Effect of Ambulatory Surgery Policy Provisions on Medical Expense Insurance Claims

Helen I. Doerpinghaus

ABSTRACT

Since the early 1980s insurers have offered medical expense insurance policies designed to reduce claim costs by providing incentives to insureds to use outpatient rather than inpatient surgery. Substitution is encouraged through the policy costsharing structure, where the insured's copayment for inpatient surgery is greater than that for outpatient surgery. This study investigates the effectiveness of policy design in inducing surgical substitution and reducing claim costs. Empirical evidence on claims data for 197,911 insureds suggests that policies designed to encourage use of ambulatory surgery do not induce the substitutution of outpatient for inpatient surgery and insurer claim costs are not reduced.

Introduction

From 1965 to 1987 national medical expenditures rose at an annual rate of approximately 10 percent.[1] The proportion of Gross National Product spent on national medical care increased from about 6 percent to more than 11 percent. In 1987 private health insurance funds paid for 32 percent of national medical care; 39 percent of national health dollars went to hospital care alone (U.S. Department of Health and Human Services, 1988). These figures demonstrate the continued real growth of health care costs in the United States, the large absolute dollar amounts associated with providing medical services, the importance of the private sector's role in funding care, and the effect of hospitalization costs on total medical spending.

Helen I. Doerpinghaus is Assistant Professor of Insurance at the University of South Carolina.

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[1] Average annual inflation for the same period was about 6.25 percent.

Economic theory and empirical evidence indicate that costsharing by insureds decreases total medical claim costs.[2] Traditionally insurance plans have required insureds to share the cost of medical services through policywide deductible and coinsurance provisions, up to a designated out-of-pocket maximum amount. Since the early 1980's insurers also have offered policies with specific surgical costsharing provisions in addition to those in effect policywide. Higher deductible or coinsurance requirements for inpatient surgery relative to outpatient surgery are expected to induce the substitution of outpatient for inpatient surgery, and decrease surgical claim costs and in turn total medical costs. This study examines policies which encourage use of ambulatory surgery and investigates the effectiveness of policy design in reducing surgical and total medical care claim costs.

The Rand Health Insurance Experiment offers the most comprehensive evidence to date on the effect of insurance policy design on the demand for medical services (Manning et al., 1987). The Rand experiment finds that policywide costsharing decreases demand for total medical services. Evidence also indicates that lower costsharing requirements for outpatient care, surgical and nonsurgical, does not decrease total medical expenditures by reducing inpatient expenditures. However, neither the Rand experiment nor non-experimental demand studies address the effect of policy design which encourages usage of ambulatory surgery on insurer claim costs.

Anecdotal evidence is not conclusive on the effect of policy design which encourages use of ambulatory surgery on insurer claim costs. Most reports exhibit little economic and statistical rigor. Many use firm or area specific data insufficient for producing results which may be generalized to a larger population. The study here improves on previous non-experimental demand analysis through use of a large data base covering 197,911 insureds from across the nation.

The article begins with the theoretical model that provides the basis for the empirical work. The model considers the insured's demand for medical and surgical services, both outpatient and inpatient, as a function of policy design and demographic characteristics. The econometric model and the data set used for testing are described, and the empirical results are reported. The study concludes with a brief summary of the major findings.

Research Methods

Theoretical Model of Demand

In Grossman's (1972) model of the demand for health, individuals inherit an initial stock of health which depreciates over time. Health stock is treated as a durable commodity produced by consumers which may be increased through investment of monetary resources and time in medical services. The model implies that individuals partly determine the length and quality of their lives through their health investment decisions. That is, the insured chooses or

[2]See, for example, Pauly (1968) and Manning et al. (1987).

demands quantities of health (and medical care) in order to maximize utility, subject to budget constraints.

This study extends Grossman's model to consider insurance coverage explicitly. The amount of coverage is assumed to be exogenous. This assumption is reasonable given that the data pertain to large employer groups (Newhouse, 1981).[3] The quality (or extent) of insurance coverage is reflected in the user price for services paid by the insured, which results from policy deductible and coinsurance rates and out-of-pocket maximums.

