

# To sign or not to sign: Physician participation in Medicare, 1984

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*Factors leading physicians to sign the 1984 Medicare participation agreement are assessed in this study. The decision was highly sensitive to Medicare reimbursement levels. A 10-percent increase in the Medicare reasonable charge increased average participation rates by 9.5 percent, or 3.2 percentage points (around the mean of 34 percent). Higher collection costs associated with obtaining that payment from Medicare discouraged participation, and physicians with large Medicare caseloads were more likely to participate.*

*Although board-certified physicians were no less likely to participate, graduates from non-English speaking non-Western European medical schools were more likely to sign. Physicians in more liberal States and in areas with greater health maintenance organization activity were significantly more likely to participate, as were those with lower malpractice costs and weaker private demand.*

## Introduction

Continued double-digit inflation in Medicare physician expenditures led Congress to revise the physician payment system. The Deficit Reduction Act (Public Law 98-369), enacted in July 1984, imposed a 15-month fee freeze on Medicare services and altered the terms of physician participation in Medicare. The fee freeze was the cornerstone of efforts by Congress to slow the growth of Part B physician payments under Medicare. However, without additional interventions, a large portion of the cutbacks in physician payments could fall on the shoulders of beneficiaries in the form of increased balance billing. Thus, a second payment reform was instituted, the Participating Physicians' Program, to reduce potential beneficiary liability.

Prior to the enactment of the Deficit Reduction Act (DEFRA), Medicare allowed physicians flexibility in how they billed and collected for services covered by Medicare, permitting them to accept assignment on a service-by-service basis. Physicians could refuse assignment and bill patients for amounts in excess of the customary, prevailing, and reasonable charge.<sup>1</sup> This system increased beneficiary outlays and gave them greater access to higher priced physicians.

Under DEFRA, Congress restrained the physicians' assignment options by giving them the opportunity to sign a participation agreement on a renewable (year-to-year) basis, beginning in October 1984. This agreement committed participants to accept all

Medicare patients and services on assignment. No balance billing of Medicare beneficiaries was permitted. The physician could bill the patient only for the deductible and for 20-percent coinsurance. Physicians who did not sign the participation agreement could accept assignment on some, none, or all Medicare services, and they could bill patients for nonassigned amounts in excess of the Medicare-allowed charge.

The fee freeze introduced under DEFRA was intended to differentially affect physicians according to their participation status. For both participants and nonparticipants, Medicare customary and prevailing charges were frozen for a 15-month period from July 1, 1984, to September 30, 1985, at the levels that were in effect for the 12-month period ending June 30, 1984, per instructions to carriers. Actual charges (those submitted or billed by physicians, as opposed to the approved or reasonable charges Medicare will pay) were frozen for those physicians who did not sign the participation agreement.

Participating physicians were allowed to increase their actual charges during the freeze period. Because payments were based on allowed charges, which were frozen, higher actual charges did not result in higher immediate Medicare payments. These higher actual charges, however, were taken into account when the charge profiles for participating physicians were updated at the end of the fee freeze. This was one of the inducements for physicians to sign the agreement, as nonparticipants did not receive updates based on higher actual charges. (Additional incentives included the publication of directories of participating physicians, dissemination of names of participating physicians by toll-free telephone lines, and electronic claims processing for participants.)

Although Medicare has published statistics on the percent of physicians signing the participation agreement, no data have been available on the physician, practice, and local economic characteristics of participants and nonparticipants. In this study, we attempt to explain the physician's decision to sign the Medicare participation agreement, based on data from

<sup>1</sup>Under the customary, prevailing, and reasonable method of payment, physicians are paid the lowest of their actual charge, their customary charge for the service, or the prevailing charge for the service in the community (as constrained by the Medicare Economic Index).

This research was supported by Grant No. 17-C-98758/1-01 from the Health Care Financing Administration. The views and opinions expressed are the grantee's, and no endorsement by the Health Care Financing Administration or the Department of Health and Human Services is intended or should be inferred.

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a national survey of physicians. Since the fall of 1984, the Medicare Participating Physicians' Program has been modified, new incentives have been added, and physicians have had additional opportunities to sign (or not sign) the agreement. In this article, we focus strictly on the original 1984 participation decision.

## Analytic framework

The physician's decision to sign the participation agreement is similar to the decision to accept Medicare claims on assignment, as well as the Medicaid participation decision. These decisions can be considered in terms of a two-market demand model: the private and the public markets. This model has been described in detail elsewhere (Mitchell and Cromwell, 1982; Sloan, Mitchell, Cromwell, 1978), and will only be summarized here. In the private market, the physician is a price setter; demand is downward sloping; and additional visits are demanded only at lower prices. In the public market, fees are predetermined, and the physician serving this market can provide as much as he chooses (within limits) at this fixed price. Medicare assignment is an example of this fixed-fee market (as is Medicaid).

