High-Ductible Health Plans

Employee Choice of a High-Deductible Health Plan across Multiple Employers

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Objective. To determine factors associated with selecting a high-deductible health plan (HDHP) rather than a preferred provider plan (PPO) and to examine switching and market segmentation after initial selection.

Data Sources/Study Setting. Claims and benefit information for 2005–2007 from nine employers in western Pennsylvania first offering HDHP in 2006.

Study Design. We examined plan growth over time, used logistic regression to determine factors associated with choosing an HDHP, and examined the distribution of healthy and sick members across plan types.

Data Extraction. We linked employees with their dependents to determine family-level variables. We extracted risk scores, covered charges, employee age, and employee gender from claims data. We determined census-level race, education, and income information.

Principal Findings. Health status, gender, race, and education influenced the type of individual and family policies chosen. In the second year the HDHP was offered, few employees changed plans. Risk segmentation between HDHPs and PPOs existed, but it did not increase.

Conclusions. When given a choice, those who are healthier are more likely to select an HDHP leading to risk segmentation. Risk segmentation did not increase in the second year that HDHPs were offered.

Key Words. Consumer-driven health plan, risk segmentation, high-deductible health plan

In response to the rising cost of health care, there has been increased interest in making the health care system more responsive to patients/consumers and in making consumers more responsible for the cost of health care. One result has been the growth of “consumer-directed health care.” Although consumer-directed health care has been defined many ways, the term commonly applies to an insurance product that has a high deductible with an associated health savings account (HSA) and a limit on out-of-pocket expenditures. This model was formalized under the Medicare and Medicaid Modernization Act and the

accompanying regulations, and the insurance plans are referred to as qualified high-deductible health plans (HDHPs).

Since 2006, there has been an increase in the number of firms offering qualified HDHPs. According to the 2009 *Survey of Employer Sponsored Health Benefits*, between 2006 and 2009, the percentage of firms offering such plans increased from 6 percent to 12 percent while the proportion of employees enrolled in them increased from 4 percent to 8 percent (Kaiser Family Foundation and Health Research & Educational Trust 2009). However, these products do not have a unique design. Although they must meet specific criteria for payments into HSAs to be excluded from income taxes; within limits, the insurance component can vary with respect to the size of the actual deductible, the maximum out-of-pocket expense, and whether preventive services are excluded from the deductible. Furthermore, both covered services and the size of the networks offering discounted prices can vary. In addition, employers differ with respect to the size of their contribution, if any, into a HSA, and whether they offer the plans as a choice or replacement for all other health plans.

Despite the growth of this type of insurance, the product remains controversial. Proponents believe individuals should have the right to purchase a policy that is right for them (Goodman 2006; Wilensky 2006; Herzlinger and Falit 2009). They argue these plans will be more affordable because their premiums will be lower than those of more traditional plans due to the higher deductibles. Furthermore, proponents believe that people should have more “skin in the game” and individuals will make better decisions if they face more of the cost of care. Critics believe that individuals are not well informed and that, if they have to pay more out of their own pocket, they will give up both “necessary” and unnecessary care (Newhouse and the Insurance Experiment Group 1993; Rice 2003). Others argue that it is a method for shifting costs to the chronically ill because they will incur high costs each year (American Academy of Pediatrics 2007; Bloche 2007; Woolhandler and Himmelstein 2007). Critics are also concerned that introducing HDHPs into employee health benefits will lead to market segmentation where those employees who are healthier will enroll in HDHPs while the sicker individuals will enroll into

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more expensive conventional plans. Additionally, they argue that this is a mechanism for favoring the wealthier because they are more likely to take advantage of the tax-preferred HSAs (Woolhandler and Himmelstein 2007).