In this study the demand for health and, in turn, for medical services, is modeled for the individual insured. An intertemporal utility function is expressed in terms of two goods, consumption of health services and a composite good. The utility function is assumed to be separable and additive over time. Individuals produce health according to the same production function with inputs of medical services, one's own time, and human capital stock. The budget constraint describes the total monetary and time resources available for use in production. The equilibrium quantities of medical services and the composite good consumed are obtained by maximizing the utility function subject to the budget constraint. The first order conditions imply that the monetary rate of return plus the psychic rate of return on an investment in health capital equal the user cost of health capital, namely the real rate of interest plus the rate of depreciation in one's health.

From the demand function for health, the demand for medical services may be derived following methods similar to those used by Hicks (1932). The demand function for medical services is specified as:

$$D_t = f(H_t, p_{tj}, v_t, t_{tj}, w_t, Z_t)$$

where

D_t = demand for medical services in period t
H_t = health status in period t
p_{tj} = user price in period t for the jth medical service
v_t = user price of a non-medical composite good
t_{tj} = time input per unit of the jth medical service consumed
w_t = wage rate in period t
Z_t = production of investment in all other goods and services.

Both the demand for health and medical services are a function of (1) health status, (2) relative prices which result from insurance policy deductible, copayment, and out-of-pocket maximum limits, (3) time price paid by the insured for various medical services, (4) the individual's wage rate, and (5)

[3] This assumption ignores the possibility of selection bias resulting from individuals choosing their employment partly on the basis of the medical insurance plan offered. See, for example, Goldstein and Pauly (1976). It also ignores potential selection bias resulting from firms with high inpatient surgery costs choosing policies designed to encourage substitution of outpatient for inpatient surgery. Designed experiments, such as the Rand study, may overcome limitations of selection bias which often are inherent to non-experimental data. However the cost of generating experimental data is usually prohibitive.

preferences. The model is subject to the following assumptions: The market for medical care is competitive, consumers are well informed, and providers deliver goods and services in order to maximize net revenue.

Policies which encourage the use of ambulatory surgery would reduce insurer surgical claim costs if several assumptions hold. First, inpatient and outpatient surgery must be substitutes. However, some but not all surgical procedures may be performed in an outpatient setting; substitutability is limited to some extent. Secondly, outpatient surgery must be less costly than inpatient surgery for total surgical claim costs to fall. Anecdotal evidence indicates that outpatient surgery is not necessarily less costly to the insurer than inpatient surgery (Ruffenach, 1988). Thirdly, for costsharing to be effective, the demand for surgery cannot be perfectly price inelastic.

Using the model of demand for medical services, three hypotheses, stated in null form, are tested:

(1) Medical expense insurance policy design does not induce the substitution of ambulatory for inpatient surgery.
(2) Policy design which encourages usage of ambulatory surgery does not affect inpatient surgical claim costs or total surgical claim costs to the insurer.
(3) Policy design which encourages usage of ambulatory surgery does not affect total medical claim costs to the insurer.

Data

A major national insurer made available claims data from seven large employer groups, two of which had two policies each, so that the total number of different policies analyzed is nine. A total of 197,911 eligible insureds are in the sample, where eligible insureds are employees or dependents under age 65. The employer groups are located across the country, and each firm represents a different industry. A profile of the employer groups appears in Table 1, and a comparison of group demographics appears in Table 2.

The nine medical insurance policies have unique costsharing structures with respect to inpatient and outpatient surgery. Table 3 shows costsharing specifications for each of the plans. The nine policies are divided into three broad groups based on their likely effect on relative user prices for ambulatory and inpatient surgery. The plans are defined as follows:

Type 1: No costsharing is required for either inpatient or outpatient surgery.

Type 2: Costsharing is required for both inpatient and outpatient surgery.

Type 3: Costsharing is required for inpatient but not for outpatient surgery.

Of the nine plans included in the data base, two plans are classified as Type 1, two as Type 2, and five as Type 3.[4]

[4] A limitation to categorizing policies into groups is that all plan effects, not just costsharing differences, appear in the coefficient estimate for the grouping variable. The problem is not uncommon with non-experimental data, and is mitigated to a degree by the presence of more than one policy per category.

