

Blue Shield Plan Physician Participation

by Donald E. Yett, William Der, Richard L. Ernst
and Joel W. Hay

Many Blue Shield Plans offer participation agreements to physicians that are structurally similar to the participation provisions of Medicaid programs. This paper examines physicians' participation decisions in two such Blue Shield Plans where the participation agreements were on an all-or-nothing basis. The major results show that increases in the Plans' reasonable fees or fee schedules significantly raise the probability of participation, and that physicians with characteristics associated with "low quality" are significantly more likely to participate than are physicians with characteristics associated with "high quality." In this sense the results highlight the tradeoff that must be faced in administering governmental health insurance policy. On the one hand, restricting reasonable and scheduled fees is the principal current tool for containing expenditures on physicians' services. Yet these restrictions tend to depress physicians' willingness to participate in government programs, thereby reducing access to high quality care by the populations those programs were designed to serve.

Introduction

Blue Shield Plan physician participation agreements serve both as a marketing device to attract subscribers and as a short-run cost-containment strategy. In most Blue Shield Plans a participating physician agrees to accept the Plan's allowance for a procedure as payment in full. In return, the physician may be reimbursed by the Plan rather than being paid directly by the patient. The advantages to the physician are smaller accounts receivable, fewer bad debts, and, of course, extra attractiveness to Blue Shield Plan subscribers. Participation does not necessarily imply a zero copayment by patients even after deductibles, if any, are met. However, since the amounts of reimbursement for procedures are predetermined in the short-run, participation makes it less risky for a Plan to offer policies with low or zero copayment. Moreover, even when copayment is not eliminated, subscribers benefit both in terms of the ceiling on out-of-pocket costs and by being relieved of the interest and liquidity costs of direct payment.

Governmental health insurance programs—specifically Medicare for the elderly and disabled and Medicaid for the indigent—use similar cost-containment

strategies. Physicians who treat Medicaid patients must accept as full payment the amount allowed for each procedure by the State's program. Under the Medicare regulations physicians may participate (accept assignment) on a claim-by-claim basis. Administrators of both programs are vitally concerned with how sensitive physician participation (assignment) is to the amounts allowed for procedures. In the case of Medicaid, allowances that are too low can mean insufficient suppliers of medical care for the poor. In the case of Medicare, allowances that are too low can mean low physician assignment levels and higher out-of-pocket costs for the elderly and disabled. Obviously, striking a desirable balance between allowance levels and participation rates is of major importance to Medicare and Medicaid management.

Unfortunately, we did not have access to Medicaid or Medicare assignment data for this study. However, we did have extensive data on the private market business from two Blue Shield Plans with physician participation arrangements. All Blue Shield Plans market one or more of three types of basic health insurance contracts: (1) usual-customary-and-reasonable (UCR), (2) partial service, and (3) indemnity. Although participation agreements do not apply to indemnity policies, the other two lines of private business do have certain strong parallels with Medicare and Medicaid. In particular, as in Medicaid, a Blue Shield subscriber is eligible for a partial service contract only if his/her family income is below a ceiling level. Also, the procedure used in setting allowances (but not the levels) is

This research was supported under Contract No. 600-76-0160 by the Health Care Financing Administration, U.S. Department of Health, Education, and Welfare. The data analyzed in this study were provided by the Blue Cross and Blue Shield Associations.

basically the same for Medicare enrollees as it is for Blue Shield Plan UCR subscribers. Therefore, analysis of physician participation in private Blue Shield business should be helpful to Medicare and Medicaid program administrators as well as to Blue Shield Plans themselves.

Determination of Allowance Levels

Claims presented to Blue Shield Plans identify the services rendered by the physician and the amount charged for each service. The Plan then sets the maximum amount allowed for each service. In partial service and indemnity business, the amount allowed is the lesser of the amount charged and a scheduled fee which is the same for all physicians. In UCR business the maximum amount allowed is called the "reasonable fee" and is ordinarily the minimum of the amount charged and the amounts set by one or both of the two fee screens.¹ The first screen, called the "usual fee" or Level 1 screen, is the physician's mean, median, modal, or listed charge for the procedure during some prior time-period fixed by the Plan. The second screen, called the "customary fee" or Level 2 screen, is a percentile—commonly but not always the 90th—of the fee distribution for the procedure in the physician's geographic area.² Like Level 1 screens, Level 2 screens are determined from past fee data and are not affected by the physician's current charges. Thus, unless the physician charges less than the screen amounts, the reasonable fee for each procedure is fixed during the current period, and, unless it happens to coincide with the level 2 screen value, it is different for each physician.

Finally, the Plan determines the amount paid to the subscriber or physician based on the amount it allows. In partial service and indemnity business, the amount paid is equal to the allowance. In UCR business the amount paid is a percentage (up to 100 percent) of the allowance. In each of the two Plans in this study, participating physicians nominally agree to accept Plan allowances as full payment and to accept reimbursement from the Plan.³ Thus, excluding deductibles, the

¹Both of the Blue Shield Plans included in this study used two fee screens. The actual amount allowed may be higher than the fee screen values under special circumstances such as when the charge can be justified by an unusual complexity of treatment required. However, such "special circumstances" claims were not included in the data base for this study.

²Some Plans establish separate geographic areas within their overall markets and calculate different Level 2 screens for each such area. One of the two Plans used in this study follows that practice. Likewise, some Plans compute separate Level 2 screens for specialists and non-specialists for services provided by both types of physicians. However, this was not the practice of the two Plans included in this study.

³However, as is discussed later, the two Plans differ with respect to their treatment of claims submitted directly by subscribers for services provided by participating MDs.

net prices (average coinsurance rates) of UCR services in the two study Plans are (small) percentages of allowances on participating claims, and are equal to the physician's charge minus a (large) percentage of allowances on nonparticipating claims.⁴ In partial service business the net prices of services are zero on participating claims, but equal to charges minus allowances on nonparticipating claims. Consequently, other things being equal, the net prices to patients of participating physicians' services are lower in the two Plans than those of nonparticipating physicians' services.

Given the public policy interest in physicians' decisions to participate (accept assignment), it is important to note the similarities and differences in the physician reimbursement procedures between Blue Shield private business and those of the Medicare and Medicaid programs. Medicare Part B features a UCR-type of physician reimbursement known as "customary-prevailing-and-reasonable" (CPR), in which the Level 1 and Level 2 screens are labeled the "customary fee" and the "prevailing fee" respectively, and in which, as in Blue Shield Plans, the amount allowed is called the "reasonable fee."⁵ Physician reimbursement under the States' Medicaid programs is either of the CPR form or, as in Blue Shield partial service business, based on fixed (or de facto) fee schedules. In Medicare, the amount paid by the carrier is 80 percent of the reasonable fee. In Medicaid programs, the amount paid is 100 percent of the allowance and coinsurance payments are zero (Chavkin, 1979).

Medicare and Medicaid both employ a physician payment system called "accepting (benefit) assignment" which is virtually identical to Blue Shield participation arrangements. A physician who accepts assignment acknowledges the amount allowed as full payment for his or her services and is reimbursed for those services—except for Medicare deductibles and coinsurance—by the carrier. The physician who does not accept assignment is free to charge and receive whatever average revenue he or she can, but must bill the patient who then files a claim for reimbursement with the carrier. Unlike the case in most Blue Shield participation arrangements, Medicare regulations permit a physician to accept assignment on a case-by-case basis. In Medicaid programs, acceptance of assignment is legally mandatory for any physician who treats Medicaid patients.

⁴The aggregate coinsurance rates in the two Plans could not be measured precisely because each Plan offered a variety of UCR contracts with differing coinsurance provisions. However, estimates indicated that the coinsurance rate averaged 5 percent or less on allowances.