Data are beginning to accumulate on some of these issues. Overall, the actual choice among plan type depends on the choices people face and the way that different insurance plans are designed. Researchers have examined various types of high-deductible-type plans, and we use the term “HDHP type” plan in the following discussion to reflect this diversity. The majority of studies found that those who select an HDHP-type plan are healthier (Fowles et al. 2004; Tollen, Ross and Poor, 2004; Buntin et al. 2006; Burke and Pipich, 2008; Fronstin 2009). However, other researchers (Parente, Feldman, and Christianson 2004) found that chronic illness of the employee or a family member did not influence this choice. Fowles et al. (2004) found that blacks were less likely to select an HDHP-type plan. Both Parente et al. (2004) and Fronstin (2008, 2009) found that those with higher incomes were more likely to choose an HDHP-type plan. The association of education with choice of HDHP is mixed with Fowles et al. (2004) finding no association and Fronstin (2009) finding one. Age does not appear to be related to the choice of an HDHP-type plan (Buntin et al. 2006). There have been no studies that distinguish between the choices made in purchasing individual or family policies.

In this paper, we examine the take-up of qualified HDHPs which were first offered by nine large employers in southwestern Pennsylvania in 2006. Using claims information, we examine a number of issues. First, we examine the growth of HDHPs among these nine employers between 2006 and 2007. Second, we compare characteristics of employees who chose an HDHP with those who did not, and we determine factors associated with the decision to select an HDHP. We hypothesize, based on the literature, that those employees who select an HDHP rather than a preferred provider plan (PPO) will be disproportionately healthy, white, and wealthy. We also determine whether gender and education are related to HDHP choice. As researchers have previously found that insurance choices are sticky, that is, individuals rarely switch plans over time, we hypothesize that employees will stick with their choices. However, for those who switch, we hypothesize those switching from an HDHP to a PPO will be relatively sicker, and those switching from a PPO to an HDHP will be relatively healthier. Finally, we investigate whether HDHP plans became more or less segmented by risk between 2006 and 2007. We anticipate that as enrollment in this type of plans increases, proportionately more of the healthy will join HDHPs. For each issue, we distinguish between individual and family policies.

We recognize that choice of plan depends not only on employee characteristics but also on other factors such as expected out-of-pocket costs (cost-sharing and premium costs), whether their chosen providers are part of the network and the ease of using the plan. Nevertheless, looking at the choices individuals make, after accounting for their employer, does shed light on how their personal characteristics are associated with their decision making.

METHODS

Study Population and Data Source

Nine self-insured employers in southwest Pennsylvania, which used the same third-party administrator, began to offer at least one tax-advantaged HDHP to their active employees in January 2006. The employers continued to offer at least one HDHP product in 2007. We obtained information on enrollment, basic benefit characteristics, census block demographics, claim summaries, and risk scores for employees and dependents who were enrolled in health plans between January 2005 and December 2007. We linked dependents and employees to create families. We excluded employees enrolled in HMOs because their data were not complete. (The majority of employees were enrolled in PPO products.)

Study Design and Sample Selection

We divided insured members into two coverage-type groups: employees enrolled in individual policies (“individual policy”) and employees and their dependents enrolled in family policies (“family policy”). We divided the employees into these groups because their premium costs and deductible levels are different and because factors influencing their choices may be different. All analyses were conducted separately for each group.

We studied 2006 and 2007 decisions separately because 2006 was the first year the HDHP product was offered. Some employees may have been hesitant to try something new and waited until after they could talk their colleagues about their experiences with the new product before considering an HDHP. Thus, we created two study subgroups to examine factors associated with choosing an HDHP instead of a PPO. The first group consisted of employees who were continuously covered between July 2005 and June 2006 (“2006 cohort”), while the other consisted of employees who were continuously covered between July 2006 and June 2007 (“2007 cohort”) (the new plan year begins on January 1). We required at least 6-month continuous enrollment before and after choosing a health plan in order to select employees for

whom we had health status data before their making an insurance choice and who probably planned to be with the company for some time following that choice.

Key Measures

Our outcome variable is the decision to select an HDHP. We also measured switching from HDHP to PPO. The key individual-level characteristics included age, sex, average or median monthly covered charges in the 6 months before making a choice (previous monthly charges), and a prospective risk score we use as a proxy for health status. For the family group, we also included number of dependents in the family. The census-level data included race, level of education, and income.

Previous Monthly Covered Charges. We calculated the average and median monthly covered charges for each employee purchasing an individual policy, and the mean and median average family covered charges for each employee purchasing a family policy.