Table 1

Characteristics of the Employer Groups

Policy Plan	Plan Type*	Employer Location	Industry	# of Insureds
Plan 1	Type 1	MI, OH, IN, IL, MO, PA, MS, MA, SC, TX	Automobile	11,041
Plan 2	Type 1	Northeastern United States	Chemicals	30,030
Plan 3	Type 2	Northeastern United States	Chemicals	429
Plan 4	Type 2	Southwestern United States	Construction	67,979
Plan 5	Type 3	United States and Puerto Rico	Insurance	72,494
Plan 6	Type 3	VA	Research	1,700
Plan 7	Type 3	United States (Approx. 50% upper Midwest)	Beer	7,126
Plan 8	Type 3	VA	Pharmaceuticals	411
Plan 9	Type 3	VA	Pharmaceuticals	6,701
			Total Insureds	197,911

*Plan Type is defined in the text.

Table 2

Characteristics of the Insureds by Policy Plan

Policy Plan	Plan Type*	% Female	Average Age	% Dependents	% Using Outpatient Surgery	% Using Inpatient Surgery	% Using Surgery
1	1	48.6	30.0	55.8	15.0	4.2	17.9
2	1	53.6	35.5	77.3	14.9	2.2	15.2
3	2	52.2	35.1	75.0	17.7	2.8	17.7
4	2	23.4	30.5	22.1	4.9	1.9	6.4
5	3	60.7	29.5	61.9	10.2	2.8	12.1
6	3	46.8	35.2	58.0	21.7	2.3	23.4
7	3	51.0	32.6	61.6	12.8	3.0	14.7
8	3	47.5	30.6	46.5	8.5	0.50	8.5
9	3	50.2	30.7	57.5	18.5	1.50	18.7

*Plan Type is defined in the text.

The data set is valuable for several reasons. A large number of observations are included in the study, where each observation describes the claims history of one eligible insured during the 18-month period, January 1, 1985, through June 30, 1986. Observations exist for all insureds, those who did and did not incur claims. The size of the data set allows for sufficient numbers of inpatient and outpatient surgeries to distinguish among plan effects. The range of employer locations allows for geographic control, which is useful since practice patterns and usage trends may vary by area of the country.

Table 3

Costsharing Design by Policy Plan

Policy Plan	Policy Type[1]	Policy Deductible[2]	Policy Coinsurance	Surgery Provisions[3]	Out-of-Pocket Maximum
Plan 1	Type 1	$100 i 200 f	20%	No costsharing for AS or IS	$1680
Plan 2	Type 1	200 i 400 f	20%	No costsharing for AS or IS	2160
Plan 3	Type 2	200 i 400 f	20%	Facility: No costsharing Surgeon: 20% coinsurance	2160
Plan 4	Type 2	200 i 600 f	20%	AS: Policy deductible waived, 10% coinsurance IS: Subject to policy deductible and coinsurance	1800i 3000f
Plan 5	Type 3	125 i 375 f	10%	AS: No costsharing IS: Subject to policy deductible and coinsurance	Based on income: $600–1500 range
Plan 6	Type 3	200 i 500 f	20%	AS: No costsharing IS: $200 deductible per admission in addition to policy deductible and 80% coinsurance	1000 i 3000 f
Plan 7	Type 3	100 i 250 f	20%	AS: No costsharing IS: Subject to policy deductible and coinsurance	500 i 1500 f
Plan 8[4]	Type 3	225 i 750 f	20%	AS: No costsharing IS: Surgeon coinsurance 10%; facility charge subject to policy deductible and coinsurance	1000 i 2000 f
Plan 9	Type 3	200 i 400 f	20%	AS: No costsharing; IS: Subject to policy deductible and coinsurance	1000 i 2000 f

[1] Type 1. No costsharing is required for either outpatient or inpatient surgery.

Type 2. Costsharing is required for both outpatient and inpatient surgery.

Type 3. Costsharing is required for inpatient surgery, but not for outpatient surgery.

[2] (i) individual; (f) family.

[3] As ambulatory surgery; IS inpatient surgery.

[4] Plan 8 is the plan with the largest deductible requirements, and it is the only one to distinguish between surgeon and facility reimbursement rates for inpatient surgery.