As long as wealthier Medicare patients are willing to pay amounts greater than the coinsurance (20 percent of the allowed Medicare charge), physicians will prefer to treat them and not accept assignment. When the marginal patient is no longer willing to pay more than the coinsurance, it becomes financially advantageous for the physician to begin accepting assignment for these patients. The point at which this occurs and the extent to which the physician continues to accept assignment will depend on Medicare payment levels, local demand, supply conditions, and so forth. In previous work, it has been found that assignment rates were higher when Medicare-allowed charges were higher relative to other insurers and when the costs of collecting directly from patients were greater.

How is the assignment decision altered by the introduction of the participation program? Participants, physicians signing the participation agreement, can no longer accept assignment on a case-by-case basis; they agree to accept Medicare's allowed charge as payment in full for all patients. The primary "carrot" to signing was the updating of charge profiles when the fee freeze was lifted 15 months later. Nonparticipants would continue to have their allowed charges frozen, which theoretically has two effects. First, a constant Medicare-allowed charge means less real, inflation-adjusted income on their assigned patients in the future. Second, unassigned Medicare patients of nonparticipating physicians will be less well insured 15 months hence because they can collect less from Medicare in real terms.

How important the carrot of updated fees would be to physicians depends on their overall Medicare caseload, their inflation in practice costs, and the growth in physician supply. Physicians with trivial Medicare caseloads will lose less by having their

allowables frozen, and they can shift out of Medicare most easily. Rapid inflation in costs would make the freeze more onerous, thereby encouraging physicians to sign. However, the low inflation rate from 1982 to 1984 (as reflected in the "all services" component of the Consumer Price Index) may have led physicians to discount the advantages of updated fees after the freeze, discouraging them from participating. This tendency to discount the updating would be reinforced if physicians were uncertain about the length and scope of the freeze. (In fact, the Administration later proposed, and Congress agreed, to extend the freeze on participants as well as nonparticipants, essentially vindicating those who doubted the Government's promise to update.)

Finally, the rapid proliferation of physicians has encouraged competition, which has the effect of reducing demand per physician as more physicians divide up a relatively constant Medicare caseload. This limits their ability to shift out of Medicare to more lucrative private patients, raises the chances of nonassigned patients switching to new physicians, and restricts their effective ability to balance bill if they do not take assignment.

## Data sources and sample description

The primary data source for this study is the Physicians' Practice Costs and Income Survey conducted by the National Opinion Research Center for the Health Care Financing Administration (HCFA) from the fall of 1984 to the spring of 1985. The survey was a nationally representative sample of non-Federal patient-care physicians. All physicians were administered (via a telephone interview) a detailed questionnaire on workloads, fees, practice costs, and patient mix. The overall response rate was 68 percent. Statistical weights used in the analysis included adjustments for nonresponse as well as for the disproportionate probability of selection (e.g., certain specialties were oversampled to ensure adequate sample sizes). The data presented have been weighted to provide national estimates.

Only self-employed physicians who treated Medicare patients were asked in the survey whether they had signed the participation agreement. (It was assumed that physicians employed by hospitals, health maintenance organizations (HMO's), and the like, did not participate in the decisionmaking process). Our analysis also excluded pediatricians (because so few had Medicare patients) and anesthesiologists, pathologists, psychiatrists, and radiologists (because their practice patterns are so different from those of other patient-care physicians). The final sample included 2,184 physicians in general and family practice and a wide range of medical and surgical specialties. One-third (33.7 percent) of these physicians responded that they had signed the Medicare participation agreement as of October 1984.

Variables measuring community demand were drawn from the Area Resource File. Data on administrative practices associated with Medicare

reimbursement were obtained by carrier (the fiscal agent responsible for claims payment) from HCFA. Because there are over 50 separate carriers, these practices may vary considerably across the United States. Data on State voting patterns in the 1984 presidential election are from the 1986 *Statistical Abstract of the United States*.

## Methodology

### Dependent variable

Multivariate probit analysis was used to explain the physician's decision to sign the Medicare participation agreement. Because the dependent variable is a dichotomous variable (equal to 1 if the physician signed and 0 if he or she did not), ordinary least-squares regression is inappropriate. Multivariate probit is preferred because it constrains the predicted values of the dependent variable to the 0, 1 interval (Goldberger, 1964).

### Independent variables

Physicians' Medicare dependence is the proportion of their total patient load that is insured by Medicare Part B. Greater Medicare dependence increases the probability that the physician will choose to sign the participation agreement.

Two variables are included to measure the influence of relative fee schedules: the Medicare-allowed charge for a followup office visit and Blue Shield's maximum allowed payment for the same procedure. Both fees were constructed from physician self-reported survey data, and they are defined for the physician's Medicare reasonable charge locality and Blue Shield plan area, respectively. As simple averages of the survey data may reflect an area's specialty mix, individual physician responses were weighted by national proportions of physicians in each of the specialty groups. The participation decision is hypothesized to be positively related to the Medicare-allowed charge and to be negatively related to the Blue Shield fee schedule.

The size of the Medicare discount (the difference between the physician's submitted charge and what Medicare deems reasonable) is an additional measure of the relative generosity of Medicare carriers. In order to capture this, we also included the carrier rate of reduction, i.e., the percent of times the Medicare payment is less than the physician's charge. This variable, although defined for a fairly large area (carrier-wide), does provide a partial measure of the physician's net fee. The higher the carrier rate of reduction, the less likely the physician will choose to participate.