Prospective Risk Score. Risk level was based on a $D \times CG$ score—a diagnosis based score calculated using the $D \times CG$ risk solutions tool. The score provides an estimate of the financial risk an individual is expected to incur based on the medical diagnoses accumulated over a rolling 12-month period. We calculated the average and the maximum prospective risk score in each family. For some analyses, we categorized individuals and families into three categories. We characterized individuals with a risk score ≤ 1 as being relatively healthy and those with a risk score > 2 as being relatively sick. We characterized families where the maximum risk score in the family is ≤ 1 as being relatively healthy and families where the maximum risk score in the family is > 2 as families with a sick family member.

Statistical Analysis

Choice of HDHP. We created an HDHP indicator for those who chose an HDHP rather than a PPO. We first compared the characteristics of members enrolled in HDHPs versus PPOs using t -tests for continuous variables and χ^2 tests for binary variables. To control for other covariates, we used a logistic regression to estimate those factors associated with the choice of plan. We define differences between groups or odds ratios (ORs) to be statistically significant if $p < .05$. Because there was wide variation across employers with respect to the

proportion of employees selecting an HDHP, we divided the sample into high-enrollment firms and low-enrollment firms, using 13 percent as the cutoff. (Thus, we estimate eight different regressions.) We further used an employer-level fixed effect model to adjust for unobserved employer-level heterogeneity.

Switching and Market Segmentation. To assess the extent of switching once the HDHP had been introduced, we determined the proportion of enrollees in 2006 that changed health plans between 2006 and 2007. To determine whether the risk pools were becoming more segmented, we calculated the change in the distribution of risk scores between 2006 and 2007 among *all* employees ever enrolled in health plans in these 2 years. In this case, we excluded three employers because very few of their employees ever enrolled in an HDHP. We examined the distribution of risk overall as well as in each company. We looked at each company because they were self-insured and made their own decisions about benefit design and premium cost to employee.

All reported *p*-values are two sided. We conducted all analyses using SAS software, version 9.2 (SAS Institute Inc., Cary, NC, USA). This study was deemed exempt from Human Subject Review by the University of Pittsburgh Institutional Review Board.

RESULTS

Did HDHP Enrollment Grow between 2006 and 2007?

Table 1 shows how enrollment in HDHPs changed between 2006 and 2007 among the nine firms. Overall, between 2006 and 2007 the percentage of employees with individual policies selecting an HDHP increased from 8.7 percent to 11.8 percent, while the percentage of employees with family policies selecting an HDHP increased from 7.7 percent to 12.3 percent. With few exceptions, between these 2 years the proportion of employees selecting HDHPs increased in each firm. However, there was considerable variation across employers with respect to the proportion of employees selecting HDHPs—either for themselves or for their families. In 2007, the proportion of employees with individual policies enrolling in HDHPs ranged from 0.8 percent to almost 34 percent across the firms while the proportion with family policies choosing an HDHP ranged from 0 percent to 66 percent. A higher proportion of employees with family policies selected HDHPs than did employees with individual coverage in six of the nine firms.

Table 1: Proportion of Employees Selecting High-Deductible Health Plan (HDHP) by Client in 2006 and 2007

<i>Employer Number</i>	<i>Policy Type</i>	<i>Number of Employees Enrolled in Either HDHP or Preferred Provider Plan</i>		<i>Proportion of Employees Selecting HDHP (%)</i>		<i>HDHP Deductible (U.S.\$)</i>
		<i>2006</i>	<i>2007</i>	<i>2006</i>	<i>2007</i>	<i>2007</i>
1	Individual	4,000	5,611	7.5	9.2	1,500
	Family	7,245	8,133	13.1	18.9	3,000
2	Individual	905	1,049	1.2	1.5	1,500
	Family	1,379	1,468	0.9	0.5	3,000
3	Individual	9,690	11,209	0.3	3.9	2,600
	Family	13,385	15,528	0.5	6.2	5,200
4	Individual	198	262	1.5	0.8	1,500
	Family	990	1,094	0.0	0.0	3,000
5	Individual	3,182	3,817	26.0	33.6	1,500
	Family	2,489	2,734	16.9	22.0	3,000
6	Individual	908	889	5.5	7.7	2,500
	Family	539	590	6.3	8.5	5,000
7	Individual	351	436	8.8	9.4	1,250
	Family	741	825	11.7	11.4	2,500
8	Individual	2,239	2,595	25.9	25.3	4,000
	Family	1,783	2,032	33.4	33.3	8,000
9	Individual	324	321	18.8	24.0	2,600
	Family	88	85	53.4	65.9	5,200
Total	Individual	21,797	26,189	8.7	11.8	
	Family	28,639	32,489	7.7	12.3	

Are There Differences between Employees Enrolled in an HDHP versus a PPO?