⁵Technically, the Medicare Level 2 screen is the 75th percentile of the fee distribution for a procedure in the physician's geographic area. However, first under the 1972-1974 Economic Stabilization Program and, in 1975, under a separate Congressional mandate, the annual growth rates of the Medicare Level 2 screens were constrained to rise no higher than set amounts.

Theoretical Framework and Previous Results

With respect to practice pricing and output policy, the most important implication of participation is that the physician's maximum average revenue on participating claims is fixed during the current period.⁶ That is, in the current period the physician acts like a price-taker in each Blue Shield submarket, defined by line of business, where he elects to participate. Depending on local competitive conditions, the physician may or may not be a price-taker in non-Blue Shield submarkets or in those Blue Shield submarkets where he or she does not participate.

One economic model that can be applied to this institutional setting is the Robinsonian model of price discrimination. The model has been used in prior research on physician participation and assignment (Sloan and Steinwald, 1978, and Hadley, 1978). Briefly, it postulates that physicians: (1) maximize (expected) profit; (2) face two or more demand functions representing the participating and nonparticipating segments of their markets; (3) face a participating demand function that is infinitely elastic in average revenue; (4) produce the same service in each market with one cost function; (5) are aware of allowance levels in the participating market segments; and (6) produce an output in each market segment and a price in each nonparticipating market segment that maximize (expected) profit.

The behavioral implications of the model are straightforward. In particular, and depending on the initial positions of the demand, marginal cost, and allowance level functions, the fraction of the physician's output devoted to the participating market segment should:

(1) increase (decrease) as the allowance level is raised (lowered);

(2) increase (decrease) as the short-run marginal cost function shifts downward (upward). For example, in a cross-section of physicians, one should observe the highest rates of participation among physicians with the shortest reimbursement lags, among those with the lowest input prices, among those of low quality (assuming low quality is associated with low marginal costs), and among group rather than solo physicians if there are economies of multi-physician practice;

(3) decrease (increase) as the nonparticipating demand function shifts outward (inward). Theoretically, factors that lead to high levels of nonparticipating demand and low physician participation rates are, for example, high physician quality, high patient income and educational levels, and a large volume of high-use patients—especially Medicare eligibles whose demands are financed outside of the Plans' private business. Factors leading (theoretically) to low levels of nonparticipating demands and high participation rates are a high risk of bad debt on nonparticipating bills (reflected, perhaps, by low *per capita* incomes in the

physician's market area), and a large volume of alternative suppliers as measured by large numbers of physicians *per capita*, and ample use of hospital outpatient facilities.

Although the model outlined here assumes profit maximization, its implications hinge only on the relative income opportunities of participation and nonparticipation. Thus, the predictions can be expected to hold—albeit more weakly—for any type of physician optimizing behavior such as utility maximization or target net income maintenance where decision-making is sensitive to income opportunities.⁷ When the profit-maximization assumption is relaxed, however, the physician's tastes and attitudes presumably have some impact on the participation decision.

The only prior study of physician participation in Blue Shield Plans is by Sloan and Steinwald (1978). Studies of Medicare assignment have been carried out by Huang and Koropecy (1973), Muller and Otelsberg (1978), and Paringer (1979). The determinants of Medicaid assignment have been explored by Sloan, Cromwell, and Mitchell (1978), and Hadley (1978). Explicitly or implicitly, all of these studies have employed the Robinsonian model, and all have used four basic groups of variables to account for variation in physician participation/assignment rates: (1) measures of reimbursement practices such as allowance levels and the stringency of claims review; (2) proxies for the level of the short-run marginal cost function; (3) measures of factors influencing the position of the practice's nonparticipating/nonassignment demand function; and (4) physician characteristics representing tastes, and possibly costs, or the position of the nonparticipating/nonassignment demand function.

Because of differences in analytic units, samples, definitions of variables, and estimation procedures, it is difficult to summarize the results of these studies.

However, the evidence tends on balance to confirm the validity of the Robinsonian model. It shows that:

(1) Carrier reimbursement practices have significant effects on participation/assignment rates. The rates appear to increase significantly with allowance levels [Sloan and Steinwald (1978), Sloan *et al.* (1978), Paringer (1979)], and proxies for the stringency of claims review have been found to be negatively correlated with Medicare assignment tendencies [Huang and Koropecy (1973), Muller and Otelsberg (1978)].

(2) High input prices (office wage rates) lower assignment rates [Hadley (1978), Sloan *et al.* (1978), Paringer (1979)], but have no clearcut effect on participation tendencies [Sloan and Steinwald (1978)]. No other surrogates for the level of marginal costs have been used.

(3) Certain proxies for strong nonparticipating/nonassignment demands such as high income population, large percentages of urban, white, and elderly residents, and low volumes of hospital outpatient visits *per capita* are negatively correlated with assignment rates

⁶The arguments here also apply to Medicare and Medicaid assignment. We do not claim that long-run average revenue is fixed on participating claims, since in UCR business the physician has the power to raise the next year's Level 1 screens by raising the current year's fee levels.

⁷In the case of target net income maintenance, the physician's participation decision should be responsive to income differentials between participating and not participating if realized net income falls below the target level. But even if realized net income equals or exceeds the target, it is probably unreasonable to assume that a physician declines the opportunity to raise his or her net income when the opportunity is obvious and easy to exploit.

[Huang and Koropecy (1973), Sloan *et al.* (1978)]. But participation rates were found to be positively correlated with population income by Sloan and Steinwald (1978), and observed relationships between participation/assignment rates and the number of physicians *per capita* are mixed.

(4) For physician traits, the strongest results indicate that non-board-certified physicians, foreign medical graduates (FMGs), young physicians, and physicians with liberal attitudes toward publicly sponsored health care have the highest participation/assignment rates [Sloan and Steinwald (1978), Sloan *et al.* (1978), Paringer (1979)].⁸ Mixed results have been found with respect to relationships between participation/assignment rates and physician specialties.

Because of their bearing on this study, the institutional and theoretical sections of the Sloan and Steinwald study merit special consideration. Sloan and Steinwald described partial service policies as "the most prevalent (of Blue Shield policies) and full-service (UCR) the least prevalent." This was not the case with the two Plans investigated in this study. Plan A had no partial service business during the sample period. In Plan B, the dollar volume of UCR business exceeded that of its partial service business.⁹

The Robinsonian model used by Sloan and Steinwald is also not completely valid for the all-or-nothing participation decision faced by physicians in our two study plans.¹⁰ The Robinsonian model permits the physician to vary his or her proportions of participating and nonparticipating outputs continuously—in effect, to participate on a claim-by-claim basis. In cases where the physician must decide whether to participate or (as in Medicaid) to accept assignment across the board, the correct model is a discrete optimization model. If the physician maximizes profit, he or she must compare the (expected) profitability of the participating (assignment) and nonparticipating (nonassignment) options and choose the option with the largest anticipated profit.

The elements of such a model are illustrated in Figures 1a and 1b. It is assumed here that there are two submarkets and that the physician does not discriminate in price if he or she chooses not to participate. (The argument is substantively the same if the physician does discriminate in price.) In Submarket 1, where the demand and marginal revenue functions are shown as the lines AB and AC respectively, the physician cannot participate. In Submarket 2, the physician may participate or not. If the physician does not participate in Submarket 2, the demand and marginal revenue functions have the positions DE and DF, respectively (Figure 1a). If the physician partici-

pates in this submarket, the demand function is the line segment DL shown in Figure 1b. Under the nonparticipating option shown in Figure 1a, the physician will choose the output OQ, where the combined marginal revenue from the two submarkets (given by a point on the line segment ARIJ) equals the marginal cost QS. The profit maximizing fee level in each submarket is OK, and the physician's total profit is the area NMLK. That is, unit profit is the fee level OK minus unit cost ON. Under the participating option shown in Figure 1b, the physician chooses the output OQ, the fee level OG in Submarket 1, and outputs of OF and FQ in Submarkets 1 and 2, respectively. Total profit in this case is the sum of the areas HIEG and IJKD. The physician will then elect to participate only if the area HIEG + IJKD equals or exceeds the area NMLK.

