enthoven and Fuchs 2006; Robinson 2006), this study quantifies the impacts and identifies differences in the impacts across the income distribution. We found significant effect on receiving an EBPI offer for low-and middle-income families (the first, second, and third quartiles of the income distribution), and significant effects on EBPI-EYEM enrollment and financial risk for middle-income families (the second and third quartiles of the income distribution).

Our study finding of families' reduced likelihood of receiving an EBPI offer in the study period is consistent with the literature. For example, the report by the Kaiser Family Foundation found that there was no difference in percentage of employers offering coverage in 2010 from that it was in 2000, but higher than it was in the mid-1990s (Kaiser Family Foundation 2010).

Prior research has examined how the rising health costs affect the proportion of Americans without health insurance. For example, one study reported that the proportion of Americans without health insurance underwent a net increase of 2 percent in just the 2 years between 2001 and 2003 (Collins, Doty et al. 2004). Another study found that more than half of the decline in coverage rates in the 1990s was attributable to the increase in health insurance premiums (Chernew, Cutler et al. 2005). This study, however, did not focus on EBPI, and it used data from 64 large metropolitan statistical areas, rather than a nationally representative sample. Our research adds to this literature by analyzing national data with fixed state effects. Our analysis reveals inverse relationships between the growth in health care costs and the decreases in EBPI availability and enrollment, two relationships based on intra-state variation in the cost index over time rather than inter-state variation in cross section. The relationships differ by family income. Although the reason for the fourth quartile's insignificant result is relatively straightforward (i.e., this group with high income steadily received an EBPI offer and was able to retain the highest proportion of EBPI-EYEM in the context of rising health care costs), the insignificant result of EBPI-EYEM coverage for the first quartile seems counter-intuitive. One possible explanation is that the substantial expansion of public insurance in the past two decades has resulted in

reduction in private coverage among low-income families, which was called as the “crowd-out” issue by prior studies (Gruber and Simon 2008). In particular, after the implementation of CHIP (Children’s Health Insurance Program) in 1997, a considerable number of private insurance enrollees have switched to CHIP (Gold, Mittler et al. 2001; Gruber and Simon 2008). Most of them are children, and some of them are low-income parents as some states allowed their CHIP to cover low-income adults (Busch and Duchovny 2005).

Recent literature has also documented high OOP expenditures for Americans (Waters, Anderson et al. 2004; Banthin and Bernard 2006). One article found that in 2003, 12 percent of adults with any private insurance faced OOP expenditures exceeding 10 percent of their income (Schoen, Doty et al. 2005). Following this study, a recent paper reported on the upward trend in underinsurance of employer coverage between 2004 and 2007 (Gabel, McDevitt et al. 2009). These two studies, however, used individual adults, not families, as the unit of analysis. They did not tie the increased financial risk among the insured to growing health care costs at the market level, nor did they distinguish the effects by income levels.

To our knowledge, ours is the first work to show directly the strong relationship between market-level increases in medical care costs and increases in a family’s financial risk due to health care spending. By controlling for a family’s total medical care expenditures, we find that much of the increased risk is not due to increased medical care use (total costs) by the family, but instead depends on market-level health care spending. Our results reveal the weakening of EBPI and the important impact of rising health care costs on this weakening.

Our analyses examine two thresholds of financial risk, OOP expenditures exceeding 10 or 20 percent of family income. For the higher threshold, we found that the effects were not statistically significant, suggesting that EBPI continues to protect families against severe financial loss above 20 percent of family income. For the lower threshold, we found that there is a strong relationship between rising health care costs and increased financial risk both for the entire study sample and among families from the second quartile to the third quartile of income distribution. Lack of evidence of a relationship among families in the lowest quartile is somewhat surprising. Because these families have EBPI for the entire year and they have very low-income, however, they may have idiosyncratic circumstances that blur the relationship. Our results do suggest that private insurance continues to protect more affluent families (those with incomes in the fourth income quartile) against financial loss above 10 percent of family income.