In 2006, among those employees choosing an individual plan (Table 2, panel A), those choosing an HDHP were younger, more likely to be female, to have lower previous year mean and median monthly charges, and to have lower prospective risk scores. Furthermore, they were more likely to live in census tracts with a lower proportion of blacks, a higher proportion of adults with a college education, and a lower proportion of individuals living below the poverty line. (All differences between HDHP and PPO enrollees are statistically significant.) In 2007, with the exception of the previous year mean monthly charges, all differences between the two groups remained statistically significant.

Among those employees choosing a family policy, in both years those choosing an HDHP were more likely to have more dependents, incur lower family mean and median monthly charges in the 6 months before making an insurance choice, have a lower maximum risk in the family (Table 2, panel B).

Table 2: Characteristics of Employees Making Plan Choice[†]

<i>Panel A: Individual Policy</i>				
<i>Employee Characteristics</i>	<i>Choice in 2006</i>		<i>Choice in 2007</i>	
	<i>HDHP</i>	<i>No HDHP</i>	<i>HDHP</i>	<i>No HDHP</i>
	<i>N= 322</i>	<i>N= 8,366</i>	<i>N= 1,060</i>	<i>N= 10,792</i>
	<i>Mean</i>	<i>Mean</i>	<i>Mean</i>	<i>Mean</i>
Employee age	44.32*	47.35	44.95*	46.50
Percent male	0.47*	0.37	0.40*	0.36
Mean monthly covered charges (U.S.\$) [‡]	153.71*	254.21	233.25	279.02
Median monthly covered charges (U.S.\$) [‡]	31.42*	60.71	41.07*	65.38
Employee's risk score [‡]	1.16*	1.74	1.60*	1.80
% Black in census track	4.25*	10.72	6.7*	10.3
% With college in census track	56.85*	52.59	54.1*	52.7
% Poor in census track	4.43*	7.36	5.5*	7.3
<i>Panel B: Family Policy</i>				
<i>Employee and Family Characteristics</i>	<i>2006</i>		<i>2007</i>	
	<i>HDHP</i>	<i>No HDHP</i>	<i>HDHP</i>	<i>No HDHP</i>
	<i>N= 923</i>	<i>N= 14,520</i>	<i>N= 2,374</i>	<i>N= 16,935</i>
	<i>Mean</i>	<i>Mean</i>	<i>Mean</i>	<i>Mean</i>
Employee age	46.30	45.90	46.54*	45.35
Percent male	0.57*	0.60	0.60	0.61
Count of dependents	2.56*	2.29	2.47*	2.29
Mean family monthly covered charges (U.S.\$) [‡]	444.06*	602.86	560.47*	672.34
Median family monthly covered charges (U.S.\$) [‡]	207.23*	252.64	225.93*	275.21
Maximum risk score in family	2.01*	2.24	2.12*	2.34
% Black in census track	3.64*	8.58	4.79*	8.40
% With college in census track	58.78*	53.29	55.50*	53.83
% Poor in census track	3.47*	6.30	4.58*	6.19

**p*-value < .05.[†]Employees had to be continuously employed for at least 6 months before and 6 months after the start of the 2006 or 2007 contract year. Total covered charges exclude pharmacy spending.[‡]The charge data are for the last 6 months of the year before making the choice decision, and the risk score is the estimated risk at the beginning of the contract year.

HDHP, high-deductible health plan.

