Special Report

Physician pricing and health insurance reimbursement

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This study was based on physician claims records from three Blue Shield Plans. The principal results are:

- Physicians are income-motivated. This means that income incentives can be incorporated into reimbursement systems to achieve specific ends, and that care should be taken to assure that new mechanisms do not create income incentives for physicians to act contrary to policy objectives.
- Physician pricing is reasonably competitive.
- Physicians do not discriminate in price in their private lines of business, but they appear to discriminate between Medicare and the private lines. Allowance caps in the minor lines of business have no appreciable impact on charge levels or the rate of charge inflation.
- The Economic Stabilization Program significantly slowed the growth rate of Medicare charges, but had no discernible effect on the inflation rate of private charges. This indicates that allowance controls applied to a large part, but not all, of physicians' business induce physicians to "shift costs" against patients insured by programs where allowances are not controlled.
- The tests conducted indicate that pursuit of a target net income is not a pervasive characteristic of physicians' economic goal behavior. Therefore, reimbursement controls on utilization to counteract demand inducement are not justified at this time. However, in view of the large increase in physician supply expected over the next decade, the issue of demand inducement merits continued monitoring.
- Physicians are significantly more likely to participate in Plans' eligible business when allowances are high rather than low. Physicians of low-perceived quality are also significantly more likely to participate than physicians of high-perceived quality. Since increases in allowances raise insurance benefit costs, it follows that increasing access to care by promoting participation exacerbates cost inflation.

The study's principal policy implications are:

- Private carriers and government should decide on a uniform means of reimbursing physicians to restrain charge inflation and to discourage cost-shifting.
- Reimbursement systems less inflationary than the fee-screen method should be encouraged or adopted.
- Utilization controls for physicians' services are not warranted at present.
- Cost containment efforts are likely to reduce access to care (by reducing physician assignment rates) for persons that government health insurance programs were most intended to serve.

Introduction

Spending on physicians' services currently represents one-fifth of total national health care expenditures. From 1965 through 1981, expenditures on physicians' services grew at an average annual rate of 12.4 percent, and even larger increases were experienced by the Medicare and Medicaid programs. By contrast, gross national product grew at an average annual rate of 9.4 percent over the same period. From 1965 through 1981, the Consumers' Price Index (CPI) component for physicians' fees rose by 7.9 percent per year, a rate 17 percent higher than the CPI as a whole. In 1981, total national expenditures on physicians' services reached $54.8 billion, and the costs to government of physicians' services under Medicare and Medicaid were $9.6 billion and $2.8 billion respectively.

Against this background of expenditure and fee inflation, government reimbursement policy for physicians' services under Medicare and Medicaid has focused on three major issues: (1) containing the level and growth rate of spending; (2) maintaining access to care by the aged and needy who are served by the programs; and (3) preserving the quality of physicians' care.

This study addresses these broad issues. Its principal objectives were to examine the role of reimbursement in physicians' economic behavior, and to determine whether present reimbursement methods help or hinder the achievement of policy goals. However, the scope of the data made it possible to explore additional areas of importance for physician reimbursement policy. The

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specific research questions investigated in the course of the study were:

- What types of optimizing behavior do physicians engage in? Is there evidence of target net income achieving behavior as opposed to profit or utility maximization? How prevalent is the pursuit of target net incomes and accompanying supplier-induced demand?
- Are the physicians' services markets basically competitive or noncompetitive in terms of pricing behavior?
- Is fee-screen reimbursement (the "customary-prevailing-and-reasonable" and "usual-customary-and-reasonable" method used by Medicare and private carriers) inherently inflationary? Does the system provide income incentives to physicians to raise their fees? Is fee schedule reimbursement less inflationary?
- To what extent do physicians discriminate in price among patients with different types of insurance coverage, and what are the implications for reimbursement policy?
- What physician and local market characteristics are significantly correlated with fee levels and rates of fee inflation, and how can the associations be used in devising reimbursement strategies?
- What are the determinants of physician participation in Blue Shield Plans? What types of physicians are most likely to participate, and what do participation patterns imply for policies to influence Medicare and Medicaid assignment rates?

The study was carried out by the Human Resources Research Center at the University of Southern California. The primary data base consisted of the claims records of three Blue Shield Plans, which were obtained and assembled by the Blue Cross and Blue Shield Associations (BCBSA).

Characteristics of physician reimbursement

The structure of Blue Shield physician reimbursement formed the institutional background of this study. Altogether, the three study Plans provided four types of health insurance programs called "lines of business." These were "usual-customary-and-reasonable" (UCR), indemnity, partial service, and Medicare ("customary-prevailing-and-reasonable"). The first three are private lines. No Medicaid data were available for this study. Although there are variations in reimbursement characteristics within the private lines depending on specific contracts, the basic reimbursement principles are as follows.

Payment in both UCR and Medicare programs is based on the "fee-screen" method. The amount allowed by the Plan for a given service—known as the "reasonable fee"—depends on two dollars amounts or fee screens. The first of these, called the Level 1 screen, is the physician's median or modal charge for the service, and it is usually calculated over the prior year. The second, called the Level 2 screen, is a percentile in the area fee distribution for the service, and it is also usually calculated over the prior year. The reasonable fee for the service is then the minimum of the physician's Level 1 screen, the Level 2 screen, and the physician's actual charge.[1] In private business, the Level 1 and Level 2 screens are called the "usual fee" and "customary fee," respectively. In the Medicare program, they are called the "customary fee" and "prevailing fee," respectively.