Two kinds of collection costs are included: costs associated with collecting payment from the patient and from the Medicare carriers. Although we do not have a measure of the actual costs associated with collecting from patients, we do have a measure of the

physician's collection ratio. Each physician was asked what percent of direct patient billings went uncollected because of patient bad debts. We specified the collection ratio as one minus the proportion uncollected. Where collection rates are lower, thus reducing net fees, physicians are hypothesized to be more willing to sign the participation agreement.

Two measures of the administrative burden associated with Medicare assignment were available from Part B carriers for 1984: claims investigation rates and denial rates. Physicians are hypothesized to be more willing to participate when these costs are lower, *ceteris paribus*.

Two variables measure ability to pay: income and Medicare coverage. Income is defined as per capita income in the physician's county and is hypothesized to shift the fee-setting demand curve outwards, thus discouraging participation.

Medicare coverage is defined as the proportion of persons 65 years of age or over in the physician's county, excluding joint Medicare-Medicaid eligibles where assignment is mandatory. Greater coverage raises demand for both assigned and nonassigned services, but the net effect on the probability of signing the agreement is clearly negative (Mitchell and Cromwell, 1982). In communities with a disproportionately larger elderly population, physicians have a larger pool of nonassigned patients on which to draw before entering the assignment market.

Four variables measuring the physicians' credentials will influence their willingness to sign the participation agreement: specialty, board certification, foreign medical school graduate (FMG) status, and age. Specialists face a higher demand for their services in the fee-setting market, and they are hypothesized to be less likely to participate than general practitioners are. Offsetting this demand effect is a collection effect, i.e., the apparent willingness of physicians with large bills to take assignment in order to guarantee payment. We know from previous work, however, that the latter effect dominates (Mitchell and Cromwell, 1982; Paringer, 1980; Rodgers and Musacchio, 1983). Thus, surgeons are hypothesized to be more willing to participate than either medical specialists or general practitioners, other factors being equal.

Board-certified physicians and U.S. medical school graduates are generally considered to be of higher technical quality; and, hence, they face a greater private demand for their services. As a result, they are hypothesized to be less likely to sign the participation agreement. We include two dummy variables, one if physicians are board certified, and one if they are medical school graduates from a non-English speaking, non-Western European country.

More experienced physicians may be less willing to sign agreements because of their higher implicit wage. As physicians age, however, demand for their services may fall in the private market. In this instance, participation rates will be higher. Because we expect the relationship to be U-shaped, physician age will be

specified both in linear and squared form. If the wage effect dominates through late middle age with the demand effect becoming more important in later years, we would expect the linear and square terms to be positive and negative, respectively.

Practice costs include the cost of the physician's time, the wage rate for nonphysician personnel, and malpractice premiums. Physicians with nonpractice income (including spouse income) over \$10,000 and women physicians are hypothesized to value their leisure time more highly and are therefore less willing to participate.

When wage levels and malpractice costs are high, physicians will be less willing to sign the participation agreement. The wage variable is defined as the wage index for hospital personnel used by the Medicare prospective payment system. (Although physician practices may be more clerically oriented than hospitals, both presumably draw from the same labor pool; this variable thus serves as a proxy for physician office personnel wages.) Malpractice costs are defined as the total malpractice amount paid by each physician (based on survey self-reported premium data).

Two variables measure local market competition for physicians' services: physician supply and health maintenance organization (HMO) penetration. The physician-population ratio is defined as the number of patient-care physicians per 1,000 county population. As this ratio rises, competition among physicians for private patients increases and private demand falls, encouraging participation.

Areas with greater HMO activity are predicted to encourage participation by imposing constraints on shifting to privately insured patients. HMO penetration is defined as the proportion of county population enrolled in HMO's.

The carrot of updated fees for participating physicians is hypothesized to be more attractive in areas with higher rates of cost inflation. The local inflation rate is defined as the 1983-84 change in the all services Consumer Price Index.

Finally, it would be desirable to have independent measures of physician attitudes toward Government, but they were not included on the survey questionnaire. Instead, we try to proxy them with State voting patterns in the 1984 presidential election, namely the percent of State population voting for Mondale. In addition, we use regional dummies to capture any other unmeasured attitudinal factors. Three dummy variables are included depending on whether the physician practices in the North Central, South, or West Census Regions, respectively. The Northeast Region constitutes the omitted category.

## Results

### Rates by specialty and location

One-third (33.7 percent) of self-employed physicians with any Medicare patients signed the Medicare participation agreement as of October 1984 (Table 1

and Figure 1). The survey estimate is slightly higher than the estimate of 30.4 percent obtained from HCFA carrier data (Burney and Paradise, 1987). The differences between these two estimates may be a function of limitations in the scope of the survey estimate—for example, exclusion of osteopathic physicians, limited license practitioners, physicians practicing less than 20 hours per week, and physicians employed by hospitals or other settings (Rosenbach, Hurdle, and Cromwell, 1985).