Information on age and sex of the insureds makes possible control for these factors as well.[5]

Testing Methods

The limited dependent variable regression model used in the study is presented. The independent variables employed for testing are defined, and the expected effects of each on the dependent variables are described.

Econometric Model: The insured's demand decision is conceptualized as a single step process wherein the individual decides whether to seek medical care, and, if so, how much to use. The dependent variable equals zero when no services are used and the natural logarithm of the claim cost when services are used.[6] The tobit regression model accomodates the joint decision methodology and provides for the limited range of the dependent variable (Tobin, 1958).[7] Maximum likelihood estimation is employed to avoid the asymptotic bias of ordinary least squares estimation. The tobit model is specified as:

$$\ln Y_i^k = \underline{X}_i \underline{\beta} + e_i \text{ if } Y_i > \$1 \text{ for } k = 1,2,3,4,$$

$$\ln Y_i^k = 0 \qquad \text{otherwise,}$$

where

Y_i^1 = total claim costs for outpatient surgical services for the ith insured in a given time period

Y_i^2 = total claim costs for inpatient surgical services for the ith insured in a given time period

Y_i^3 = total claim costs for total surgical services, inpatient and outpatient, for the ith insured in a given time period

Y_i^4 = total claim costs for all medical services, surgical and nonsurgical, for the ith insured in a given time period.

$\underline{X}_i$ is a vector of independent variables, $\underline{\beta}$ is a vector of regression coefficients, and e_i is a random error term assumed to be distributed $N(0, \sigma^2)$.

Independent Variables: The nine independent variables included in the vector $\underline{X}_i$ are described as follows:

TYPj = 1 if Type j insurance plan, 0 otherwise, for j = 2,3

AGE = age of the insured

SEX = 1 if the insured is female, 0 if male

[5] Information was not available on other medical expense insurance policies offered to employees or on the premium paid by the employer or the employee.

[6] The assumption is made here that all claims are greater than or equal to \$1.

[7] An alternative model posits that medical decisions are made through a sequential decision process, and a series of probit and linear regression equations is used for testing. The data here were analyzed using both methodologies and the results were found to be similar.

WAGE = average annual income level by county in which the insured resides; this proxies wage of the individual insured.[8]
SGPC = the number of surgeons per capita in the county where the insured resides.
FASF = the number of freestanding ambulatory surgical facilities in the county where the insured resides.[9]
HASP = the number of hospital ambulatory surgical procedures performed in the county where the insured resides.
HEXP = the natural logarithm of total hospital expenditures per day in the county where the insured resides.

Variable Effects: The expected effects of the independent variables on medical service expenditures are presented in Table 4. The policy plan variables, TYPj, measure the user prices of medical services, which largely depend on the policy's surgical costsharing structure. For those policies with relatively low costsharing requirements, any type of surgery often would result in expenses in excess of the costsharing amount, bringing the user marginal price paid for medical services to zero.[10] For policies with greater copayment requirements, the incentives to use lower priced alternatives would be stronger.

Policy Type 2 is expected to decrease outpatient, inpatient, and total surgical expenditures, as well as total medical claim costs, relative to the benchmark plan, because Type 2 plans require costsharing for ambulatory and inpatient surgery whereas Type 1 plans do not. Plan Type 3 is not expected to decrease outpatient surgery claim costs, relative to the benchmark, because there is no ambulatory surgical costsharing requirement for Type 3 plans or for the benchmark plans. Further, since Type 3 requires inpatient surgical costsharing, substitution of outpatient for inpatient surgery is expected which may increase total outpatient surgery expenditures. Thus policy Type 3 is expected to decrease inpatient, total surgical charges and total medical claim costs, relative to the benchmark.

Since information on health status of the insured is not available, age and sex, strong predictors of health status, are used in estimation. The coefficient estimates for AGE and SEX are expected to be positive since female and older insureds tend to demand more medical services.

The income variable, WAGE, is a proxy for the wage rate of the insured. Evidence suggests a positive correlation between income and demand for medical services, and the expected sign of the coefficient estimates is positive. This may be investment related, since increased health may enable continued production on the job, or it may be consumption related. WAGE also serves as a proxy for own time price, which affects total user price for medical

[8] WAGE, SGPC, HASP and HEXP data were obtained from the 1985 Area Resource File which is based on 1982 data.