In turn, the amount paid by the Plan for the service is a fixed percentage of the allowance or reasonable fee. In private business, it is ordinarily 80 percent, but it may be higher. In the Medicare Program, the figure is 80 percent after the patient's deductible is satisfied. (None of the three Plans had deductibles in private UCR business during the study period.) In Medicare, the Level 2 screen is nominally set at the 75th percentile of the area fee distribution,[2] while in private business the screen is commonly higher—up to the 90th percentile. Consequently, UCR reasonables and amounts paid tend to be higher than Medicare reasonables and amounts paid. In both private business and the Medicare program, the patient's copayment is the difference between the amount paid by the Plan and the physician's bill. However, the actual copayment rate depends on another institutional feature of reimbursement—benefit assignment or physician participation.

Reimbursement in the Plans' indemnity and partial service lines is based on "fee schedules." A scheduled fee is just a dollar amount listed by the Plan for the services, and the allowance for the service is the minimum of the scheduled fee and the actual charge. The amount paid by the Plan equals the allowance, and the patient's copayment is the difference between the physician's bill and the Plan's payment. On indemnity claims, copayment is the difference between the physician's charge and the amount paid by the Plan. On partial service claims, copayment varies.

The essential differences between fee-screen and fee-schedule payment are: (1) fee screen allowances vary with the physician while fee schedule allowances do not;[3] (2) fee-screen allowances are typically much higher than fee-schedule allowances (generally 50 percent to

[1]In special circumstances such as where there is an unusual complexity of treatment, the reasonable fee may be the physician's actual charge, even though it exceeds the fee screens.

[2]Constraints on the growth rate of Medicare Level 2 screens have been in effect almost continuously since the beginning of the Economic Stabilization Program in 1972. As a result, Medicare Level 2 screens tend to be lower than the 75th percentiles.

[3]There are exceptions to the rule. Physicians whose reasonable fees equal Level 2 screens will have the same fee-screen allowances. Those whose indemnity or partial service charges are below the scheduled fees will have different indemnity or parital service allowances.

100 percent higher in the study plans); and (3) fee-screen allowances are usually updated much more frequently than fee-schedule allowances. With the one exception discussed, reimbursement for indemnity and partial service claims is the same. However, to be eligible for a partial service policy, the subscriber's family income must not exceed a (generally low) ceiling. Indemnity contracts are not subject to this provision.

The amounts of physician reimbursement and patient copayment vary further within lines of business according to an arrangement known as "accepting benefit assignment" in Medicare and "physician participation" in the Plans' private business.[4] The physician who accepts assignment or participates agrees to accept the Plan's allowance as full payment for his service. In return for this agreement, he becomes eligible to be paid by the Plan rather than by the patient. In Medicare, the physician can accept or refuse assignment on a claim-by-claim basis. In the Plans' private business, participation is usually on an all-or-nothing basis. In the two study Plans which had them, the participation agreements were of the all-or-nothing kind.[5] The participation agreements applied only to UCR and, in one of the two Plans, to partial service business. They did not apply to indeminity claims, even those filed for participating physicians' services.

On assigned or participating claims, the physician's average revenue (that is, the amount he receives) is the Plan's allowance—the reasonable fee in fee-screen business—net of bad debt on the patient's copayment. The patient's copayment is therefore the Plan's allowance minus the amount the Plan pays. On nonassigned or nonparticipating claims, the physician's average revenue is his charge for the service, also net of bad debt on the patient's copayment. Copayment, in this case, is the physician's charge minus the amount paid by the Plan. As a result, the net price of services to patients (the out-of-pocket cost per unit of services) is typically lower for assigned/participating claims than for nonassigned/nonparticipating claims. The gross price of services (the physician's average revenue) is typically higher if he chooses not to accept assignment or participate then it is if he chooses to accept assignment or participate.

These characteristics of Plan reimbursement imply rather different structures of physician average revenue and net prices to patients across lines of business and physician assignment or participation status. The differences mandated special attention in this study, and they were taken into account in designing and carrying out the analysis.

[4]Medicaid programs have a similar arrangement, also called physician participation or, less often, accepting benefit assignment.

[5]It was observed in the study data that some physicians reported both participating and nonparticipating claims in the same year. This could have been due to reporting errors or to switches in participation status during the year. Since participating physicians were technically free to bill their patients, it may also be that some of them did so, and that the claims filed by patients were recorded as nonparticipating.

Data base and data sources

The study's primary data were the claims records of three Blue Shield Plans, which we refer to as Plans A, B, and C. The Plans are located in the Midwest, East, and South, respectively. The claims data apply to approximately 65-high-utilization medical, surgical, and other procedures. For Plans A and B the data covered the years 1973-76. For Plan C they covered the years 1975-78. All three Plans provided records for their UCR business. Plans A and B furnished data for their indemnity business, and Plan B provided data on its partial service business as well. Plan B, the only Medicare carrier of the three, made its Medicare Part B data available for the study.

For each service, the Plans' claims record contained data on the following variables: (1) amount charged by the physician, (2) amounts paid and allowed by the Plan, (3) number of services, (4) county location of the service, (5) physician specialty, (6) physician participation status,[6] (7) setting in which the service was performed, and (8) age and sex of the patient.

At the outset of the study, BCBSA constructed two analytical files for each Plan. In the first file, the county in which the service was performed was designated as the unit of analysis. In the second file, the individual physician was chosen as the analytical unit. To construct the second file, with the assistance of the American Medical Association, samples of physicians who practiced in each Plan's geographic area during every year of the study period were developed. The data elements listed above were then organized for each physician in the file, and these were merged with physician-specific data such as specialty, age, sex, practice setting, board certification status, and country of medical graduation taken from the American Medical Association's (AMA) *1977 Masterfile of Physicians.* Approximately 1,000 physicians were included in each Plan sample, representing 14 different specialties.

County-level data on population demographics and medical supply characteristics were merged with both analytical files. These data were derived from several sources, principally the AMA's annual series, *Physician Distribution and Medical Licensure in the U.S.*, and the *Area Resources File* created by the Manpower Analysis Branch, Health Resources Administration, U.S. Department of Health and Human Services.