General surgeons have historically shown high assignment rates (McMillan et al., 1985), and their high participation rates (46.5 percent) are consistent with expectations. For the remaining surgical specialists shown in Table 1, most of the participation rates clustered around the specialty-wide mean (32-34 percent), although ophthalmologists and other surgical specialists appeared to be somewhat below this average, at 29 percent and 26 percent, respectively. (Other surgical specialties include plastic surgery, cardiovascular or thoracic surgery, otolaryngology, and neurosurgery.)

Although the participation rate of internists averaged 1 out of 3, medical subspecialists were slightly more likely to sign the agreement. For example, 39 percent of cardiologists and 41 percent of other medical specialists (e.g., allergists, nephrologists) chose to participate. Like the internists, general practitioners had participation rates of about 1 out of 3, but family practice physicians averaged less than 1 out of 4. This may reflect philosophical differences among the three groups, variations in

**Table 1**  
**Medicare participation rates, by type of specialty and geographic location: October 1984**

Specialty and location	Rate of participation
All physicians	33.7
Specialty:	
General practice	31.3
Family practice	23.9
Internal medicine	33.0
Cardiology	38.8
Other medical specialties <sup>1</sup>	40.5
General surgery	46.5
Orthopedic surgery	34.1
Ophthalmology	29.3
Urology	32.1
Obstetrics-gynecology	34.0
Other surgical specialties	25.7
Other specialties <sup>2</sup>	50.4
Geographic location:	
Urban (SMSA)	34.6
Rural (Non-SMSA)	29.0
Northeast	41.6
South	28.7
North Central	31.5
West	34.7

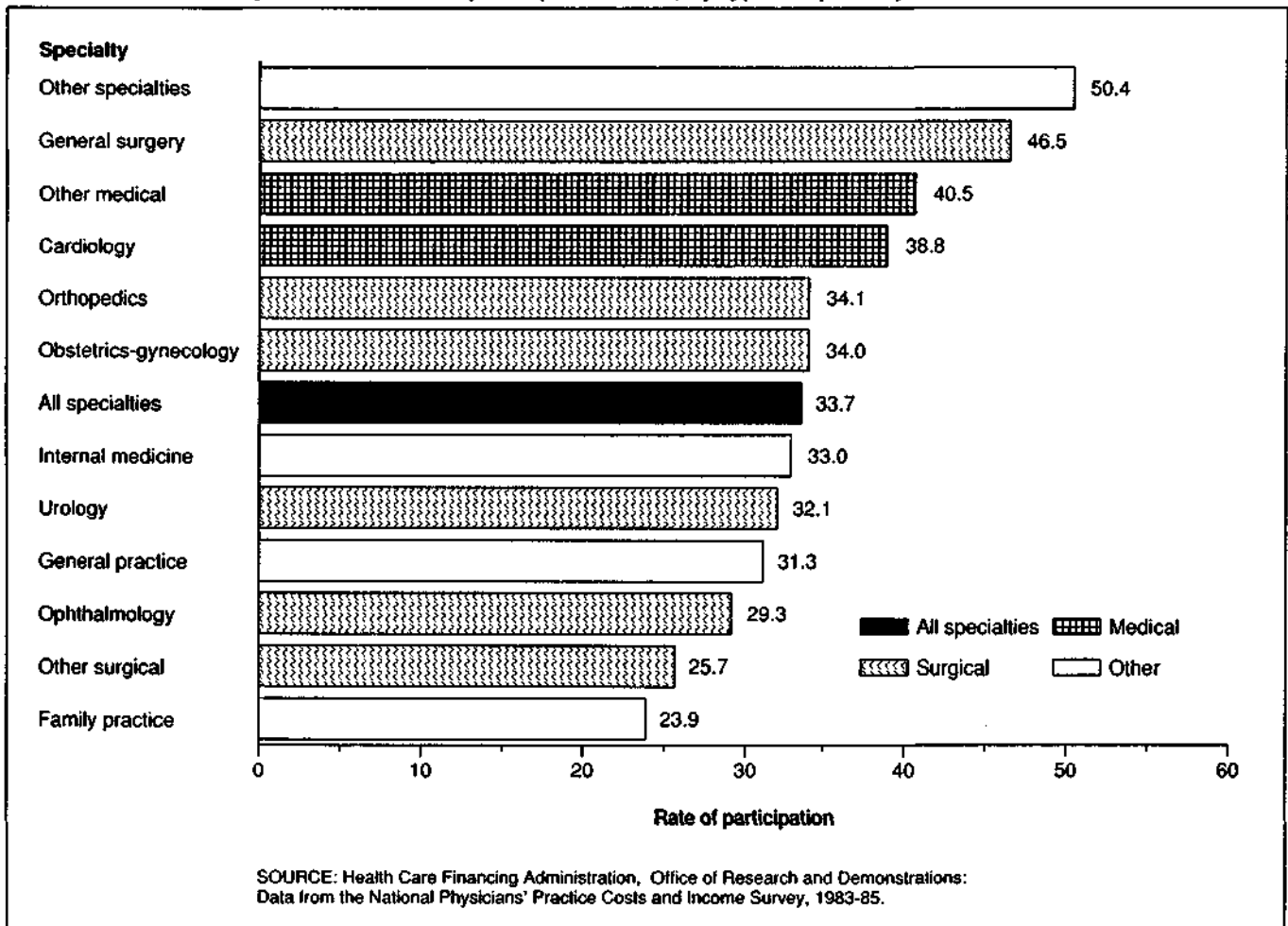
<sup>1</sup>Excludes pediatrics.