Furthermore, they were more likely to live in census tracks with a lower proportion of blacks and individuals living below the poverty line, but with a higher proportion of college-educated adults. These associations were all

statistically significant. The associations between HDHP choice and employee age and sex differed between employees choosing family and individual policies. Unlike employees choosing individual policies, those choosing HDHP family policies were more likely to older, but that association was statistically significant only in 2007. Unlike employees choosing individual policies, those choosing HDHP family policies were more likely to be male, but that association was only statistically significant in 2006.

What Factors Are Associated with Choice of Plan Type?

Table 3, panel A, shows the factors associated with choosing HDHPs in individual policies. Among employees in high-enrollment firms who were selecting individual policies, the factors statistically significantly associated with their choosing HDHPs in 2006 were being male (OR = 3.51), age (OR = 1.04), and being healthy (OR = 2.53). These factors were also statistically significantly associated with HDHP choice in 2007, but the point estimates were lower. In addition, employees living in zip codes with more college-educated adults were significantly more likely to choose an HDHP in 2007.

Among employees in low-enrollment firms, being male (OR = 1.69), being healthy (OR = 1.63), and living in a census tract with fewer blacks (OR = 0.78), were statistically significantly associated with selecting an HDHP in 2006. As with employees in high-enrollment firms, these factors remained statistically significant in 2007, and with the exception of risk ≤ 1 , the point estimates were lower.

Table 3, panel B, shows the factors associated with choosing HDHPs in family policies. Among employees in high-enrollment firms who were selecting family policies, the factors statistically significantly associated with their selecting an HDHP in 2006 were being male (OR = 2.83), age (OR = 1.02), number of dependents (OR = 1.27), having a sick family member (OR = 0.84 for max risk score > 2), living in a census tract with a lower proportion of blacks (OR = 0.84 for black), and living in a census tract with a high proportion of college education individuals (OR = 1.28). In 2007, the same factors were associated with HDHP choice, and, with the exception of the coefficients for age and high risk (which were basically unchanged), the coefficients for those variables were closer to 1 in 2007. However, in 2007, employees with healthy families were more likely to select an HDHP, an association not observed in 2006. Among families in low-enrollment firms choosing an HDHP, the association of the different variables with the choice of HDHP varied considerably across the 2 years. The only variable that was statistically significant in both years was

Table 3: Factors Associated with Choice of High-Deductible Health Plan (HDHP) by Year and Extent of Firm Enrollment in HDHP

Panel A: Individual Policy

	2006				2007			
	<i>High HDHP Enrollment Firms</i>		<i>Low HDHP Enrollment Firms</i>		<i>High HDHP Enrollment Firms</i>		<i>Low HDHP Enrollment Firms</i>	
	<i>OR</i>	<i>p-Value</i>	<i>OR</i>	<i>p-Value</i>	<i>OR</i>	<i>p-Value</i>	<i>OR</i>	<i>p-Value</i>
Male	3.51	<.01	1.69	0	1.77	<.01	1.39	.07
Age	1.04	.01	1.01	.08	1.01	.01	1.02	.04
Total plan payment in 2006	1.1	.34	0.97	.7	1.01	.76	1.03	.21
Prospective risk score*								
Low risk ≤ 1	2.53	.02	1.63	<.01	1.37	<.01	1.67	.03
High risk > 2	1.04	.94	0.6	.02	0.89	.32	0.88	.62
Black [†]	0.77	.19	0.78	<.01	0.97	.31	0.82	.01
Some college [†]	0.96	.69	1.28	<.01	1.21	<.01	0.94	.28
Below 100% poverty rate [†]	1.06	.85	1.04	.8	1.05	.54	1.12	.39