Various minor editing tasks and data manipulations were necessary to carry out some of the analyses, but only three major operations were undertaken.

[6]The identifier of claim assignment status in Plan B's Medicare data was deleted. As a result, no analyses could be conducted involving Medicare assignment.

It was known at the start of the study that the Plans might assign a single provider code to all physicians in a group or partnership practice. Since the physicians selected for the physician analytical file could be identified in the claims records only by provider code, this meant that the claims of two or more physicians could be assigned to a single practitioner. To obviate the problem, a rule was established whereby group and partnership physicians were removed from the physician file if the volumes of their claims significantly exceeded the average volumes of solo physicians. The rule resulted in the editing of from 3 percent to 11 percent of total volume of services in the physician files depending on the Plan and year.

In order to utilize a single measure of output in the analyses, the numbers of procedures were converted into relative value units (RVUs). This was done with the use of the *1974 Revision of the California Relative Value Scale (CRVS).* Because the units defined by the CRVS vary by specialty, a method was designed and implemented to standardize them across specialties. In the final county and physician analytical files, all units of physicians' physical outputs of services were expressed as RVUs.

Some physicians in Plan A and B submitted both participating and nonparticipating claims in the same year. Because the Plans' participation agreements were on an all-or-nothing basis, a rule was established for the physician files in order to label each physician as participating or nonparticipating in a given year of observation. In Plan A, a practitioner was defined as participating in a particular year if more than 5 percent of his RVUs in UCR business were submitted on a participating basis. In Plan B, a practitioner was so defined if more than 5 percent of his RVUs in UCR and partial services business were submitted on a participating basis. The participation statuses of Plan B physicians having only Medicare claims were defined as unknown.

Physicians' economic motivation and optimizing behavior

Although physicians as a group may have many different types of entrepreneurial objectives, prior research has tended to focus on just three: profit maximization, utility maximization, and the pursuit of target net incomes. The first two objectives are well known in economics, but the third has been developed over the past ten years to explain certain aspects of physicians' observed economic behavior.

The target net income hypothesis has usually been linked with the concept of physician-(or supplier-) induced demand. Briefly, it holds that physicians set income targets for themselves, based either on estimates of their peers' earnings or on subjective estimates of their own fair, reasonable, or appropriate earnings capabilities. Insofar as the markets for physicians' services are imperfectly competitive and physicians have "agency" relationships with patients, the hypothesis also holds that physicians can increase their net incomes by raising their fees, prescribing unnecessary services for patients that is, inducing demands or both. Hence, it argues that physicians respond to forces that lower their actual net incomes below the targets by increasing their fees, generating demands, or both, unless public policy prevents them from doing so.

Two general kinds of conditions can cause physicians' actual net incomes to fall below the target levels: an increase in local physician supply, which reduces the number of patients per physician; or constraints on the growth rate of fees. Throughout most of the 1970s, government policy did, in fact, actively promote the growth of national physician supply, and constraints on the growth rates of fees were imposed during the Economic Stabilization Program of 1972-74. In addition, the growth rate of Medicare Level 2 screens has been limited since 1975 by the Medicare Economic Index. Under the target net income hypothesis, the expansionary manpower policy may have increased expenditures on physicians' services because it provoked increases in fees, demand generation, or both. Similarly, the constraints on fees and Level 2 screens may have increased the costs (paid benefits) of government and private health insurance programs because they gave physicians incentives to generate unnecessary demands. Thus, the target net income hypothesis implies that efforts to enlarge physician supplies inflate health care costs, and that fee controls must be accompanied by a system of utilization controls to prevent demand inducement.

To contrast these implications with those of the standard economic market model, suppose that physicians maximize either profit or utility, and assume that the markets for physicians' services are competitive. Under normal conditions, market demand and supply functions for physicians' services exist and are downwardly and upwardly sloped, respectively.

Consider first the effects of an increase in the supply of physicians. Other things equal, an increase in the number of physicians shifts the supply-of-services function outward and lowers the market price level. The quantity of services supplied (and consumed) also increases, and total expenditures on physicians' services rise, are constant, or fall depending on whether the market demand is price-elastic, unitary price-elastic, or price-inelastic. The quantity of services per patient also tends to increase. As a result, the behavior of quantity following an increase in physician supply may be much the same as the target net income hypothesis predicts. However, the hypothesis asserts that fee levels *may* rise, and the standard model predicts that they always fall. Under standard theory, then, an increase in physician supply may raise expenditures on physicians' services, but it improves patients' welfare because it means a lower price of care and improved access to physicians' services.

Next, consider the effects of controls on physicians' fees. They can be of two types-direct restraints on fees, or limits on alowances (for example, on Level 2 screens). Assuming that direct restraints achieve their purpose, they establish a ceiling on fees below the

market-clearing level. In the standard model, the result is excess demand for physicians' services, a reduced quantity of services consumed, and a smaller total expenditure on physicians' services. Under the target net income hypothesis with demand inducement, physicians shift their demand functions outward to points where the consumption of services restores their net incomes to the target levels. In this case, total market consumption increases with respect to the equilibrium rate, excess demand is zero, and total expenditures on physicians' services may rise, remain constant, or fall.[7]

When controls are imposed on allowances, their effects on physicians who participate or accept assignment are identical to those of fee ceilings. That is, the controls set ceilings on physicians' average revenues. Thus, the comparative statics of the standard and target net income hypotheses are the same whether controls are imposed on allowances or direct restraints are placed on fees. For physicians who do not participate or accept assignment, tightening the controls on allowances raises the net prices paid by patients (since reimbursement is a fixed percentage of allowances) and shifts demand functions inwardly. In the standard model, the inward shift in demand leads to a decline in market fee levels and reductions in both the quantity of services and total expenditures on services. Under the target net income hypothesis, the shift can bring about a rise in fees (if market demand is sufficiently price-inelastic), a fall in fees (if market demand is sufficiently price-elastic), demand inducement without changes in fees, or some combination of changes in fee levels and demand inducement. Theoretically, the impacts on market quantities and total expenditures are equally difficult to predict. For instance, if physicians respond to the inward shift in market demand by inducing new demands, nothing prevents the new market equilibrium fees, quantities, and expenditures from being identical to their old values. In that event, there would be no change in any of the market variables after the imposition of allowance controls.