<sup>2</sup>Excludes anesthesiology, pathology, psychiatry, and radiology.

NOTE: SMSA is standard metropolitan statistical area.

SOURCE: Health Care Financing Administration, Office of Research and Demonstrations: Data from the National Physicians' Practice Costs and Income Survey, 1983-85.

**Figure 1**  
**Physicians' Medicare participation rates, by type of specialty: October 1984**



Medicare dependence, or some other attribute of the practice.

Finally, the highest overall participation rate was found among other specialists, including emergency physicians and neurologists. One out of two physicians in this group signed the agreement. The multivariate analysis will examine the significance of these interspecialty differences, controlling for the independent effects of physician credentials, Medicare dependence, usual fees, competitive effects, and so on.

Also shown in Table 1 are the participation rates by region and urban-rural location. Physicians in urban areas were slightly more likely than their rural colleagues to sign the Medicare participation agreement (35 versus 29 percent). We might have expected the opposite, given that the elderly in rural areas tend to be poorer and to have more limited complementary insurance coverage. Instead, lower participation rates among rural physicians may have been a function of their greater philosophical opposition to the program (Rosenbach, Hurdle, and Cromwell, 1985).

Physicians in the Northeast were by far the most likely to sign the agreement (42 percent), consistent with their generally high assignment rates. Also, a

relatively high proportion of physicians in the West Region opted to sign the agreement compared with physicians in the North Central and South Regions. The regional participation rates are comparable to reports by physicians nearly a decade earlier on their likelihood of participating in Medicare under an "all-or-nothing" option (Mitchell and Cromwell, 1983). For example, 39 percent of the physicians in the Northeast and 32 percent of those in the West reported they would accept all cases on assignment versus 27 percent in the South and North Central Regions.

### Multivariate analysis

Means and standard deviations for the independent variables are shown in Table 2, and probit results are presented in Table 3. Because the probit coefficients are not directly interpretable, a table of marginal impacts for selected statistically significant variables is provided (Table 4). Elasticities are calculated for continuous variables and marginal effects for discrete dummy variables. For example, a 1-percent increase in Medicare dependence resulted in a 0.23-percent decline in the average participation rate. Marginal effects simply give the absolute change in the

Table 2

## Means and standard deviations for independent variables in the Medicare participation analysis

Independent variable	Mean	Standard deviation	Independent variable	Mean	Standard deviation
<b>Medicare dependence</b>			<b>Physician credentials—Cont.</b>		
Proportion of physician's patients who receive Medicare	0.33	0.22	Physician is board certified	0.65	0.48
<b>Fee schedule</b>			Physician is foreign medical graduate (non-Western European, non-English speaking country)	0.15	0.35
Medicare-allowed charge for followup office visit	19.18	5.37	Physician's age	49.34	11.53
Blue Shield fee for followup office visit	23.23	6.22	Physician's age squared	2,567.72	1,217.20
Carrier rate of reduction	0.24	0.03	<b>Practice cost</b>		
<b>Collection cost</b>			Physician is female	0.04	0.20
Collection ratio	0.89	0.10	Physician has nonpractice income of \$10,000 or more	0.35	0.48
Proportion of claims denied	0.07	0.02	Wage index for hospital personnel	1.07	0.18
Proportion of claims investigated	0.04	0.02	Average malpractice premiums in thousands	7.16	7.17
<b>Ability to pay</b>			<b>Competition</b>		
Per capita income in thousands	10.62	2.05	Physician-population ratio	2.08	1.46
Proportion of persons 65 years of age or over (excluding Medicaid eligibles)	0.10	0.03	HMO enrollees per population	0.08	0.10
<b>Physician credentials</b>			<b>Inflation</b>		
Specialty:			Local area inflation rate, 1983-84	0.04	0.005
Family practitioner	0.16	0.36	<b>Attitude proxy</b>		
Internist	0.17	0.37	State population voting for Mondale in 1984	41.37	5.53
Cardiologist	0.04	0.19	Physician practices in the North Central Region	0.21	0.41
Other medical specialist	0.10	0.30	Physician practices in the South Region	0.33	0.47
General surgeon	0.10	0.29	Physician practices in the West Region	0.22	0.42
Obstetrician-gynecologist	0.10	0.30	Physician practices in the Northeast Region (omitted category)	0.24	—
Ophthalmologist	0.06	0.23			
Orthopedic surgeon	0.07	0.25			
Urologist	0.03	0.18			
Other surgical specialist	0.07	0.26			
Other specialist	0.04	0.18			
General practitioner (omitted category)	0.08	0.28			

NOTE: HMO is health maintenance organization.