Panel B: Family Policy

	2006				2007			
	<i>High HDHP Enrollment Firms</i>		<i>Low HDHP Enrollment Firms</i>		<i>High HDHP Enrollment Firms</i>		<i>Low HDHP Enrollment Firms</i>	
	<i>OR</i>	<i>p-Value</i>	<i>OR</i>	<i>p-Value</i>	<i>OR</i>	<i>p-Value</i>	<i>OR</i>	<i>p-Value</i>
Male	2.83	<.01	2.9	.17	2.3	<.01	2	<.01
Age	1.02	<.01	1.05	.07	1.02	<.01	1.02	<.01
Number of dependents	1.27	<.01	1.32	.05	1.21	<.01	1.12	<.01
Total plan payment in 2006	0.97	.24	1.01	.62	1	.87	0.99	.5
Prospective risk score*								
Low risk ≤ 1	1.12	.25	1.45	.44	1.31	<.01	1.07	.6
High risk > 2	0.8	.02	0.36	.1	0.78	<.01	0.88	.33
Black [†]	0.84	<.01	0.65	.13	0.85	<.01	0.85	<.01
Some college [†]	1.28	<.01	1.07	.61	1.22	<.01	0.98	.52
Below 100% poverty rate [†]	0.83	.1	1.72	.08	1.15	.03	1.08	.45

*Comparison group is risk score between 1 and 2.

[†]These variables are at census block levels, representing proportion of residents in the areas.

OR, odds ratio.

the count of dependents. Surprisingly, family health status variables were not associated with choice of an HDHP in either year for low-enrollment firms.

Is There Switching between HDHP and PPO?

There was very limited switching among types of plans among employees who had been enrolled in a health plan for at least the last 6 months of 2006 and 6 months of 2007 (see Table S1). In 2007, among those with individual policies, 5 percent of employees with an HDHP in 2006 switched to PPO, while only 2.7 percent of those with a PPO policy in 2006 switched to an HDHP. The results were similar for those with family policies. For both types of policies (individual and family), employees who switched from a PPO to an HDHP had lower prospective risk scores on average than those remaining in a PPO. Although this difference was consistent with our hypotheses, the differences in the risk scores were statistically significant only for those with family policies. The average family risk score was 1.33 for employees who switched their family policies from a PPO to an HDHP compared with 1.47 for those who stayed in a PPO. The switching pattern of those with an HDHP was contrary to our expectations. The average risk scores of those remaining in an HDHP were higher than those switching to a PPO. However, the difference in risk scores was statistically significant only for employees with individual policies.

Did the Insurance Pools Get More Segmented?

We examined plan segmentation by looking at the distribution of risk across HDHPs and PPOs by examining all members *ever* enrolled in each year in the six firms with meaningful enrollment (> 2 percent) in HDHPs. In 2006, 16.8 percent of employees in these six companies selecting an individual policy enrolled in an HDHP, while in 2007, 19.3 percent employees did (Table 4, panel A). In 2006, 21.2 percent of those who were relatively healthy (risk score ≤ 1) selected an HDHP, while in 2007, 23.1 percent of the relatively healthy employees did so. Thus, in both years, relatively healthy employees were disproportionately more likely to select an HDHP than employees overall. Similar results were observed in four of the six firms in 2007. However, between the 2 years, the distribution of the healthy across the two types of plans became slightly more balanced as the relative proportion of healthy employees who enrolled in an HDHP fell from 1.26 to 1.10. In four firms, the relative proportion of healthy employees dropped—and in two of those (5 and 9), the relative proportion even fell below zero. With respect to sick employees, a disproportionate proportion of them enrolled in a PPO—the relative

Table 4: Proportion of Members Enrolled in High-Deductible Health Plan (HDHP) by Risk Class

Panel A: Individual Policy

		<i>Percent of Group Enrolling in HDHP in 2006</i>			<i>Percent of Group Enrolling in HDHP in 2007</i>		
		<i>All (a)</i>	<i>Risk ≤ 1 (b)</i>	<i>Risk > 2 (b)</i>	<i>All (a)</i>	<i>Risk ≤ 1 (b)</i>	<i>Risk > 2 (b)</i>
All	HDHP (%)	16.84	21.21	10.40	19.33	21.21	13.30
	Relative proportion of HDHP ((b)/(a))		1.26	0.62		1.10	0.69
Firm 1	HDHP (%)	7.53	9.70	4.83	9.11	9.70	8.17
	Relative proportion of HDHP ((b)/(a))		1.29	0.64		1.06	0.90
Firm 5	HDHP (%)	25.67	28.48	18.65	33.48	28.48	24.11
	Relative proportion of HDHP ((b)/(a))		1.11	0.73		0.85	0.72
Firm 6	HDHP (%)	5.55	9.69	2.07	7.65	9.69	6.00
	Relative proportion of HDHP ((b)/(a))		1.75	0.37		1.26	0.78
Firm 7	HDHP (%)	8.83	12.02	3.70	9.45	12.02	1.67
	Relative proportion of HDHP ((b)/(a))		1.36	0.42		1.27	0.18
Firm 8	HDHP (%)	26.07	27.54	25.78	25.46	27.54	23.94
	Relative proportion of HDHP ((b)/(a))		1.06	0.99		1.08	0.94
Firm 9	HDHP (%)	19.29	23.66	7.69	24.44	23.66	12.00
	Relative proportion of HDHP ((b)/(a))		1.23	0.40		0.97	0.49