Because the implications of the target net income hypothesis are in large part indeterminate, it is difficult to design empirical tests to discern whether it or the standard theory best characterizes physicians' pricing and output behavior. However suggestions of three approximate tests for distinguishing between the standard and target net income theories follow.

1. Large physician-population ratios (that is, large market supplies of physicians) should be accompanied by low fee levels if the neoclassical theory is correct. Hence, positive correlations between physician density and market fee levels support the target net income hypothesis over the standard theory.
2. If demand inducement occurs, it should appear to shift the individual physician's average revenue function outwardly as the market supply of physicians increases. A positive partial correlation between the physician's average revenue and the area physician-population ratio therefore favors the target net income hypothesis. A zero or negative partial correlation argues against the hypothesis and favors the standard theory.
3. If the standard theory is correct, fee controls and limits on the growth of Medicare Level 2 screens should have retarded the growth rates of Medicare billed charges and quantities of services during the Economic Stabilization Program of 1972-1974. If Medicare fee levels were unaffected during this time or Medicare quantities increased, the findings would support the target net income hypothesis.

Each of these tests was carried out in the course of the study, but with somewhat ambiguous results. Test 1 was performed both descriptively and as an aspect of estimating cross-sectional charge regressions for the sampled physicians. In the descriptive findings, no significant simple correlations were found between charge levels and county physician density in any of the three Plans. Beyond that, about half of the signs on the correlations were negative. The results consequently did not support the target net income hypothesis. On the other hand, in the charge regressions, the partial correlations between charges and county physician population ratios were significantly negative in Plan A and significantly positive in Plans B and C. These estimates—which are more reliable than simple correlations—are indicative of demand inducement in Plans B and C, but not in Plan A.

Test 3 was applied to Plan B's Medicare Business. Descriptive findings showed that, between 1973 and 1974, Medicare fees rose at less than half the rate of fees in the Plan's private business, on which there were no allowance controls during the Economic Stabilization Program. Unfortunately, we could not observe the quantities of Medicare services per user, and we were forced to measure them on per-physician and per-enrollee bases instead. The quantity of services per physician grew by nearly 40 percent between 1973 and 1974, and the quantity per enrollee increased substantially in all fields but the medical specialties. Thus, the behavior of fees during the last year of the Economic Stabilization Program conformed to the predictions of both the standard and target net income theories, while the behavior of Medicare quantities was as predicted by the target net income hypothesis.

Although the evidence from Test 3 seems to support the theory of demand inducement, two factors prevent drawing any firm conclusions. First, there was a moderate growth of Medicare quantities throughout the study period, and it is hard to say whether the high growth rate of quantities during 1973-1974 actually

[7]Actually, the implications of the target net income hypothesis are slightly ambiguous under these circumstances. If physicians were realizing their income targets before the fee controls, obtaining the same net incomes at lower fees would require an increase in output. However, if marginal and average production costs are increasing, it may be difficult for physicians to raise their net incomes regardless of the amount of demand inducement, inasmuch as increases in output could reduce net incomes.

reflects demand inducement, or whether it was a part of the overall trend. Second, the growth of Medicare quantities was accompanied by a decline in the quantities of private services per physician, and the decline was especially pronounced in 1973-74. It is reasonable to infer that the sharp increase in Medicare quantity in 1973-74 was at least partly caused by a shift away from private business. Neither the standard nor target net income hypotheses predicts such a shift, and it is particularly puzzling in view of the relatively low levels and growth rates of Medicare fees in 1973 and 1974. For these reasons, the results of Test 3 are judged to be inconclusive and find that the appearance of demand inducement for Medicare services may have been due to unexplained and unobserved factors.

To carry out Test 2, we formulated and estimated an econometric model of the individual physician's practice. The model was designed to reveal whether physicians typically, maximize profit, maximize utility, or pursue target net incomes. Theoretically, it is known that all three types of optimizing behavior can yield the same pricing and output policies under special conditions. However, our objective was to determine whether physicians can be described generally as profit maximizers, as utility maximizers who do not induce demands, or as target net income pursuers who do not maximize profit.

A two-stage procedure was incorporated into the physician econometric model in order to perform Test 2. The first-stage test called for rejection of the profit maximization hypothesis if there were systematic differences between estimated marginal revenue and estimated marginal cost at observed outputs. When the model was estimated, the first-stage test indicated that profit maximization could be rejected for Plan A physicians and for (participating) physicians in Plan B who provided Medicare services. For physicians in Plan C and those providing non-Medicare services in Plan B, it was not possible to reject the profit maximization hypothesis.

The second-stage test was meant to distinguish between utility-maximizing and target net income behavior. If the physician did not maximize profit (as revealed by the first-stage test) and his average revenue was not significantly positively correlated with the county physician-population ratio, the implication was that he maximized utility. If he did not maximize profit and average revenue was significantly positively correlated with the county physician-population ratio, the implication was that he induced demands and was probably a target net income seeker. Execution of the second-stage test led to rejection of the utility maximization hypothesis and tentative acceptance of target net income achieving behavior for Plan C physicians and for Plan B physicians providing Medicare services.