[9] FASF data were obtained from the Freestanding Ambulatory Surgical Association.

[10] If the insured anticipates incurring expenses greater than the deductible or out-of-pocket limit, after which the insurer pays 100 percent of eligible charges, the insured's decision is likely to reflect this expectation (Keeler, Newhouse, and Phelps, 1977, and Ellis, 1986).

Table 4

Expected and Actual Sign of the Estimated Coefficient

	Dependent Variables							
	Ambulatory Surgery Expenditures		Inpatient Surgery Expenditures		Total Surgery Expenditures		Total Medical Expenditures	
Independent Variables	E	A	E	A	E	A	E	A
TYP2	–	–	–	–	–	–	–	–
TYP3	+	–	–	NS	–	–	–	+
AGE	+	+	+	+	+	+	+	+
SEX	+	+	+	+	+	+	+	+
WAGE	+	+	+	+	+	+	+	+
SGPC	I	NS	I	NS	I	NS	I	NS
FASF	I	NS	I	NS	I	NS	I	+
HASP	I	+	I	NS	I	+	I	–
HEXP	I	–	I	NS	I	–	+	+

E signifies the expected sign of the coefficient.

A signifies the actual sign of the estimated coefficient.

NS signifies a result which is not statistically significant.

I signifies that the expected sign is indeterminate.

services.[11] Whether ambulatory surgery time costs are greater than inpatient surgery time costs has not been established. However, if there are additional travel or home-care time costs associated with ambulatory surgery, higher wage earners, with relatively higher time prices, may demand relatively less outpatient care.

Three medical supply variables, SGPC, FASF, and HASP, are included in the regression equation.[12] Several factors are discussed which may affect the signs of the coefficient estimates: elasticity of demand for services, the presence of supplier-induced demand, and substitutability of outpatient for inpatient surgery.

The expected sign of the coefficient for SGPC is indeterminate. Under competitition, an increased supply of surgeons may have a negative impact on the time and monetary price of surgery, all else equal. Given relatively lower prices, expenditures may increase if demand is elastic, and the expected sign of the coefficient would likely be positive. However, this result depends on the elasticity of demand. A positive relationship between supply of surgeons (SGPC) and expenditures on surgery also may reflect reverse causation:

[11] See, for example, Phelps and Newhouse (1974).

[12] Insurance data were unavailable on the number of surgeries performed in physician offices.

surgeons may locate in areas with high demand for surgery.[13] The theory of supplier-induced demand for medical care may also explain a positive coefficient. This hypothesis posits that the physician, as both agent for the patient and supplier of services, has a financial interest in increasing the patient's demand for medical care. However, data limitations prevent testing the theory here.

The expected effect of the two variables, FASF and HASP, on medical expenditures is ambiguous. Increased supply may imply greater expenditures on outpatient surgery, but again this result depends on the elasticity of demand. Also, if inpatient and outpatient surgery are substitutes, an increased supply of ambulatory surgery facilities may drive inpatient surgery prices down, but the net effect on total surgical and total medical expenditures would be indeterminate. An increased supply of freestanding ambulatory facilities might also result in increased demand if incentives, such as physician ownership, exist for physicians to refer patients to those facilities.

HEXP, the hospital price variable, serves as a proxy for the user price for all other goods and services, and may control for cost-of-living differences across regions of the country. In higher cost-of-living areas, total medical expenditures would likely be greater also. However, the signs of the coefficients for expenditures on ambulatory, inpatient, and total surgical services are ambiguous and would depend in part on the medical substitutability of outpatient for inpatient surgery and the relative area prices of each.

Empirical Results

The empirical results are summarized in Table 4. Evidence indicates that policies which require costsharing for both ambulatory and inpatient surgery decrease claim costs for the insurer. However, there is no evidence that policy design induces the substitution of outpatient for inpatient surgery.

Ambulatory Surgery Expenditures

Table 5 reports estimates of the tobit regression equation where the dependent variable equals the natural logarithm of total expenditures per person for ambulatory surgery services. Tobit regression coefficients do not have a straightforward economic interpretation, and a transformation is required to find the insured's expected expenditure. The t-statistics are relatively large which may be due to the size of the data set.