We omit the details because of space limitations, but it can be shown that the economic implications of the discrete model are generally much more indeterminate than those of the Robinsonian model. For example, in the Robinsonian model an outward shift in the nonparticipating demand function (that is, in the demand function for services on which the physician cannot participate) unambiguously lowers the profitability of participating and reduces the probability of participating. In the discrete model, the same type of shift raises the profitability of both the participating and nonparticipating options, and, on strictly logical grounds, it is not possible to tell which option becomes more profitable to the physician. Hence, the effect of the shift in the participation probability cannot be unambiguously predicted. As a basis for comparing the implications of the Robinsonian and discrete models, the theoretically predicted impacts of shifts in allowance levels and demand and cost functions on the participation probability are summarized in Table 1.

TABLE 1
Predicted Effects of Changes in Market Conditions on Participation Probabilities

Change in Market Conditions	Predicted Effect on Participation Probability (*: increase; -: decrease; ?: indeterminate)	
	Robinsonian Model	Discrete Model
Outward Shift in Demand Function in Nonparticipating Submarket	—	?
Outward Shift in Demand Function in Participating Submarket	—	—
Upward Shift in Marginal Cost Function	—	?
Increase in Allowances in Participating Submarket	+	+ (except in special cases)

⁸Sloan and Steinwald (1978) argued that FMGs (from non-white, non-English speaking countries) are of lower perceived quality than U.S. medical graduates, and Paringer (1979) claimed that FMGs have lower implicit wage rates than U.S. medical graduates. But whether country of medical graduation is a quality proxy or a labor cost proxy, its effect on the participation/assignment decision should be in the same direction.

⁹There are indications that the amounts of all Plans' partial service business declined substantially after 1968, the year of the data source on Blue Shield Plan characteristics used by Sloan and Steinwald.

¹⁰See the next section on this point.

FIGURE 1A
Nonparticipating Physician Pricing and Output Decisions

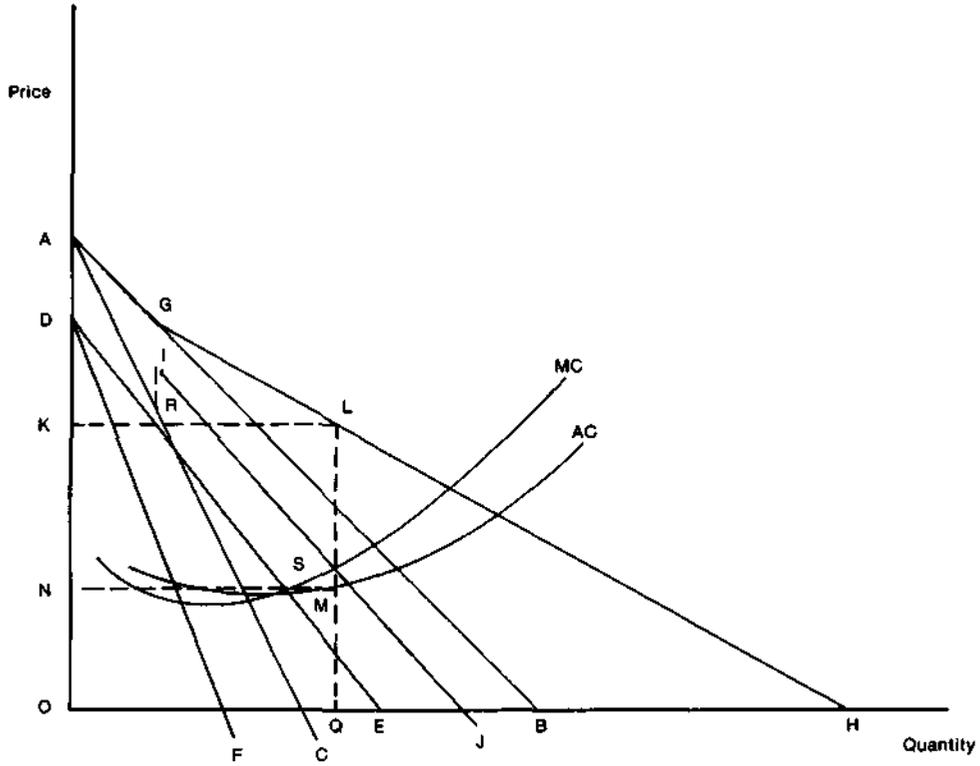
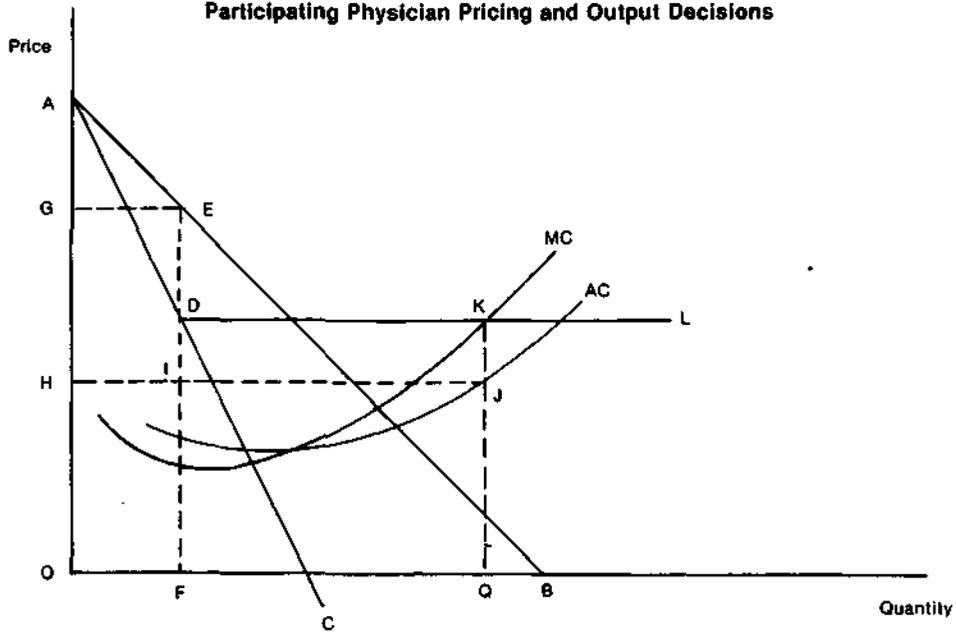


FIGURE 1B
Participating Physician Pricing and Output Decisions



The discrete model suggests further that the physician's participation decision will be less sensitive to shifts in any of these functions than the Robinsonian model implies. This is so because in the discrete model there must be a quantum change in the relative profitabilities of participating and not participating before the physician is led to switch from one option to the other. A consequence of this consideration is that when participation or assignment (as in Medicare) is on a claim-by-claim basis, participation/assignment decisions are more likely to be responsive to relatively small changes in Plan allowances and local market conditions than when participation/assignment is on an all-or-nothing basis.

The relative indeterminacy and lower sensitivity of all-or-nothing participation decisions to shifts in revenue and cost conditions do not lessen the importance of examining the decisions themselves. They merely emphasize that participation behavior must be determined empirically, and that it often cannot be predicted using *a priori* reasoning.