The results of Test 2 are shown in Table 1, where they are compared with the outcomes of Test 1 and 2. The test results were generally consistent. There was no evidence of demand inducement in Plan A, and it was concluded that Plan A physicians maximized utility. In Plan B, Test 2 and 3 indicated the probable existence of demand generation for Medicare services, but not in the Plan's private business. To perform Test 1 on Plan B, private and Medicare business were aggregated, and since Medicare business represented about half of physicians' total observed outputs, demand inducement for Medicare services may have given the appearance of demand inducement in the aggregate. In Plan C, Tests 1 and 2 both suggested the existence of demand inducement, although the Test 2 results were partly consistent with profit maximization.

Table 1
Results of tests for physicians' optimizing behavior

Blue Shield Plan	Test 1	Test 2	Test 3
A (Midwest)	Not target net income achievers	Utility maximizers	Not applied
B (East) Private business	Target net income achievers	Profit maximizers	Not applied
Medicare		Target net income achievers	Possibly target net income achievers, but results ambiguous
C (South)	Target net income achievers	Probably target net income achievers, but results ambiguous	Not applied

On balance, then, the target net income hypothesis could not be rejected, but the analyses implied that pursuing a target net income is not a universal form of physician optimizing behavior. Indeed, it appeared that no single type of optimizing behavior best characterizes physicians. Why the type of optimizing behavior evidently varied across Plans is a difficult question to answer. The variation over Plans may have been due to regional differences in management practices, but it is not clear why physicians in the same Plan tended to exhibit different optimizing objectives depending on the line of business. The tests may, of course, have been biased, and it is also possible that the variations in objectives were more apparent than real. In terms of pricing and output policies utility maximizing behavior can be very similar to either profit maximizing or target income behavior. Hence, contingent on physicians' particular tastes, one could observe what appeared to be profit maximizing or target net income behavior even though in the narrow sense physicians' maximized utility. The results obtained here do not indicate an urgent need for policies to counteract the effects of demand inducement. However, if physicians' propensities to generate demands depend on their tastes and those tastes vary over time or with market conditions, the problem deserves continued attention and monitoring.

Physicians' pricing behavior: Competitive or monopolistic?

A firm is said to be competitive or perfectly competitive if its average revenue function is infinitely elastic in price (horizontal in quantity) at the going market price level. The firm is said to be imperfectly competitive, monopolistic, or to have market or monopoly power if its average revenue function is finitely price-elastic (downwardly sloping in quantity). The monopolistic firm can raise the price of its product by reducing its output. The competitive firm cannot, and if it raises its selling price over the market price level, it loses all of its customers to its competitors.

Because of restricted entry into the profession and consumers' ignorance of medical procedures, it has often been argued a priori that the physicians' services markets are noncompetitive. If this hypothesis is correct, it has several implications for the economic performance of the markets.

First, the size of the long-run profit or net income the physician can earn increases as his market power increases. The physician may choose not to exploit his market position, but if he does, his monopoly profit adds to health care costs. Second, in noncompetitive markets physicians are not compelled to be efficient, and, insofar as noncompetitive markets permit managerial slack, they also add to health care costs.

Third, most formulations of the target net income hypothesis assume that physicians possess some degree of market power, since otherwise they are unable to raise their fees as a means of achieving income targets. A finding that physicians do not possess significant market power tends to weaken the target net income hypothesis and to undermine the hypothesis' implications for market performance. However, it has never been established how little market power is necessary to induce demands. For example, consumers may be much more knowledgeable of, and sensitive to, fee differentials than they are of the quantities of services needed to treat illnesses. If this is the case, physicians' abilities to generate demands may be compatible with rather highly elastic average revenue functions.

Fourth, noncompetitive firms are better or more quickly able than competitive firms to pass along increases in input prices in the form of higher prices to consumers. Hence, the physicians' services are vulnerable to the cost-push type of price inflation to the extent that they are noncompetitive. Our analyses of the effects of fee-screen reimbursement suggested further that the inflationary incentives embodied in the system are strongest in the least competitive markets. The problem of reimbursement-related fee inflation is therefore likely to be most severe if the markets are highly monopolistic.

Although imperfections in market structure can usually be approached most successfully through public policy to revise structure, reimbursement policy can be used to mitigate some of the deleterious performance effects of market power. For instance, tighter controls on fees can be expected to have a constraining impact on monopoly profit, the costs of inefficiency, and the rate of fee inflation. As we have already remarked, demand generation can be counteracted by a system of utilization controls.

To study the question of physicians' market power, average revenue functions were specified as one aspect of the physician econometric model. The functions were estimated for six sub-samples of physicians who provided nonparticipating UCR, nonparticipating partial service, indemnity, and Medicare services in the three Plans[8]. The estimated price elasticities of the average revenue functions should have been large in absolute value if practices are competitive, and close to -1 if practices possess considerable market power.[9]

The estimated price elasticities of the average revenue functions ranged from -3.0 to -23.5. In three of the six subsamples, the slopes of the functions were not significantly negative—meaning that in those subsamples the functions were not statistically distinguishable from the average revenue functions of perfect competitors. The findings consequently suggest considerable variation in the degree of competitiveness of the physicians' services markets. They show that physicians' markets can be categorized generally as being at the more competitive rather than the less competitive end of the spectrum of market structures.

Curiously, the results seem to show that significant market power is neither necessary nor sufficient for demand inducement to occur. In Plan C, where the evidence of demand inducement was strongest, physicians' average revenue functions appeared to be highly price elastic. Yet in Plan A, where there was no evidence of demand inducement, the price elasticities of average revenue were relatively low. The contrast may well underscore both the unpredictability of physicians' optimizing behavior and its variability over different groups of providers.

The findings also have mixed implications for physician reimbursement policy. On one hand, they do not preclude the possibilities of monopoly profit, inefficiency, or excessive fee inflation in some markets. Hence, they do not conclusively rule out the need for selective remedial policies. But, they indicate monopoly performance is probably not characteristic of the markets as a whole, and they do not support the need for drastic or sweeping revisions of present reimbursement policy toward physicians.