SOURCE: Health Care Financing Administration, Office of Research and Demonstrations: Data from the National Physicians' Practice Costs and Income Survey, 1983-85.

probability of participation associated with positive values of the discrete independent variables. Thus, being a general surgeon increased the probability of participating by 15.5 percentage points, *ceteris paribus*, relative to general practitioners (GP's) (around a mean of 34 percent).

As expected, Medicare dependence had a strong impact on the participation decision. Physicians who had larger Medicare caseloads to start with were significantly more likely to sign participation agreements. The estimated elasticity associated with this variable is 0.23, however, suggesting that physicians' decisions were only moderately responsive to their current Medicare activities. Physicians with one-half of their caseload devoted to Medicare patients were one-third more likely than physicians who only depend on Medicare for one-tenth of their patients to sign participation agreements.

The impact of an increase in the Medicare-allowed charge is clearly positive, as predicted, and highly significant. Physicians were definitely more willing to sign participation agreements when allowed charges were higher. The estimated elasticity is almost one, suggesting that the magnitude of physician response to

changes in the reimbursement level would be quite large. A 10-percent increase in the Medicare-allowed charge increased average participation rates by 9.5 percent, or 3.2 percentage points (around a mean of 34 percent). Relative reimbursement levels for other third-party payers do not appear to have influenced the participation decision; the Blue Shield fee variable was insignificant.

Although the size of Medicare's discount, as measured by the carrier rate of reduction, had no discernible effect on physicians' willingness to sign agreements, higher collection costs discouraged participation. As expected, high collection ratios (implying low patient collection costs) reduced the physician's willingness to sign. A 10-percent increase in physicians' collection ratios lowered the probability of their participation by 5.7 percent. Participation rates do not appear to be significantly affected by Medicare carrier practices regarding claims denial and investigation.

Areas with higher incomes raised private demand (including nonassigned Medicare demand), thus significantly depressing participation levels. The probability of physicians choosing to participate in

**Table 3**  
**Regression results for Medicare participation decision: October 1984**

Independent variable	Coefficient	T-ratio	Independent variable	Coefficient	T-ratio
<b>Medicare dependence</b>			<b>Physician credentials—Cont.</b>		
Proportion of physician's patients who receive Medicare	<sup>1</sup> 0.635	3.97	Physician is board certified	-0.106	-1.55
<b>Fee schedule</b>			Physician is foreign medical graduate (non-Western European, non-English speaking country)	<sup>1</sup> 0.431	5.07
Medicare-allowed charge for followup office visit	<sup>1</sup> 0.042	5.45	Physician's age	0.005	0.22
Blue Shield fee for followup office visit	-0.007	-0.82	Physician's age squared	-0.000	-0.37
Carrier rate of reduction	0.332	0.29	<b>Practice cost</b>		
<b>Collection cost</b>			Physician is female	0.054	-0.39
Collection ratio	<sup>2</sup> -0.580	-2.00	Physician has nonpractice income of \$10,000 or more	0.025	0.41
Proportion of claims denied	-3.502	-1.54	Wage index for hospital personnel	0.145	-0.44
Proportion of claims investigated	-2.267	-1.22	Average malpractice premiums in thousands	<sup>3</sup> -0.010	-1.78
<b>Ability to pay</b>			<b>Competition</b>		
Per capita income in thousands	<sup>2</sup> -0.043	-2.06	Physician-population ratio	-0.034	-1.40
Proportion of persons 65 years of age or over (excluding Medicaid eligibles)	-1.515	-1.39	HMO enrollees per population	<sup>1</sup> 1.588	3.47
<b>Physician credentials</b>			<b>Inflation</b>		
Specialty:			Local area inflation rate, 1983-84	13.029	1.31
Family practitioner	-0.193	-1.47	<b>Attitude proxy</b>		
Internist	-0.142	1.07	State population voting for Mondale in 1984	<sup>1</sup> 0.020	3.36
Cardiologist	0.073	0.39	Physician practices in the North Central Region	0.021	0.14
Other medical specialist	0.203	1.36	Physician practices in the South Region	-0.173	-1.43
General surgeon	<sup>1</sup> 0.407	2.76	Physician practices in the West Region	-0.198	-1.34
Obstetrician-gynecologist	<sup>3</sup> 0.284	1.83	Constant	-1.186	-1.30
Ophthalmologist	-0.098	-0.58	Chi-square	<sup>1</sup> 218	
Orthopedic surgeon	0.213	1.27			
Urologist	0.014	0.07			
Other surgical specialist	-0.070	-0.43			
Other specialist	<sup>1</sup> 0.495	2.65			

<sup>1</sup>Statistically significant at the 1-percent level.

<sup>2</sup>Statistically significant at the 5-percent level.

<sup>3</sup>Statistically significant at the 10-percent level.

NOTE: HMO is health maintenance organization.