Data and Formulation of the Model

The data used in this study are the claims records of 942 physicians in Plan A and 928 physicians in Plan B covering the years 1973-1976. The records apply to approximately 60 high-use medical, surgical, and other procedures, and were provided by the Blue Shield Association. One of the two Plans is located on the East Coast. The other is located in the Midwest. Each physician in the sample practiced in the Plan's market area during the four years of the study period. The

The claims records contained the amounts charged by physicians and the amounts allowed and paid by the plan. They also contained the frequency with which each procedure was performed and certain additional claims data indicated in Table 2.¹¹ To derive a single measure of the physician's output, the procedure frequencies were converted into relative value units (RVUs) using the 1974 California Relative Value Scale. The number of RVUs was then aggregated for each physician and year, and mean charges and allowances per RVU were calculated for each physician and year. Finally, measures of RVUs were standardized across specialties in order to generate a common output index for all physicians.

The physician-specific claims data were merged with additional physician and county data taken from several sources. Physician characteristics such as age, sex, specialty, board certification status, country of medical graduation, etc., were derived from the American Medical Association's Masterfile of Physicians. County-level data describing local market conditions were drawn from the sources listed at the end of Table 2.

¹¹"Special circumstance" claims where amounts allowed exceeded the scheduled or screen amounts were edited out of the data base due to obvious difficulties in analyzing the nature of conditions underlying the "special circumstances."

As already mentioned, the two study Plans formally offered participation agreements on an all-or-nothing basis. In Plan A the agreement applied only to UCR business. In Plan B a participating physician was required to participate in both UCR and partial service business, and he or she could not elect to participate in one of the two lines alone. Since partial service allowances were lower than UCR allowances in Plan B, it was predicted that they represent a stronger constraint on the Plan B physician's participation decision than UCR allowance levels.¹²

In modeling the participation decision, it was assumed that, at the start of each year, the physician faces the discrete optimization problem previously described. Having chosen the alternative yielding the largest anticipated profit or net income, the physician then participates or does not participate in all applicable private business during the year. Accordingly, we estimated the probability that the physician participates in year *t* as a function of allowance levels and other reimbursement variables, proxies for level of his or her short-run marginal cost function, proxies for the position of the demand function in the nonparticipating segment of his or her market, and a group of physician and patient-mix variables.

Five groups of explanatory variables were selected for this study from among those justified in the foregoing section. The variables are defined in Table 2.

¹²Despite the all-or-nothing nature of the two participation agreements, the data indicated that some physicians in each Plan had both participating and nonparticipating claims in each of the sample years. Those physicians with both types of claims had predominantly one or the other, and there may have been several reasons such as switches in participation status or Plan coding errors that account for inconsistency between the data and the formal participation agreements. In addition, each Plan allowed participating physicians to bill their patients. In Plan B, when a patient who had been billed by a participating physician submitted a claim for reimbursement, he or she was informed of his or her payment liability—that is, that the physician was entitled to no more than the difference between the amount allowed and the amount paid by the Plan. A patient billed by a participating physician in Plan A was not informed of his or her payment liability except upon specific request. Hence, it was technically possible for physicians in Plan A to participate but to be reimbursed on some claims as if they were nonparticipating and, in effect, to participate on a claim-by-claim basis.

To generate participation data that were compatible with the Plans' participation agreements, physicians in both Plans were initially defined as participating if more than 5 percent of their RVUs in private business were provided on a participating basis. To allow for the possibility of *de facto* claim-by-claim participation in Plan A, a participation rate was defined as the ratio of RVUs provided on a participating basis to the total number of RVUs in private business recorded for the physician. This participation rate definition yielded empirical results which were almost identical to those derived from the first definition.

TABLE 2
List and Definitions of Variables

Variable	Definition ¹
	<u>Dependent Variable</u>
PART _t	Dummy variable = 1 if the physician participated in year t (P,C)
	<u>Explanatory Variables</u>
AGE	Physician's age in 1979 (P,A)
AMASEX	Dummy variable = 1 if the physician is female (P,A)
APRVU _{1t}	Amount allowed per RVU (in dollars) in UCR business in year t (P,C)
APRVU _{5t}	Amount allowed per RVU (in dollars) in partial service business in year t (P,C)
BORDCERT	Dummy variable = 1 if the physician was board certified in 1977 (P,A)
CPRVU _t	Amount charged per RVU (in dollars) in all private business lines in year t (P,C)
DOCPRCAP _t	Number of non-Federal physicians <i>per capita</i> in physician's county in year t (M,D)
ENRBPRCAP _t	Fraction of county population enrolled in Medicare Part B in year t (M,H)
FMG	Dummy variable = 1 if the physician was a foreign medical graduate (P,A)
GROUP	Dummy variable = 1 if the physician practiced in a group in 1977 (P,A)
IM	Dummy variable = 1 if the physician was an internist (P,A)
INPAHOSP _t	Fraction of the physician's RVUs in private business provided in hospitals in year t (P,C)
INPERCAP _t	<i>Per capita</i> income in the physician's county in year t (C,D)
LAGPRCLM _t	Average number of days between claim filing and claim payment in private business in year t (P,C)
OTHER—EM	Dummy variable = 1 if the physician practiced in a hospital or other institutional setting in 1977 (P,A)
OTHRSPEC	Dummy variable = 1 if the physician had a nonprimary care specialty (P,A)
OUTPPRCP _t	Number of hospital outpatient visits <i>per capita</i> in physician's county in year t (C,H,D)
PARTNER	Dummy variable = 1 if the physician practiced in a partnership in 1977 (P,A)
PD—	Dummy variable = 1 if the physician was a pediatrician (P,A)
PRCT—URB	Percentage (X 10) of residents in county living in urban areas (C,H)
RVU _{1t}	Number of RVUs provided in UCR business in year t (P,C)
RVU _{5t}	Number of RVUs provided in partial service business in year t (P,C)
TIME74	Dummy variable = 1 if year of observation was 1974
TIME75	Dummy variable = 1 if year of observation was 1975
TIME76	Dummy variable = 1 if year of observation was 1976
WAGEINDX _t	Average payroll per employee in physicians' offices in year t (C,B)

¹The first letter in parentheses following the variable definition indicates the unit to which the variable applies, where P denotes the physician and C denotes the physician's county. The second letter denotes the source of data. The sources are as follows:

A: American Medical Association, *Masterfile of Physicians*, 1977.

B: U.S. Bureau of the Census, *County Business Patterns*, annual.

C: Plan claims records.

D: American Medical Association, *Physician Distribution and Medical Licensure in the U.S.*, annual.

H: Manpower Analysis Branch, Health Resources Administration, U.S. Department of Health, Education, and Welfare, *Area Resources File*, 1978.

The first group consists of six reimbursement, pricing, and output variables. APRVU1 and APRVU5 denote the dollar amounts allowed per RVU in UCR and partial service business (that is, the fee screen or fee schedule amounts set by the Plans), respectively. Both allowances were predicted to be positively correlated with the participation probability. In Plan B the partial service allowance averaged about 55 percent of the UCR allowance during the four-year sample period. Hence it was expected to have a somewhat stronger impact on the participation probability than the UCR allowance level. In Plan A, where there were no partial service allowances, it was expected that the UCR allowance would have a stronger quantitative influence on the participation probability than the UCR allowance in Plan B.

LAGPRCLM signifies the average number of days between filing a claim and receipt of reimbursement from the Plan. Long payment lags increase the practice's accounts receivable, raise its interest costs, and shift its marginal cost function upward.¹³ CPRVU stands for the average amount charged by the physician in private business. A single measure of average amount charged was used because variation in charges across the private business lines was negligible.¹⁴ Other things being equal, it was assumed that to the extent practice costs (and quality) are correlated with charges, high-priced physicians would tend to have high unit and marginal costs and to face strong demands for services produced on a nonparticipating basis.¹⁵

The fraction of the physician's total number of RVUs provided to hospital inpatients (INPAHOSP) was taken as proxy for the level of marginal costs and the average size of claims representing, in turn, the risk of bad debt on nonparticipating services. Large values of INPAHOSP should imply low marginal costs and a high cost of bad debt on nonparticipating claims. It was further conjectured that large outputs of UCR and partial service RVUs (RVU1 and RVU5) increase the physician's sensitivity to anticipated profit differentials between participating and not participating (Paringer, 1979). This conjecture is explored further in the following section.