Fee-screen reimbursement and charge inflation

It has long been argued by health economists and others that fee-screen reimbursement is inflationary. One part of the argument holds that the reimbursement mechanism enables physicians to raise their charges over time. That is, a rise in the physician's reasonable fees (allowances) between last year and this year lowers the net prices his patients pay if the physician does not raise his charges. Hence, the physician can raise his charges without affecting net prices—that is, without affecting the quantities of his services demanded—and the reimbursement mechanism permits him to do so.

The second and stronger part of the argument claims that physicians exploit the mechanism by raising their charges in order to raise next year's reasonable fees. In essence, it states that a rise in next year's reasonable fees allows the physician to raise his average revenue and net income over this year's levels. The rational, income-motivated physician therefore establishes an optimal or desired level of reasonable fees for next year, and sets his current charges to achieve it. If the hypothesis is correct, it implies not only that fee-screen reimbursement perpetuates fee inflation, but that it is actively encourages physicians to raise their charges over time.

The relationships between the rate of charge inflation and fee-screen reimbursement were explored in two ways. First, descriptive comparisons were made between inflation rates in different lines of business. If physicians did set their prices in order to exploit the fee screen mechanism, one would expect lower rates of charge inflation in lines of business like indemnity and partial service where reimbursement was based on infrequently updated fee schedules. Second, we specified and estimated three dynamic regression equations incorporating different hypotheses about physicians' propensities to raise their UCR and Medicare charges over time.

The results were generally mixed. The descriptive comparisons showed that charge inflation rates were almost identical in the physicians' private lines of business, regardless of the type of reimbursement and frequency of updating allowances. However, the rate of Medicare charge inflation was significantly lower than the rate for private business in Plan B, particularly during 1973 and 1974 when strict Economic Stabilization Program controls on Medicare allowances were in effect.

These rather anomalous findings appear to have a simple explanation. If the rates of charge inflation vary across lines of business for any reason, it must follow that physicians discriminate in price over their patients' insurance coverage. There was little evidence that physicians did, in fact, discriminate in price over their private lines of business, although we found that individual practitioners tended to charge slightly lower prices for their Medicare patients than private patients in Plan B. As a result, the patterns of charge inflation could reflect the absence of price discrimination over patients' private coverage, and some tendency for discrimination in favor of Medicare patients.

The low rate of charge inflation for Medicare services in 1973 and 1974 clearly suggests the influence of controls on the growth rates of Medicare Level 2 screens. The question remains, of course, why controls on Medicare allowances evidently did restrain charge inflation in Medicare business, while much stronger controls on the Plans' fee schedule allowances did not (nearly all of the fee schedules were not updated during the study periods). The answer may lie in the relative sizes of the sample physicians' Medicare and private fee schedule business. In all three Plans, fee schedule business represented a relatively small percentage of physicians' total outputs. Conversely, in Plan B Medicare business comprised 30-80 percent of physicians' total observed outputs, depending on specialty. Thus, it may have been unprofitable for the physicians to discriminate in price among their private patients, but it could have been profitable to discriminate in favor of Medicare patients because of the large sizes of Medicare clientele. If this were the case, one would expect a lower rate of charge inflation for Medicare services than for private services.

Two of the three regression equations gave implausible or ambivalent implications regarding physicians' dynamic pricing behavior. However, in both cases it seems likely that the models were conceptually inappropriate or econometrically misspecified. The third, and most theoretically defensible of the equations showed that physicians tend to establish desired reasonable fee levels for their UCR and Medicare services, and that they tend to raise their current charges in order to attain next year's reasonable fee targets. The parameters of the equation also indicated that physicians typically do not realize the full amounts of their target reasonables. The result could have been due to Level 2 screens, and this appeared to be largely true for Medicare services, but it could have been due to inefficiencies or miscalculations in physicians' pricing policies.

Overall, the analyses imply that:

- Fee-screen reimbursement embodies inflationary pricing incentives.
- Physicians generally respond to these incentives by pursuing inflationary pricing policies.
- Constraints on the growth rates of reasonable fees—that is, on Level 2 screens—are likely to retard the rate of charge inflation only if they apply to a significant share of physicians' business.
- Constraints on the magnitudes and growth rates of Medicare Level 2 screens encourage physicians to discriminate in price against private-paying patients. Thus, they may bring about cost-shifting away from Medicare patients and to the privately insured and uninsured sector.

Price discrimination

Price discrimination exists if a firm sells the same product under the same conditions to different buyers at different prices. It is generally associated with the possession of monopoly power by the firm, and it can occur only if markets are segmented (that is, the seller can group buyers into different classes and buyers cannot resell the commodity to one another). Price discrimination is a means for the firm to increase its profit. That is, rather than charging the same price to all customers, the firm staggers its selling prices to buyers according to their willingness and ability to pay. The effect on buyers as a group is to reduce their "consumers' surplus" thus, reducing consumers' welfare.

In the physicians' services markets, the historical use of the "sliding-fee scale" has often been labeled as price discrimination. Because the sliding scale resulted in the treatment of patients too poor to be cared for, its welfare implications are not entirely clear. However, it has been argued that the sliding scale was evidence both of physicians' monopoly power and of their tendencies to extract monopoly profits from patients.

In this study the issue of price discrimination was addressed through analyses of the prices charged to patients with different insurance coverage. Insurance coverage naturally segments the demands for physicians' services, and it also provides incentives for physicians to discriminate because it involves different rates of patient copayment and net prices, given the same gross price of services. Because data on production costs were not available, we could not determine whether differences in fees across coverage actually signified price discrimination. Since the physician can vary the quantity or quality of his services with the average revenue he expects to receive, fee differences may reflect cost differences, and in that event fee variation does not necessarily represent price discrimination. On the other hand, identical or closely similar fee levels over different types of insurance coverage suggest a homogeneous package of services provided to patients and the absence of price discrimination.