Plan effects for both the Type 2 and Type 3 insureds are negative, relative to the benchmark. The negative coefficient for the Type 2 plan is expected, given that insureds are required to share the cost for outpatient surgery, whereas those in the benchmark plan have comparable free care. However the

[13] Since data on surgeons were obtained from the 1985 Area Resource File, based on 1982 data, and claims data are from 1985 and 1986, the lagged claims data controls to a degree the possibility of reverse causation.

Table 5

Natural Logarithm of Ambulatory Surgical Expenditures

Independent Variable	Parameter Estimate	Standard Error	t-statistic
Intercept	-18.308	0.334	-54.752
TYP2	-4.950	0.127	-39.024
TYP3	-1.100	0.107	-10.233
AGE	0.129	0.002	51.400
SEX	1.887	0.085	22.089
WAGE	0.302	0.039	7.653
SGPC	0.059	0.214	0.276
FASF	0.003	0.013	0.252
HASP	0.016	0.004	4.272
HEXP	-0.281	0.042	-6.630

negative coefficient for the Type 3 plan is not expected given that it has the same ambulatory costsharing rule as the benchmark plan. Further, the relatively greater costsharing requirement for inpatient surgery would be expected to induce substitution of outpatient for inpatient surgery. There is no evidence of substitution here.

A possible explanation for the negative coefficient for the Type 3 plan variable may be that the insurer's definition of ambulatory surgery is somewhat ambiguous. That is, some ambulatory surgical procedures are in fact noninvasive examinations associated with subsequent inpatient surgery. Thus a higher user price for inpatient surgery may negatively affect the demand for complementary outpatient examination procedures which are billed as outpatient surgeries.

The variables, age, sex and the wage proxy are positively related to medical expenditures suggesting that females, older insureds, and higher wage earners incur higher ambulatory surgery claim costs. If there are time costs unique to ambulatory surgery, these do not appear to be prohibitive for higher wage earners. The estimated coefficient for the hospital price variable, HEXP, is negative, and there is no indication that outpatient surgery is substituted for inpatient care in areas where hospitalization may be relatively more costly.

Inpatient Surgery Expenditures

Table 6 reports estimates of the tobit regression equation where the dependent variable is the natural logarithm of total inpatient surgical expenditures. As expected, the coefficient estimate for Type 2 plan effects is negative and statistically significant indicating that the inpatient costsharing requirement reduces inpatient expenditures, relative to the free surgical care benchmark plan.

The Type 3 plan effect is not statistically significant. Evidence from estimation of the first two tobit regression models indicates that Type 3

Table 6

Natural Logarithm of Inpatient Surgical Expenditures

Independent Variable	Parameter Estimate	Standard Error	t-statistic
Intercept	-47.846	1.186	-40.313
TYP2	-1.017	0.356	-2.855
TYP3	0.043	0.327	0.132
AGE	0.095	0.007	13.339
SEX	5.158	0.257	20.033
WAGE	0.512	0.123	4.164
SGPC	-0.243	0.610	-0.398
FASF	0.056	0.036	1.570
HASP	-0.012	0.011	-1.110
HEXP	-0.054	0.123	-0.439

insureds do not substitute outpatient for inpatient surgery: the Type 3 plan effect on total outpatient surgery expenditures is negative and, for total inpatient surgery expenditures, the plan coefficient is not significantly different from the benchmark.

Total Surgical Expenditures

Table 7 reports the estimation results where the dependent variable is the natural logarithm of total expenditures for all surgical services, both inpatient and outpatient. The coefficient estimate for Type 2 plan effects is negative and statistically significant, as expected. Thus Type 2 plan effects are negatively related to outpatient, inpatient, and total surgical claim costs.

Table 7

Natural Logarithm of Total Surgical Expenditures

Independent Variable	Parameter Estimate	Standard Error	t-statistic
Intercept	-18.561	0.334	-55.618
TYP2	-4.237	0.125	-33.879
TYP3	-0.761	0.109	-6.980
AGE	0.120	0.002	48.146
SEX	2.362	0.086	27.580
WAGE	0.331	0.039	8.325
SGPC	-0.056	0.213	-0.262
FASF	0.014	0.013	1.110
HASP	0.012	0.004	3.379
HEXP	-0.246	0.042	-5.813

The coefficient estimate for Type 3 plan effects on total surgical expenditures is negative, which is expected since surgical costsharing for Type 3 insureds is greater than that required for insureds in the benchmark plan. However, evidence from estimation of the first three tobit equations indicates that total surgical claim costs in Type 3 plans are reduced, not because of the substitution of outpatient for inpatient surgery, but because ambulatory surgical claim costs are reduced.