Our study has a number of strengths, including the use of a nationally representative sample, a design that uses intra-state variation over an 8-year study period, and a focus on American families that are thought to have the best health insurance coverage in the private marketplace (i.e., EBPI-EYEM). This study also has limitations. In particular, the relationship between rising health costs and families' financial risks might be caused by factors unobserved in the MEPS survey, and causal interpretation should be made with caution. This analysis used cost growth at the state level, which does not reflect variation within a state or any subsidies across states. Future analyses at smaller areas that better reflect markets, such as metropolitan statistical area, county, or hospital service area level, are needed. Our measure of cost growth at the state level reflects the joint effects of health services prices, quantities, and quality. Like previous studies in this area (Baicker and Chandra 2004; Chernew, Cutler et al. 2005), we did not estimate structural models but chose to take a reduced form approach. Our goal here is to develop evidence regarding the evolution of EBPI in a health care market with increasing cost pressures and to provide a more complete story regarding the consequences of rising health care costs for EBPI's availability and enrollment, and the financial protection offered by it. Further analyses, especially structural models, may provide additional insights regarding the roles of health care quality, quantity, and price in affecting the evolution of EBPI, allowing us to understand better the effects of health cost growth. For example, if quality improvement is the main reason for the rising costs (e.g., more preventive care, which increases the short-run costs, and improved patient safety, which requires investment by health care systems and plans), then employers may want to keep offering health insurance to enable their employees' access to quality care. If increased quantity of health services utilization is the main reason (e.g., increased treatment intensity as found by prior research; Thorpe and Howard 2006), both the insurers and the employers may want to increase OOP expenditures to rein in unnecessary treatment and procedures.

This study relied on families' reports of EBPI availability, including private insurance offered either by private and or by government employers. Future studies are needed to distinguish insurance offerings among different employers, such as private versus government employers. The MEPS Household Component data also did not allow us to analyze government workers with self-insured coverage, which remains a topic for future studies. The MEPS did not collect information about tax deductions related to medical expenditures exceeding 7.5 percent of family income, as allowed by the current federal tax codes. In addition, we could not include insurance premium

contributions by families since the MEPS contains reliable premium data only from 2001 forward (Collins, Kriss et al. 2006). As a result, we were not able to examine how EBPI enrollment is affected by increases in insurance premium, which is an important measure of whether the insurance is affordable to the family. By excluding insurance premiums, we may underestimate families' financial risk; however, excluding tax deductions may cause overestimation. How these two variables affect estimates of families' economic burden remains an open question.

Our results have important policy implications. First, our finding of significantly negative impacts of cost growth on EBPI availability and enrollment implies that controlling health care costs may be essential to maintain the role of EBPI in our health care system. As Emanuel noted recently, "the fundamental problem arises because of a cost-coverage trade-off. Without controlling health care costs, any attempt at universal coverage will be transient (Emanuel 2008)." Our work quantifies this concern.

Second, because insurance is a significant component of employee compensation packages, rising health care costs generate substantial economic pressures in the labor market. Our results support the concern (Enthoven and Fuchs 2006) that rising medical costs are reducing the protections afforded to families by private insurance and provide direct evidence of the consequences for working- and middle-class families: reductions in employment-based insurance and increased financial risk due to medical care costs. The literature suggests that increases in OOP expenditures can translate into reduced access to care, worse health outcomes, and medical debt or bankruptcy (Mentnech, Ross et al. 1995; McKusick, Mark et al. 2002; Finkelstein, Brown et al. 2005). For example, one study showed that utilization of health care services by those with private insurance and medical debt is similar to utilization by individuals without any insurance coverage (Hoffman, Rowland et al. 2005). Thus, excessive financial risk not only affects the pocketbooks of the privately insured families but also has important implications for the health care that they receive. Unless health care costs are controlled, financial protection and access to care will likely continue to deteriorate for working- and middle-class families.

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NOTE

1. We ran two alternate models by including and excluding a family's total annual health expenditures. The two models generated similar results. We reported here the model with families' annual expenditures because it is conceptually sound.

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SUPPORTING INFORMATION

Additional supporting information may be found in the online version of this article:

Appendix SA1: Author Matrix.

Appendix S1: Summary of Variables about the Family Heads and the Families.

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