The second group of explanatory variables consisted of a measure of physicians' office wage rates (WAGEINDX) and type-of-practice dummies reflecting possible economies of large scale. Large values of WAGEINDX imply a relatively high level of production costs. Dummies indicating solo practice and practice in

expense-sharing arrangements were deleted, so if there are important economies of scale, group practice (GROUP) and partnership practice (PARTNER) should denote relatively lower levels of unit costs. Practice in hospitals and other institutional settings (OTHER—EM) indicates a low level of non-physician expenses and should also denote a relatively lower level of unit production costs.

The third group of explanatory variables is comprised of several county-level proxies for the position of the average revenue functions in the nonparticipating submarkets and in the participating submarket when the physician does not participate. They include *per capita* income (INPERCAP), the fraction of the county population enrolled in Medicare Part B (ENRBPSCP), the percentage of county residents living in urban areas (PRCT-URB), the number of physicians *per capita* (DOCPRCAP), and the number of hospital outpatient visits *per capita* (OUTPPRCAP). Increases in the values of each of the first three of these variables were assumed to signify outward shifts in the average revenue functions. Increases in the values of the last two were assumed to denote backward shifts—since they should be associated with fewer patients and/or diminished quantities demanded per physician.¹⁶

The fourth group of variables is made up of physician characteristics. Medical graduation in a foreign country (FMG) and board certification (BORDCERT) were taken as proxies for the perceived quality of the physician's services and/or the level of production costs. In the first sense, they stand for the positions of average revenue functions with respect to all nonparticipating services, and, in the second, they stand for the position of the physician's cost function. No hypotheses were proposed with respect to the effects of physician age (AGE) and sex (AMASEX) on the participation decision. Although physician age has generally been found to be negatively correlated with assignment rates, it may capture the influence of the physician's tastes, the perceived quality of his/her services, and the size of his/her nonparticipating and non-subscribing clientele. Thus, it was unclear on *a priori* grounds how age would be related to the participation probability, and similar comments apply with respect to the physician's sex.¹⁷

Specialty dummies denoting practice in internal medicine (IM), pediatrics (PD-), and the non-primary care fields (OTHRSPEC) were defined chiefly to reflect differences in participation propensities between the primary care and non-primary care fields. The general and family practice dummy was deleted. Although demands in the nonparticipating markets may differ between primary care and referral practitioners, there

¹³On nonparticipating claims the payment lag applies to the subscriber's claims. Lacking evidence to the contrary, we assumed that the payment lag incurred by the subscriber would have been incurred by the physician if the claim were submitted on a participating basis. If the assumption is not correct, it would tend to obscure the payment lag/participation probability relationship.

¹⁴Strictly speaking, the current average charge level is endogenous, but to have used the one-year lagged charge instead would have necessitated dropping the initial year's data. For this reason—and the fact that current and one-year lagged charges were highly correlated—the current charge level was retained.

¹⁵Paringer (1979) reported a significantly negative partial correlation between the physician's charge level and his or her willingness to accept Medicare assignment.

¹⁶All five of the variables were moderately to highly inter-correlated. Also, in Plan A the office wage proxy (a county-level variable) was almost perfectly correlated with county *per capita* income. No other county socioeconomic variables were entered into the regression equations because of the high degree of multi-collinearity.

¹⁷Other variables such as the holding of medical school appointments and proxies for the physician's race and medical school research orientation were considered as well. However, none of the sample physicians held faculty appointments, and the use of race and research orientation proxies led to large numbers of missing or unreliable observations. Consequently, these variables were omitted.

were no obvious hypotheses concerning a systematic relationship between specialty and participation status.

The final group of explanatory variables consists of three time dummies signifying the years of observation 1974 (TIME74), 1975 (TIME75), and 1976 (TIME76). The 1973 dummy was deleted. The variables were included as proxies for time-related events such as changes in reimbursement policies which might affect participation decisions but which could not be directly observed.

Findings

With the physician designated as the analytic unit, the participation probability was specified as a regression function of the explanatory variables listed in Table 2 and estimated from the combined cross-sectional and time-series sample of physician and county data.¹⁸ Regressions were estimated separately using single-equation ordinary least squares (OLS), single-equation logit, and two-stage least squares (TSLS) applied to a simultaneous system.¹⁹ All three sets of estimates were closely similar, and the TSLS estimates, which are not shown, were nearly identical to the OLS estimates—indicating that simultaneity is a negligible source of bias in the single-equation regressions. For comparative purposes the OLS and logit estimates of the participation probability are shown in Tables 3 and 4, respectively.

¹⁸Two data editing steps were taken before estimating the regressions. First, observations defined by physician and year were deleted when charges equaled allowances. This was done because, as mentioned, the amount allowed by the Plan cannot exceed charges. Therefore, the fee screen or fee schedule amounts were not observable in those instances in which reported allowances were equal to charges (that is, the difference between the fee screen or fee schedule amounts and charges could not be determined when charges were less than or equal to the former amounts). Since the correct exogenous reimbursement variables are the fee screen or fee schedule amounts, it was necessary to restrict the samples to cases where they were observable. The deletions removed 26 percent of the observations from the Plan A sample and 11 percent of the observations from the Plan B sample.

Second, physicians with no UCR business were deleted from both samples because there were no reliable ways of estimating their missing UCR allowances. In Plan B, physicians having UCR claims but no partial service claims were retained, and their partial service allowances were estimated as the sample mean allowances for partial service business as a whole. Since partial service allowances are determined by fixed fee schedules (when they are less than amounts charged), it was felt that this procedure generated reasonably accurate proxies for the unobserved allowances.

Due to the two editing steps and the fact that some physicians had no recorded sample claims in one or more of the study years, the number of physicians appearing in each of the samples varied from year to year. In the Plan A sample, the number of physicians averaged about 725 per year. In the Plan B sample, the average number was about 750 per year.

¹⁹In the simultaneous equation system, the participation probability, current charge per RVU, current output(s) of RVUs, and the current allowance(s) per RVU were specified as endogenous.

The results strongly confirm the role of allowances, charges, reimbursement lags, and, in general, the relative income opportunities of participating and not participating, in the physician's participation decision. Coefficients on the allowance variables all had the expected signs and, with one exception, all were significant (well below the 5 percent level). Moreover, as anticipated, the UCR allowance had a much stronger influence on the participation probability in Plan A (both quantitatively and in terms of statistical significance) than in Plan B. And in Plan B, the partial service allowance had a considerably stronger influence on the participation probability than the UCR allowance.

The elasticities of the probability of participating with respect to allowances, estimated from the OLS regressions at sample means, are: .838 for Plan A's UCR allowance; .095 for Plan B's UCR allowance; and .205 for Plan B's partial service allowance.²⁰ By way of contrast, Sloan and Steinwald (1978) estimated the elasticity of the participation probability with respect to (a proxy measure of partial service) allowances at approximately .10.²¹

The remaining results are rather more mixed. Six cost-related variables were used in the regressions—WAGEINDX, LAGPRCLM, INPAHOSP, GROUP, PARTNER, and OTHER-EM. Large values of the first two signify high unit and marginal costs under the hypotheses given in the preceding section. Thus, if upward shifts in the practice's average and marginal cost functions reduce participation probabilities, WAGEINDX and LAGPRCLM should be negatively related to the participation probability, and the remaining four variables should be positively related to it. The signs of the coefficients on LAGPRCLM, INPAHOSP, PARTNER, and OTHER-EM were consistent with this interpretation, although the coefficients themselves were not uniformly significant. The signs of the coefficients on WAGEINDX and GROUP either varied between Plan samples or else were not consistent with the prediction. Thus, although there were some indications that participation rates fall with increasing unit or marginal costs, the results were not systematic.