SOURCE: Health Care Financing Administration, Office of Research and Demonstrations: Data from the National Physicians' Practice Costs and Income Survey, 1983-85.

areas with per capita incomes one standard deviation below the mean (income = 8.57) was 22 percent greater than in areas where average incomes were one standard deviation above the mean (12.74). The second community demand variable measuring Medicare coverage was not significant.

It had been hypothesized that surgeons' desire to ensure collection of large bills would dominate the higher private demand for their services (relative to GP's) and lead to greater participation. For two of the surgical specialties, this was certainly the case. The marginal effects for the general surgeon and obstetrician-gynecologist (OB-GYN) coefficients (Table 4) imply that the participation rate for general surgeons and for OB-GYN's was about 50 percent higher and 34 percent higher, respectively, than that for GP's, ceteris paribus. The remaining surgical specialists (ophthalmologists, orthopedic surgeons, urologists, and other surgical specialties) were neither more nor less likely than GP's to sign participation agreements. Despite presumed higher demand for their services, medical specialists (internists, cardiologists, etc.) were not any less willing to

participate, compared with general practitioners. Finally, the all other specialty group was significantly more likely to sign up. This is a heterogeneous group of physicians that includes specialties as diverse as neurology, physical medicine, and emergency medicine.

There is no evidence that board-certified physicians were any less likely to sign participation agreements. In separate specialty-specific regressions (not shown), board-certified family practitioners, other medical specialists, OB-GYN's, and all other specialists were less likely to participate, but the estimates were significant only at the 10-percent confidence level. No differences in participation status between board-certified and nonboard-certified physicians were demonstrated for the remaining specialty groups (GP's, internists, cardiologists, general surgeons, ophthalmologists, orthopedic surgeons, urologists, and other surgical specialists).

Graduates from non-English speaking, non-Western European medical schools were significantly more likely to participate. All other things equal, the probability that these foreign medical graduates would

**Table 4**  
**Impact of selected explanatory variables on**  
**the Medicare participation decision:**  
**October 1984**

Variable	Elasticity <sup>1</sup>	Marginal effect
Medicare dependence	0.23	—
Medicare-allowed charge for office visit	0.95	—
Collection ratio	-0.57	—
Per capita income	-0.50	—
General surgeon	—	15.5
Obstetrician-gynecologist	—	10.7
Other specialist	—	19.1
Foreign medical graduate	—	23.3
Malpractice costs	-0.08	—
HMO activity	0.14	—
State population voting for Mondale in 1984	0.95	—

<sup>1</sup>Unlike ordinary least squares estimates, probit elasticities will vary somewhat depending on whether one assumes an increase or decrease in the independent variable. Here we assumed a 10-percent increase in all continuous variables in calculating the elasticities.

NOTE: HMO is health maintenance organization.

SOURCE: Health Care Financing Administration, Office of Research and Demonstrations: Data from the National Physicians' Practice Costs and Income Survey, 1983-85.

agree to participate is 47 percent, compared with only 30 percent for the average graduate from a U.S. or Western European medical school.

In contrast with theory and with previous empirical work, there are no differences in willingness to participate based on physician age. Other time-price variables were also insignificant.

Wage levels for nonphysician personnel had no effect on participation levels, but the final practice cost variable, malpractice premiums, was significant at the 10-percent level. Physicians with high malpractice costs were less willing to participate and accept Medicare's allowed charge as payment in full. The estimated magnitude of this effect is relatively small, however; a 10-percent increase in malpractice premiums lowered the probability of participation by only 0.8 percent.

Increased competition, as measured by more physicians per capita, had no impact on the participation decision, suggesting that physicians were able to protect their nonassigned workloads through inducement. Shifting to privately insured patients was limited in areas with greater HMO activity, thereby encouraging physicians to sign participation agreements. The HMO variable is positive and highly significant, although its associated elasticity is fairly low; a 10-percent increase in relative HMO enrollments raised the probability of participation by 1.4 percent. This small elasticity is largely the result of low HMO penetration rates (only 7.7 percent of the population was enrolled in HMO's in 1984). As HMO enrollments continue to increase, however, physicians should be even more willing to sign agreements. The coefficient associated with our HMO variable suggests that, in areas with twice the average HMO activity (HMO = 0.154), physicians were 31 percent more likely to participate than those in areas with no HMO enrollment.

It had been hypothesized that, in areas that had experienced relatively higher cost inflation, physicians would be more likely to participate in return for postfreeze updated fees. The inflation rate variable was insignificant, however, suggesting that this carrot was ineffective (or its promise was not given much credence by physicians). Alternative explanations include the fact that general inflation had slowed to such an extent (only 4 percent from 1983 to 1984) that the perceived value of the fee update was diminished and/or our CPI measure lacked sufficient cross-sectional variation to capture an inflation effect (its coefficient of variation was only 0.11).

Physicians' political attitudes, as proxied by State voting patterns in the 1984 presidential election, proved to be important in the participation decision. Physicians practicing in States with relatively more votes for Mondale were significantly more likely to sign the agreement. The elasticity was 0.95 (equivalent to the impact of the Medicare fee variable). In States where the popular vote for Mondale was 50 percent of the total, the participation rate was 25 percent higher than that for States with 30 percent voting for Mondale.