Panel B: Family Policy

		<i>Percent of Group Enrolling in HDHP in 2006</i>			<i>Percent of Group Enrolling in HDHP in 2007</i>		
		<i>All (a)</i>	<i>Risk ≤ 1 (b)</i>	<i>Risk > 2 (b)</i>	<i>All (a)</i>	<i>Risk ≤ 1 (b)</i>	<i>Risk > 2 (b)</i>
All	HDHP (%)	16.64	20.76	12.34	20.94	24.27	17.87
	Relative proportion of HDHP ((b)/(a))		1.25	0.74		1.16	0.85
Firm 1	HDHP (%)	13.19	15.66	10.43	18.90	20.03	17.55
	Relative proportion of HDHP ((b)/(a))		1.19	0.79		1.06	0.93
Firm 5	HDHP (%)	16.94	21.42	10.66	22.02	26.88	16.97
	Relative proportion of HDHP ((b)/(a))		1.26	0.63		1.22	0.77
Firm 6	HDHP (%)	6.34	9.30	4.88	8.47	12.68	6.53
	Relative proportion of HDHP ((b)/(a))		1.47	0.77		1.50	0.77
Firm 7	HDHP (%)	11.64	15.02	6.19	11.33	14.56	8.20
	Relative proportion of HDHP ((b)/(a))		1.29	0.53		1.29	0.72
Firm 8	HDHP (%)	33.45	36.80	29.87	33.28	37.25	27.38
	Relative proportion of HDHP ((b)/(a))		1.10	0.89		1.12	0.82
Firm 9	HDHP (%)	53.41	56.41	22.73	65.88	76.32	56.25
	Relative proportion of HDHP ((b)/(a))		1.06	0.43		1.16	0.85

proportion enrolling in an HDHP was 0.62 in 2006 and 0.69 in 2007. Thus, between the 2 years, the distribution of the sick became slightly more balanced between HDHPs and PPOs. We observe this general pattern in three firms (1, 6, and 9). However, in two firms (5 and 8), the HDHP experienced both an increase in the relative enrollment of the relatively healthy and a decrease in the enrollment of those more likely to be sick.

Table 4, panel B, presents comparable data on families. As with the individual policies, the families enrolled in an HDHP were disproportionately healthy and disproportionately less likely to have a sick member. Again, the distribution of risk across HDHPs and PPOs became somewhat more balanced in 2007. Overall, and in firms 1 and 5, the relative proportion of healthy families decreased while the relative proportion of families with a sick member increased. There was only one firm (8) where the HDHP experienced both an increase in the relative enrollment of healthy families and a decrease in the relative enrollment of families with at least one sick member.

DISCUSSION

In this paper, we examined some aspects of the spread of HDHP among those firms which first introduced HDHPs as a choice in 2006. We found that there was growth in enrollment in HDHPs among all those firms.

There were some differences between the associations found by personal characteristics and take-up between the univariate and multivariate analyses. We expect that these are due to the difference across the firms with respect to size, location, and gender.

Most of our findings on the associations between employee characteristics and plan selection are consistent with those reported in the literature. Like the majority of researchers (but unlike Parente et al. 2004), we found, on balance, that health status is associated with plan choice. For employees choosing individual plans, we found that healthy employees are more likely to choose an HDHP. Furthermore, for those selecting family policy, we found having a sick family member was consistently negatively associated with selecting an HDHP, while having a healthy family was positively associated with selecting an HDHP only in 2007. Our prospective risk score is probably a better indicator of health status than those used previously (i.e., self-reported health status, health care expenditures, and self-reported chronic illness). Furthermore, we found that categorizing risk into three levels (risk ≤ 1 ; > 1 risk ≤ 2 ; and risk > 2) was a better way to characterize health status than a using single continuous risk variable.