Total Medical Expenditures

Results of the tobit estimation, where the dependent variable is the natural logarithm of total medical care expenditures (surgical and nonsurgical), appear in Table 8. The Type 2 plan effects on total medical expenditures are negative, relative to the benchmark plan and costsharing for both inpatient and outpatient surgery decreases claim costs for outpatient surgery, inpatient surgery, total surgery, and total medical care.

Type 3 plan effects on total medical expenditures are positive and statistically significant, relative to the benchmark plan. This result is not expected, given that Type 3 requires more costsharing than does the benchmark plan. Recall that the Type 3 plan effect on total surgical claims is negative, yet the Type 3 plan effect on total medical claim costs is positive. Since Type 3 plans require surgical costsharing, insureds may substitute nonsurgical treatment for surgical care, and as a result total medical expenditures could increase.

The wage variable is positively correlated with ambulatory surgery, inpatient surgery, total surgery, and total medical care expenditures. There is no evidence in the study that income predicts the type of service used, only that it is positively related to medical expenditures.

The coefficient estimates for the two facility supply variables, FASF and HASP, are positive and negative, respectively, which indicates that the two

Table 8

Natural Logarithm of Total Medical Care Expenditures

Independent Variable	Parameter Estimate	Standard Error	t-statistic
Intercept	-8.576	0.161	-53.323
TYP2	-0.761	0.063	-12.035
TYP3	2.145	0.058	36.691
AGE	0.045	0.001	36.709
SEX	1.672	0.043	38.975
WAGE	0.160	0.020	7.870
SGPC	0.126	0.105	1.201
FASF	0.029	0.006	4.694
HASP	-0.015	0.002	-8.007
HEXP	0.199	0.022	8.962

facilities are not perfect substitutes in producing outpatient surgery.[14] The roles of the two facilities are determined in large part by physicians who staff them, and physicians may prefer freestanding facilities to hospital ambulatory surgery clinics because of (1) relatively greater production capacity (i.e., faster turn-around time), (2) economic incentives in large part due to the fact that the surgeons often own the freestanding clinics, and (3) increased autonomy for the physician in the freestanding clinic when compared to a general hospital, even one with a dedicated outpatient surgery facility.[15] Data do not allow investigation of the difference in the facilities or the importance of physician ownership, but further research in this area may be warranted.

Conclusions

Evidence indicates that policy design which requires insureds to share the cost for inpatient surgery, but not for outpatient surgery, does not induce the substitution of outpatient for inpatient surgery. Policies offering insureds free outpatient surgery and costly inpatient surgery do not reduce total surgical and medical claim costs.

This result suggests that gross classification of all outpatient and inpatient surgeries as either substitutes or complements may not be especially useful, since some procedures may be substitutes and others may be complements. Future analysis using specific surgical procedures (identified beforehand as substitutes or complements) might allow a furthered understanding of how policy design might reduce claim costs for selected common surgeries.

Results here also indicate that policies which require costsharing for both ambulatory and inpatient surgery reduce ambulatory surgical, inpatient surgical, total surgical, and total medical claim costs for the insurer, relative to traditional policies requiring no surgical costsharing by the insured. That is, costsharing across all surgical procedures reduces insurer claim costs. This result, using non-experimental data, follows that of the Rand health insurance experiment: greater costsharing by insureds decreases medical service expenditures. In order to reduce medical claim costs, employers and insurers could amend insurance policies which presently require only inpatient surgical costsharing to include outpatient surgical costsharing also.

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[14]Multicollinearity does not appear to be a problem here since the correlation coefficient between HASP and FASF is.087.

[15]This information was obtained from the S.C. Chapter of Healthcare Financial Management Association conference, Columbia, S.C., November 5, 1988.

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