Finally, we included regional dummy variables to capture any residual attitudinal differences or other unmeasured factors. These variables were not significant.

## Discussion

One-third of the Nation's physicians signed the Medicare participation agreement in 1984. What distinguishes participants from nonparticipants and to what extent can participation rates be increased through Medicare policy changes? First and foremost, physicians are very sensitive to Medicare reimbursement rates. We found that a 10-percent increase in the Medicare-allowed charge increased average participation rates by 9.5 percent. Similar results have been obtained in related research on the Medicare assignment decision (Mitchell and Cromwell, 1982; Paringer, 1980; and Rodgers and Mussachio, 1983). Simply stated, increase what Medicare pays physicians and more physicians will sign the participation agreement.

Participants are relatively more dependent on Medicare patients than nonparticipants are. Presumably, the carrot of updated charge profiles at the end of the fee freeze is an inducement to sign among physicians with greater reliance on Medicare. This finding parallels earlier research by Mitchell and Cromwell (1983) indicating that their previous assignment rate is the single best predictor of physicians' decisions under an all-or-nothing assignment requirement.

Physician credentials—namely, board certification and graduation from a U.S. medical school—serve as proxies for the quality of Medicare participants. Participants are neither more nor less likely than nonparticipants to be board certified. However, foreign medical graduates are about 50 percent more likely to sign a participation agreement than U.S.



medical school graduates. Earlier research also indicates that FMG's accept more claims on assignment (Mitchell and Cromwell, 1982; Mitchell and Cromwell, 1983), but interestingly FMG's are less likely to take all cases on assignment in an all-or-nothing environment (Mitchell and Cromwell, 1983). Similarly, Paringer's (1980) research found that foreign medical graduates had higher assignment rates, but this was true only for physicians who also participated in the Medicaid program.

Physicians in areas with high per capita incomes are less likely to participate because of increased private demand. This is consistent with Mitchell and Cromwell's (1982) earlier work showing that assignment rates are depressed in areas with higher incomes. Rodgers and Mussachio (1983) also found that assignment rates were relatively responsive to payment probability. Physicians with lower income patients and those who practiced in areas with high unemployment rates had lower assignment rates. Our current work also explores the impact of HMO activity on participation rates. As expected, physicians in areas with heavy HMO concentration were more likely to sign the agreement than those in areas with less HMO activity. As HMO penetration increases, the ability to shift to private demand is reduced. This finding is particularly significant for policymakers. As alternative delivery systems proliferate, competition for private nonassigned, nondiscounted patients will force more physicians to sign the participation agreement. In this study, we measured only the impact of HMO activity. Undoubtedly, the rapid growth of preferred provider organizations will also influence physicians to sign the agreement.

Next, we comment on the role of political attitudes in the decision whether or not to sign the agreement. The attitude proxy—percent of State population voting for Mondale in the 1984 presidential election—was positive and highly significant. Physicians in more liberal States were more likely to sign the agreement, a finding consistent with tabular data from these same physicians concerning their reasons for signing or not signing (Rosenbach, Hurdle, and Cromwell, 1985). The single most important reason for signing was altruism, either towards Medicare patients or the Federal Government (reported by one-fourth of participants). Among nonparticipants, economic reasons dominated, but philosophical opposition was the next most important (reported by one-fifth of nonparticipants). Physicians cited various concerns, including opposition to Government intervention, to discrimination against the medical profession, and to the method of payment.

Although it is undeniable that physicians are motivated by deeply rooted philosophical beliefs, we show that participation rates can indeed be affected by certain policy levers, notably increases in Medicare allowed charges. The disadvantage to raising Medicare reimbursement rates across the board, however, is that all physicians would share the benefits, including those who do not sign. An alternative strategy would be to raise payment rates only for physicians who

elect to participate. This, in fact, is what Congress did as part of the Omnibus Reconciliation Act of 1986; the Medicare prevailing charge (the maximum amount Medicare will pay in a locality) for nonparticipants was set at 96 percent of the prevailing charge for participating physicians. A similar strategy was pursued in the fiscal 1988 budget reconciliation bill. As of April 1988, participating physicians will receive a 3.6-percent increase for primary care services and a 1-percent increase for other services, and nonparticipating physicians will receive 3.1-percent and 0.5-percent increases for primary care and other services, respectively.

Finally, we note an important caveat. It is possible that our analysis underestimates the potential impact of policy variables. This initial participation decision was made under great time pressure and under conditions of great uncertainty. DEFRA was passed in late July 1984, and participation decisions had to be made by September 30. Many physicians, especially those returning after Labor Day from summer vacations, had little time to learn how the program was supposed to work. Some physicians may not have been adequately informed about the advantages and disadvantages of participation; others may have been misinformed. Some physicians, although understanding the incentives, may have discounted their real value (particularly the customary charge update for participants post-freeze) and chosen not to participate. At subsequent decision points, physicians may be better informed and make more rational choices. As a result, we might expect to observe even larger impacts of policy variables, such as Medicare reimbursement levels.

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