When the charges of individual physicians were examined, we found no evidence of fee variation across private lines of business in any of the three study Plans. This rather strongly indicates the absence of price discrimination in physicians' private business. On the other hand, in Plan B there were statisically significant differences between physicians' Medicare charges and those in private business. In three of the four broad specialty strata—general practice, the medical fields, and the surgical fields—physicians' Medicare charges were lower than their charges in private UCR business. In the fourth stratum—the nonmedical, nonsurgical fields—the reverse was true. Thus, the results show that physicians discriminated against Medicare patients in the nonmedical, nonsurgical specialties, but in favor of Medicare patients in the other specialties.

The anomalies in the evidence may raise more questions than answers for reimbursement policy. For example, the absence of price discrimination in private business occurred in spite of large differences in allowances and net prices between lines of business, and it is generally consistent with our findings showing that the markets are relatively competitive. But the charge variations between Medicare business and private business in Plan B occurred in the presence of large differences in allowances.

These results could indicate differences in the degree of physicians' market power between the Medicare and private lines, or they could indicate differences in physicians' willingness to exploit their market power. They could also suggest that physicians do not discriminate in price across minor lines of business. UCR outputs were somewhat larger than outputs in the other private lines, and it may not have been profitable for physicians to set separate charge levels for small groups of patients in those other lines. Medicare business did, however, comprise a substantial portion of physicians' observed outputs in Plan B, so in this case there may have been income incentives for many physicians to establish separate Medicare charge levels. If that interpretation is correct, Medicare reimbursement policy is partly responsible for what appears to be price discrimination mostly favoring Medicare patients. The policy segments consumers of physicians' services, and it also encourages price discrimination through its system of low Medicare allowances and high net prices to patients. Moreover, any effort to constrain Medicare allowances or to raise the net prices of services to Medicare patients is likely to increase the subsidization of Medicare services by non-Medicare patients.

Physicians' pricing patterns

This study examined the correlates of physicians' charges through the use of univariate descriptive methods and multiple regressions fitted to cross-sectional charge data for physicians in each Plan. The major issues considered were the effects on charge levels of physician product differentiation, market conditions, and reimbursement methods.

If physicians' services are heterogeneous and the degree of consumer ignorance of the services is moderate or large, charge levels should appear to vary significantly with measures of product differentiation. Regardless of the extent of product differentiation, charge levels should, of course, also vary significantly with measures of the strength of local demands, input prices, competition, and any other factors characterizing market conditions. To carry out the analyses, proxies for product differentiation were defined as the physician's specialty, age, sex, practice setting, professional and educational background, intensity of hospital practice, and patient-mix. Proxies for market conditions were specified as county per capita income, degree of urbanization, percentage of elderly in the population, physicians' office personnel salary rates, and the physician-population ratio.

The descriptive tabulations and multiple regressions both yielded much the same results. Charge levels tended to be highest for physicians who were specialists, board-certified, graduates of foreign medical schools (FMGs), young, not in solo practice, and whose outputs were provided largely in office settings. However, the regressions indicated in many instances that the tendencies were either not statistically significant or not systematic across Plans. In addition, the effects of the proxies on charge levels were generally numerically small, and in some cases the associations are hard to explain as the consequences of product differentiation alone. For example, if the relatively high charge levels of FMGs are attributed to a high level of service quality, this contradicts most opinion on the relative quality of U.S. and foreign medical graduates.

Admittedly, the proxies for product differentiation are limited. But subject to that qualification, they tend to show that the degree of product differentiation in the physicians' services markets is not very great. The result is consistent with our findings that physicians' average revenue functions are moderately to highly price-elastic. Strongly significant associations between sellers' prices and their (or their product) characteristics would be indicative of important market imperfections, and they would generally imply low elasticities of sellers' average revenue functions. Thus, the evidence tends to confirm the inference that physicians are competitors or monopolistic competitors rather than monopolists or oligopolists selling a highly differentiated product.

Most of the proxies for local market conditions also appeared to have little effect on physicians' charge levels. County per capita income was positively related to charge levels in all three Plans, and the relationship was statistically significant in two. This suggests that charges increase as the strength of demand within markets increases. However, charges were either not significantly or not systematically associated with the other four market variables. For instance, they were significantly positively related to the percentage of elderly in the county population in one Plan, significantly negatively related to the percentage in a second, and very weakly negatively related to the percentage in the third. There are no immediately obvious explanations for the patterns.

When the physician's average allowance level was added to the list of explanatory variables in the regressions, it was found to be highly positively correlated with the physician's charges. Moreover, the inclusion of allowances roughly doubled the explanatory power of the equations. This result is puzzling because allowances reflect the physician's prior-year charges, so they should have had the same predictive capabilities as the proxies for product differentiation and market conditions. That is, if allowances embodied only the lagged effects of product differentiation and market conditions, they should not have had strong, separate effects on charge levels.

The fact that they did have strong, separate effects suggests any of three possibilities. First, the proxies for product differentiation and market conditions may have been inadequate. If this is true, it weakens inferences that can be drawn from the regressions. And since the same or similar proxies have been widely used in other studies of physician pricing and the demands for physicians' services, it also raises more far-reaching questions about the reliability of known facts about physicians' practices.

Second, the theoretical relationships between price levels and product differentiation, seller concentration, the composition of demand, and other elements of market structure hold only when markets are in long-run equilibrium. Since the study periods were times of inflationary pressures on physicians' fees, the physicians' services markets were clearly not in long-run equilibrium. On the one hand, this implies that one should not necessarily expect to find significant or predictable associations between charges and industry structure. On the other hand, it indicates that time trends may be the most powerful predictors of current charge levels. If time trends are the strongest predictors of fees, this could easily explain why current charges were closely correlated with allowances, inasmuch as the latter are based on lagged fee levels.