²⁰The exceptionally high sensitivity of the Plan A participation probability to allowances may be partly due to the relatively low overall rate of participation in that Plan. An average of only 74 percent of the Plan A physicians in the regression sample participated in one or more years of the study period, as opposed to an average of 88 percent of the physicians in Plan B. As the number of physicians motivated to enter participation agreements increases, one would tend to expect the remaining nonparticipants to be those who are least responsive to additional income incentives.

²¹We have suggested that all-or-nothing participation decisions ought to be less sensitive to changes in allowance levels than the claim-by-claim type decisions examined by Sloan and Steinwald. While the figures cited here indicate the contrary, the two studies are not strictly comparable. Aside from differences between our selection of explanatory variables and those chosen by Sloan and Steinwald, we were able to use exact measures of physicians' allowances and Sloan and Steinwald were not. It is hard to say whether Sloan and Steinwald underestimated the sensitivity of participation to allowances due to their allowance proxy, but additional empirical evidence on the sensitivity issue is clearly desirable in view of differences in our results.

TABLE 3
OLS Estimates of the Probability of Participating In Private Business

Variable	Plan A		Plan B	
	Parameter Estimate	t-ratio	Parameter Estimate	t-ratio
INTERCEPT	2.737**	3.90	1.201**	9.17
APRVU	.279**	6.98	—	—
APRVU1	—	—	.039*	2.10
APRVU5	—	—	.140**	7.01
CPRVU	-.261**	-9.25	-.057**	-4.49
RVU/1000	-.001	-.14	—	—
RVU1/1000	—	—	.004	1.01
RVU5/1000	—	—	.001	.17
LAGPRCLM	-.001**	-4.18	-.0005*	-2.49
AGE	.003**	3.65	-.002**	-2.67
AMASEX	.102*	2.56	.035	1.15
BORDCERT	-.061**	-3.01	-.064**	-4.98
FMG	.138**	6.60	.061**	4.27
GROUP	-.104**	-4.82	-.096**	-3.91
PARTNER	.092**	3.77	.007	.43
OTHER—EM	.121**	3.93	.045*	2.26
PD—	.118**	2.68	.106**	3.62
IM	-.128**	-3.16	-.094**	-3.51
OTHRSPEC	.005	.16	-.006	-.27
INPAHOSP	.023	.98	.051*	2.27
WAGEINDX	.002	.16	-.019**	-4.60
DOCPRCAP	159.776	1.12	-5.000	-.37
OUTPPRCP	.284	1.24	-.00008	-.005
INPERCAP	-.0005**	-2.83	-.00006*	-2.38
ENRBPRCP	-5.341**	-3.45	-.734	-1.49
PRCT—URB	-.00005	-.42	.0002**	3.78
TIME 74	.175	1.77	.084**	3.14
TIME 75	.159	1.33	.100**	3.18
TIME 76	.463*	2.01	.197**	3.77

DFE	2416	2984
SSE	383.99	285.96
MSE	.16	.10
F	21.87	11.83
Prob > F	.0001	.0001
R ²	.18	.09

One and two asterisks denote coefficients significantly different from zero at the 5 percent and 1 percent levels respectively (two-tailed tests). Because of heteroscedasticity, the t-ratios may be biased. However, any such bias appears to be minimal as the OLS-reported t-ratios here closely approximate the Logit model asymptotic t-ratios in Table 4.

TABLE 4
Logit Estimates of the Probability of Participating in Private Business

Variable	Plan A		Plan B	
	Parameter Estimate	Asymptotic t	Parameter Estimate	Asymptotic t
INTERCEPT	16.27**	3.21	5.726**	3.81
APRVU	1.749**	6.16	—	—
APRVU1	—	—	.360	1.95
APRVU5	—	—	1.497**	6.51
CPRVU	-1.597**	-7.71	-.466**	-4.22
RVU/1000	-.009	-.32	—	—
RVU1/1000	—	—	.038	.81
RVU5/1000	—	—	.008	.11
LAGPRCLM	-.006**	-4.01	-.005**	-2.77
AGE	.021**	3.64	-.014*	-2.23
AMASEX	.970**	2.72	1.401	1.89
BORDCERT	-.327*	-2.48	-.620**	-4.33
FMG	.989**	6.70	.845**	4.74
GROUP	-.577**	-4.56	-.768**	-3.66
PARTNER	.593**	3.50	.055	.32
OTHER—EM	.772**	3.53	.703*	2.57
PD—	.689*	2.14	2.531**	3.93
IM	-.829**	-3.08	-.969**	-3.31
OTHRSPEC	-.055	-.22	-.128	-.48
INPAHOSP	.141	.95	.415	1.77
WAGEINDX	.130	1.27	-.201**	-4.66
DOCPRCAP	-94.69	-.09	177.3	1.33
OUTPPRCAP	4.618*	2.40	.207	1.24
INPERCAP	-.004**	-3.21	-.0007*	-2.54
ENRBPRCP	-44.97**	-3.30	-10.78	1.92
PRCT—URB	-.00008	-.11	.0008*	1.98
TIME 74	.476	.53	.861**	2.90
TIME 75	.062	.06	1.001**	2.91
TIME 76	2.333	1.21	2.013**	3.55
	<u>At</u>	<u>At</u>	<u>At</u>	<u>At</u>
	<u>Convergence</u>	<u>Zero</u>	<u>Convergence</u>	<u>Zero</u>
Log Likelihood	-1177	-1729	-972	-2142
Sum of Squared Res.	2579	2494	2971	3089
DFE	2470	2495	3063	3090
% Correctly Predicted	77.5	50.0	88.3	50.0
Likelihood Ratio Index (About Zero)		.320		.546
Likelihood Ratio Statistic (About Zero)		1106		2338

One and two asterisks denote coefficients significantly different from zero at the 5 percent and 1 percent levels respectively (two-tailed tests).

The effects of the county-level proxies for the positions of physicians' average revenue functions for nonparticipating services were also somewhat mixed. *Per capita* income and the fraction of the county population enrolled in Medicare Part B were negatively correlated with the participation probability. These results suggest that the relative profitability of participating is reduced by outward shifts in the average revenue functions for services on which physicians do not participate. However, the same line of reasoning would suggest that the coefficients on PRCT-URB should have been negative, and those on DOCPRCAP and OUTPPRCP should have been positive. But there were no systematic patterns in the signs of the coefficients on these three variables. Hence, the evidence is not conclusive that shifts in the nonparticipating average revenue functions influence participation probabilities.

The surrogates for physician quality—FMG, BORDCERT, and CPRVU—entered the regressions highly significantly and with the same signs for each Plan sample. The findings here show unambiguously that "high-quality" physicians have materially lower participation rates than "low-quality" physicians. In terms of the theoretical model, they indicate that "high-quality" physicians face relatively large demands for services produced on a nonparticipating basis and have commensurately weak income incentives to enter into participation agreements where average revenues are lower.

The relationships between the participation probability and physicians' personal characteristics varied between Plans. In each Plan female physicians were more likely to participate than males, but the physician's age had no systematic relationship with the participation probability. In Plan A the participation probability rose significantly with the physician's age, but in Plan B the probability declined significantly with age. As a group, primary care practitioners seemed about as likely to participate as referral specialists (OTHSPEC), but there were marked differences in participation probabilities within the primary care fields. General and family practitioners had about the same participation rates as referral specialists, but pediatricians in both Plans were significantly more likely to participate than

general and family practitioners, and internists were significantly less likely to do so.