We had mixed results in our estimates of the association between the characteristics of the census area and selecting an HDHP. The strongest relationship was with the racial characteristics of the county. We found that in all models the coefficient of percent black was negative and in five of the eight models it was statistically significant. It is possible that blacks are more risk adverse. We found that the coefficient of percent with college education was > 1 in five instances and significant in four of these. These findings suggest that people who are educated may be more willing to examine the benefits and costs of HDHPs. The coefficient of percent of county that is poor was usually statistically insignificant. We acknowledge that county characteristics are poor surrogates of the characteristics of the individual choosing a health plan.

We also found that, after the new product was introduced, employees basically stuck with their choices. It is difficult to compare our switching numbers with those reported in the literature because the study populations/questions are so different (Strombom, Buchmueller, and Feldstein 2002; Atherly, Florence, and Thorpe 2005; Tchernis et al. 2006). Most of these studies have found that there is limited switching between types of plans. Buchmueller and Feldstein (1996) estimate that if relative prices are held constant, between 4 percent and 6 percent of employees switch plans—which is close to the proportion of employees in this study who switched plan types between 2006 and 2007. In addition, we noted that those employees with family policies who shifted from an HDHP in 2006 to a PPO in 2007 were more likely to have an unhealthy family member. This was contrary to our expectations. However, some policy analysts believe that people who expect to have very high expenditures may be more likely to select an HDHP because maximum out-of-pocket expenditures may be lower (Feldman and colleagues consider this in terms of pent-up demand [2007]. It is possible that this contributed to our unexpected finding).

Over the 2 years we studied, the relatively healthy disproportionately chose HDHP plans, whereas the relatively unhealthy disproportionately chose the PPOs. On balance, the degree of risk segmentation improved or stayed about the same. These findings suggest that HDHPs will probably lead to risk segmentation within the employer pools where choice among types of plans is offered, but that the overall risk segmentation may stabilize. However, more years of data are needed before the distribution before a firm conclusion on the relative distribution of the sick and healthy across types of plans can be reached.

While this study contributes to the literature on choice of HDHPs, it has several limitations. We could not account for either the premiums paid by the employees for the two types of plans or for employer contribution to HSAs. Furthermore, we could not control for employer education activities. It is

likely that these factors account for the large differences in the proportion of enrollees selecting HDHPs across firms, but we did not have access to the relevant data. We could not determine whether employees had a spouse employed in another firm. In addition, our firms were located in one area of the country. Furthermore, we did not have good data on the education, race, and income of the employees making these choices. We could not assess the effect of covering preventive care services as all HDHPs excluded preventive care services from the deductible and all PPOs charged something for preventive care. Finally, we only had 2 years of data and the patterns of employee choices could change over time as employees became more familiar with the product.

In conclusion, we find, after adjusting for unobserved firm heterogeneity, that many of the concerns that critics have raised about HDHPs are supported by our results. Those who are relatively healthy are more likely to select HDHPs. Furthermore, employees with a sick child are less likely to select an HDHP. In addition, our results also suggest that blacks and those with less education are less likely to enroll in HDHPs. Risk segmentation between HDHPs and PPOs existed, but it did not get worse; it may have improved slightly as individuals became more familiar with the HDHP product over time.

The implications of risk segmentation will depend on how the employer sets the premium costs for the employee. For instance, Medicare sets the premiums charged individuals based on a standard risk pool, but it pays the Medicare Advantage Plans a risk-adjusted premium for each enrollee. In the employer case, a similar type of policy could be implemented. The employer could minimize the consequences of risk segmentation if any differences in the premiums charged to employees were due to a lower benefit and decreased utilization associated with higher cost sharing not due to a having a healthier set of enrollees.

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SUPPORTING INFORMATION

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

Appendix SA1: Author Matrix.

Table S1: Risk Characteristics of Employees by Health Plan Type and by Whether They Switched Plan Types

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