The time dummies indicate similar patterns of autonomous shifts in the participation probabilities in the two Plans over the four-year study period. In particular, the probabilities rose significantly in 1973-1974, remained stable during 1974-1975, and rose significantly again in 1975-1976. Although neither of the two Plans imposed constraints on physicians' allowances during the Economic Stabilization Program, the common pattern of shifts in the participation probability suggests a common cause. One possibility is the restrictions on Medicare allowances in effect during 1973-1974 and again after 1975. Restrictions on Medicare allowances may have reduced the average revenue on Medicare services sufficiently during 1973-1974 and 1975-1976 to make Medicare business relatively less profitable during those years. Such an effect would shift the average revenue function in the nonparticipating segment of the physician's market inward and could have increased the physician's incentives to participate in private business. Unfortunately, we were unable to explore this possibility with the data available to us, but it appears to deserve further research attention.

The volumes of the physician's outputs in UCR and partial service business had no significant impacts on participation probabilities, and none was initially predicted. However, following Paringer's (1979) study of Medicare assignment, where the hypothesis was first put forward, we conjectured that the responsiveness of physicians' participation decisions to participating/nonparticipating net income differentials would increase as the volumes of participation-eligible business increase.

While there are other ways of testing this conjecture, we attempted to replicate the approach used by Paringer. Both samples were stratified into terciles by the combined outputs of UCR and partial service business, and the single-equation version of the participation probability was re-estimated for each of the resulting subsamples. Because of the close similarity of the OLS and logit estimates for the full samples, the subsample regressions were estimated using only OLS. The results are shown in Tables 5 and 6. If Paringer's hypothesis is correct, the absolute values and t-statistics of coefficients on all explanatory variables measuring the relative income opportunities of participation and nonparticipation should increase monotonically with output levels in private business where the physician is eligible to participate.

TABLE 5
OLS Estimates of the Probability of Participating in Private Business for Sample Stratified
by Physician Output: Plan A

Variable	First Tercile		Second Tercile		Third Tercile	
	Parameter Estimate	t-ratio	Parameter Estimate	t-ratio	Parameter Estimate	t-ratio
INTERCEPT	3.218*	2.56	2.563*	2.05	2.488*	2.00
APRVU	.144**	3.01	.411**	4.03	.726**	6.59
CPRVU	-.171**	-5.14	-.400**	-5.24	-.550**	-6.90
LAGPRCLM	-.001**	-3.27	-.001	-1.79	-.0002	-.39
AGE	.005**	3.16	.003*	2.15	.001	.55
AMASEX	.119*	2.09	.140	1.95	.063	.74
BORDCERT	-.100**	-2.83	-.099**	-2.88	.004	.11
FMG	.091*	2.50	.132**	3.68	.165**	4.55
GROUP	-.204**	-5.39	-.138**	-3.63	.032	.84
PARTNER	.139**	3.09	.037	.83	.095**	2.46
OTHER—EM	.121**	2.63	.086	1.52	.201**	3.05
PD—	.243**	3.67	.086	1.01	-.055	-.48
IM	.036	.53	-.027	-.40	-.351**	-4.65
OTHRSPEC	.112	1.94	.021	.37	-.088	-1.36
INPAHOSP	-.034	-.95	.086	1.89	.130**	2.65
WAGEINDX	.029	1.39	-.017	-.77	-.006	-.23
DOCPRCAP	198.520	.78	126.831	.50	205.131	.81
OUTPPRCP	.246	.58	.480	1.20	.063	.16
INPERCAP	-.001*	-2.06	-.0003	-1.15	-.001	-1.76
ENRBPRCP	-6.247*	-2.21	-7.613**	-2.69	-3.884	-1.46
PRCT—URB	-.0002	-1.07	-.0002	-1.17	.0003	1.85
TIME74	.086	.46	.216	1.24	.233	1.39
TIME75	-.011	-.05	.272	1.31	.232	1.10
TIME76	.359	.81	.479	1.17	.634	1.65
DFE	784		791		794	
SSE	119.16		125.93		119.84	
MSE	.15		.16		.15	
F	11.18		8.96		8.71	
PROB>F	.0001		.0001		.0001	
R ²	.25		.21		.20	

One and two asterisks denote coefficients significantly different from zero at the 5 percent and 1 percent levels respectively (two-tailed tests).

TABLE 6
OLS Estimates of the Probability of Participating in Private Business for Sample Stratified
by Physician Output: Plan B

Variable	First Tercile		Second Tercile		Third Tercile	
	Parameter Estimate	t-ratio	Parameter Estimate	t-ratio	Parameter Estimate	t-ratio
INTERCEPT	.966**	4.44	1.119**	5.28	1.650**	5.86
APRVU1	.029	1.30	.125**	2.66	.040	.73
APRVU5	.079**	2.59	.194**	5.39	.156**	3.69
CPRVU	-.047**	-3.22	-.155**	-4.24	-.038	-.95
LAGPRCLM	-.0001	-.39	-.001*	-2.20	-.001**	-2.70
AGE	-.003**	-2.65	-.002	-1.85	.001	.71
AMASEX	-.014	-.32	.058	.99	.059	.91
BORDCERT	-.062**	-2.74	-.072**	-3.22	-.054*	-2.40
FMG	.064*	2.32	.101**	4.38	.017	.66
GROUP	-.031	-.65	-.131**	-3.51	-.108*	-2.37
PARTNER	-.017	-.60	.008	.28	.040	1.29
OTHER—EM	.043	1.41	.006	.16	.100*	2.50
PD—	.092*	2.36	.079	1.50	.186	1.47
IM	-.138**	-3.49	-.132**	-2.95	.065	.59
OTHRSPEC	.005	.15	-.031	-.77	.048	.45
INPAHOSP	.055	1.73	.045	1.04	.127*	2.44
WAGEINDX	-.010	-1.48	-.023**	-3.58	-.024**	-2.97
DOCPRCAP	.184	.01	-13.842	-.63	.246	.01
OUTPPRCAP	-.005	-.19	-.022	-.82	.053	1.61
INPERCAP	.00002	.36	-.00004	-.90	-.0002**	-4.54
ENRBPRCP	-.224	-.27	-.316	-.39	-1.430	-1.55
PRCT—URB	.0001	1.33	.0003**	3.81	.0001	1.24
TIME74	.016	.32	.100*	2.31	.162**	3.19
TIME75	.019	.34	.134**	2.70	.174**	2.88
TIME76	.037	.43	.238**	2.88	.429**	3.99
DFE	977		980		979	
SSE	93.08		91.98		90.19	
MSE	.10		.09		.09	
F	4.49		9.08		4.22	
PROB>F	.0001		.0001		.0001	
R ²	.10		.18		.09	

One and two asterisks denote coefficients significantly different from zero at the 5 percent and 1 percent levels respectively (two-tailed tests).

The findings give qualified support to Paringer's hypothesis. None of the variable coefficients behaved strictly as the hypothesis predicts, but in Plan A the sensitivity of the participation probability to changes in allowance and charge levels increased dramatically with the physician's output of UCR services. Indeed, the elasticity of the participation probability with respect to allowances, shown in Table 7, rose five-fold from the first to the third output terciles. The same type of pattern emerged in Plan B for the first and second output terciles—and for the first and third as well—but not for the second and third.

TABLE 7
Elasticities of the Participation Probability with Respect to Allowances Evaluated at Output Tercile Means

Plan/ Line of Business	Output Tercile		
	First	Second	Third
Plan A UCR	.443	1.214	2.173
Plan B UCR	.072	.308	.095
Partial Service	.126	.290	.203

Despite ambivalences in the evidence, it seems reasonable to conclude that there were interactions between physicians' participation decisions and the volumes of their participation-eligible business. This, of course, is to say no more than that a physician is likely to react to relative income opportunities more strongly when the amount of business affected by his or her decision is large than when it is small.

Conclusion

The physician participation agreements offered by the two study Plans were of the all-or-nothing type. Theoretically, the effects of physician, practice, and local market characteristics on participation decisions under this type of agreement have a high degree of uncertainty. Except for the impacts of allowance levels, it is consequently difficult to argue that any particular group of characteristics will affect participation decisions in the same way regardless of the makeup of the physician population. This is not to say that examining all-or-nothing participation choices is irrelevant for policy purposes, but rather that the policy implications ought to be based on empirical observation.

Although the participation agreements offered by the two study Plans have close parallels only in the present form of Medicaid assignment, we believe the results have several important applications to all forms of government reimbursement policy for physicians.

First, insofar as board certification, graduation from a U.S. medical school, and high charge levels are proxies for physician quality, the evidence clearly indicates that high-quality physicians are weakly attracted into participation agreements. Since the lower income portions of the population are precisely those served by—or with the strongest incentives to visit—participating and assignment physicians, it seems evident that

the insitutions of assignment and participation tend to yield a relatively low quality of care to low income consumers. This conclusion should not be overemphasized, and, as Sloan and Steinwald (1978) have pointed out, it is probably an inevitable concomitant of any effort to constrain physicians' average revenues which leaves the practitioner free to reject the program. It can also be argued that providing some type of physicians' care to low income patients is preferable to offering little or none at all. Nevertheless, the issue of controlling health care costs versus maintaining health care quality is one which policymakers must continue to confront.

Second, the finding that allowance levels exert a moderate to strong influence on the decision to enter into a participation agreement highlights a fundamental problem in physician reimbursement. Inducing physicians to participate or to accept assignment and imposing constraints on their allowances is the cornerstone of current private and government reimbursement policy toward physicians. Yet the evidence shows that raising allowance levels is arguably the only significant policy tool for increasing participation/assignment rates. And at some point, the costs to the public of increasing physicians' allowances offset the savings due to controls on allowance levels. It is therefore reasonable to ask whether attempting to promote a 100 percent participation or assignment rate—or perhaps even a rate close to 100 percent—is necessarily a cost-effective method of paying for society's medical care.

Third, some of our results suggest that Blue Shield participation rates are adversely affected when physicians' income opportunities in the Medicare program are raised. Accordingly, it is reasonable to suppose that Medicare and Medicaid assignment is also adversely affected when physicians' income opportunities in Blue Shield Plans' and other carriers' private business are raised. If the supposition is correct, one can expect downward trends in Medicare and Medicaid assignment under any circumstances that lower physicians' income opportunities from these sources (such as new controls on Medicare or Medicaid allowances) relative to those from carriers' private business. The degree to which cost controls on government-and-privately-financed physicians' services interact in physicians' pricing and output decisions has not been systematically explored, and we were not able to investigate the issue here. It is another area deserving increased attention by policymakers and administrators.

Finally, some authorities have proposed that Medicare assignment be changed from its current claim-by-claim basis to an all-or-nothing system in order to strengthen the controls on Medicare costs. It has also been suggested that Medicaid and Medicare assignment be tied together as a means of increasing the number of physicians who provide Medicaid services.

The essential question in the first proposal is whether changing the form of Medicare assignment will, in fact, increase the rate of Medicare assignment. On this point the present study has relatively little empirical evidence to offer. Ideally, it would be necessary to compare the determinants of Medicare assignment with those of all-or-nothing participation among the same group of physicians—or among different physician samples with proper standardization. We were not able to conduct such analyses with the data available to us. However,

as has been explained, participating physicians in Plan A whose patients submitted the claims were not effectively limited by the participation agreement to accepting amounts allowed as full payment. Thus, in effect, they could participate on a case-by-case basis. However, the regressions based on proportions of RVUs participating were virtually identical to those using a dummy variable for participation. This might indicate either a strong predisposition not to bend the rules or it could suggest that all-or-nothing participation is not much different from case-by-case participation in terms of the physician's decision to participate.

With respect to tying Medicare and Medicaid assignment together, the study's findings do shed light on the consequences one might expect for the joint assignment rate. In Plan B, physicians were allowed to participate only if they agreed to participate in high-allowance (UCR) and low-allowance (partial service) business. Although the average participation rate was considerably higher in Plan B than in Plan A, where only high-allowance (UCR) participation agreements were offered, it is obviously not possible to attribute this difference to a single characteristic of the two participation agreements. Indeed, in Plan B the participation probability behaved as one would theoretically predict. Participation probabilities varied significantly with allowance levels in both high-allowance and low-allowance business, but they were generally much more sensitive to reimbursement levels in the former than the latter.

Applying these results to a joint, all-or-nothing system of Medicare and Medicaid assignment, it is reasonable to believe that low Medicaid allowances would dominate high Medicare allowances in physicians' assignment decisions. Accordingly, the most likely effect of joint assignment should be an overall assignment rate between the current Medicare and Medicaid rates, and perhaps closer to the latter than the former. Joint assignment should therefore increase access to physicians' services by Medicaid eligibles, but it should also lower the portion of Medicare services subject to allowance controls on expenditures.

This study does not point the way to a magic solution for controlling the costs of physicians' care. Instead, it emphasizes the tradeoffs between cost-containment on the one hand, and maintaining the quality and accessibility of physicians' care or the market freedom of consumers and providers on the other. Since it is increasingly doubtful that a magic solution exists, the time is right for reimbursement policymakers to recognize the tradeoffs and to base their calculations on them.

Acknowledgments

We wish to express our appreciation to Jon Gable, HFCA project officer, and to the anonymous referees for their useful comments.

References

- Chavkin, D.F. "Trends in State Administration of Medicaid Programs." *Health Care Financing Grants and Contracts Report*. DHEW Publication No. (HCFA) 030139-79. Washington, D.C.: U.S. Department of Health, Education, and Welfare, 1979.
- Hadley, J. "Physician Participation in Medicaid." *Final Report on Contract No. 600-76-0054 with the Social Security Administration, U.S. Department of Health, Education, and Welfare*. Washington, D.C.: The Urban Institute, April, 1978.
- Huang, L. and O. Koropecy, "The Effects of the Medicare Method of Reimbursement on Physicians' Fees and on Beneficiaries' Utilization." *A Report on the Results of the Study of Methods of Reimbursement for Physicians' Services Under Medicare*, prepared by the Health Insurance Benefits Advisory Council. SS. Pub. No. 92-73 (10-73). Washington, D.C.: U.S. Department of Health, Education, and Welfare, July, 1973.
- Muller, C. and J. Otelsberg, "Study of Physician Reimbursement Under Medicare and Medicaid." *Report on Contract No. 600-76-0145 with the Health Care Financing Administration, U.S. Department of Health, Education, and Welfare and the Research Foundation of the City University of New York*, January, 1979.
- Paringer, L. "The Medicare Assignment Rates of Physicians: Their Responses to Changes in Reimbursement Policy." Working Paper 1250-1. Washington, D.C.: The Urban Institute, March, 1979.
- Sloan, F.A., J. Cromwell, and J.B. Mitchell, *Private Physicians and Public Programs*. Lexington, Massachusetts: D.C. Heath, 1978.
- Sloan, F.A. and B. Steinwald, "Physician Participation in Health Insurance Plans: Evidence on Blue Shield," *Journal of Human Resources*, XIII (Spring, 1978), pp. 237-63.