Third, reimbursement methods may have had more powerful influences on physicians' pricing policies than the characteristics of the services of their markets. The findings on fee-screen reimbursement and pricing lend some support to this interpretation. If reimbursement mechanisms encourage physicians to follow similar pricing policies or free them from competitive pressures, charge levels would tend to vary more with allowances than with elements of market structure or physician characteristics. Ths may also be what the regression estimates reveal.

Variables measuring the percentages of the physician's outputs in non-fee screen business were included as regressors to investigate the impact of differences in allowances on charge levels. It was hypothesized that: charge levels increase as allowance levels increase because, other things equal, higher allowances mean lower net prices to patients; and the physician's average charge level falls as the percentage of his non-UCR business increases because allowances are lower in non-UCR business than in UCR business.[10] On these grounds, it was expected that charge levels would be negatively correlated with the percentages of the physician's outputs provided to patients covered by indemnity contracts, partial service contracts, and Medicare.

The regression results tended to confirm the expectation and its underlying hypotheses. Out of a total of five

coefficients estimated in the three Plan regressions, three were significantly negative, one was nonsignificantly negative, and one was significantly positive. In all instances, the numerical effects on charges of changes in the percentages of non-UCR business were small. For example, the estimates showed that a ten-point increase in any of the percentages would have produced a reduction in charge levels by 1 percent or less. Consequently, variations in allowances and patient copayment rates among physicians' lines of business seem to have little impact on physicians' average charges.

Physician participation

In terms of patient welfare, the purpose of physician participation and benefit assignment arrangements is to increase access to care. Given the same charge or gross price for a service, the net price paid by the patient can never be higher on a participating/assigned claim than on a nonparticipating/nonassigned claim. But if, as is usually the case, the physician's charges exceed his allowances, the net prices on participating/assigned claims are lower than on nonparticipating/nonassigned claims.

In this study, physician participation rates in two of the study Plans were examined descriptively and analytically. The descriptive results showed that physicians with the highest participation rates tended to be general practitioners, foreign medical school graduates, not board certified, female, and not in group practice. They indicated further that participating physicians had somewhat lower charge levels than nonparticipating physicians. Other associations between participation tendencies and physician, practice, and patient traits were not consistent across the two Plans.

Because of the inherent limitations of univariate descriptive methods, participation tendencies were next estimated in the context of a regression model of the participation decision. Fundamentally, the model hypothesized that the decision depends on the relative income opportunities of participating and not participating.[11] Exogenous variables were included in the regression to represent the economic conditions facing physicians.

Like the descriptive findings, some of the regression results were not consistent across Plans. For example, there were no systematic relationships between the probability of participating and the physician's age, type of practice, or county characteristics. And unlike the descriptive findings, the regressions indicated that physicians in certain other fields were about as likely to participate as general practitioners. Pediatricians had about the same participation rates as general practitioners (as did physicians in some of the referral specialties), but internists had much lower rates.

The regressions yielded three strong and important results. First, they showed that increases in allowances (reasonable or scheduled fees) significantly raise participation rates, and that the sensitivity of the participation decision to increases in allowances rises markedly with the physician's output in lines of business where he is eligible to participate. . In general, the results suggested that allowance levels are the dominant factor in participation decisions.

Second, physicians with characteristics commonly associated with a relatively low quality of services had the highest participation rates. These characteristics include graduation from a foreign medical school, lack of board certification, and low charge levels.

Third, market factors outside the control of reimbursement policy had highly important impacts on the time trends of participation rates in both Plans. In one Plan, a large increase in county per capita income was accompanied by a substantial decline in the participation rate over the study period. In the second Plan, a large increase in office wage rates over the study period had a substantially depressing effect on the participation rate. But the effect was mostly offset by changes in unobservable factors (proxied by time dummies) which tended to raise the rate.

More than anything else, the findings underscore the normative problems inherent in policy to maintain participation or assignment rates. The first finding implies that policy must contend with tradeoffs between promoting access to care and containing the costs of health care to government. Raising allowance levels is the only powerful and direct tool for increasing assignment or participation rates, but when allowance levels rise, so do program benefit costs which are tied to them. Thus, there is a measurable increase in program costs associated with a policy to increase access to care by raising participation or assignment rates.

The second finding indicates that policy must also face tradeoffs between promoting the quality of physicians' services and containing health care costs. If physicians who do not participate (or, by analogy, do not accept assignment) consist disproportionately of those of the highest quality, any effort to increase their participation rate by raising allowances inflates benefit costs. Conversely, anti-inflationary limits on the growth rates or levels of allowances have a strong likelihood of discouraging participation by high-quality physicians. This is a particular problem for the Medicaid program, in which eligible patients can be treated only by physicians who participate in the program.

The third result shows that policy concerning participation or assignment rates can be vulnerable to external shocks. Market conditions may independently increase or lower the relative profitability of participation/assignment to physicians, and they may do so significantly and rapidly. If the relative profitability of participation/assignment rises, it brings a windfall gain to policy administrators. In that case, allowance levels and program costs can be reduced with no loss in terms

of access to care or service quality. But, if the relative profitability of participation/assignment falls, administrators must decide whether to permit participation/assignment rates to decline, or whether to maintain the rates at their old levels and to incur the accompanying increase in program costs.

Conclusion

The results of this study convey an impression of the physicians' services markets as competitive or monopolistically competitive, and characterized by at most a moderate degree of product differentiation. Although physicians did not typically appear to maximize profit, nearly all indications show that they are income motivated. In the most general terms, this suggests that income incentives to achieve special reimbursement goals can be incorporated into policy and be expected to have predictable consequences. It also suggests that policy may inadvertently contain income incentives that can and will have adverse welfare effects.

There was considerable evidence of variability in physicians' pricing and output behavior across Plans, and in some cases across lines of business in the same Plan. For example, the incidence of apparent demand generation varied by Plan and line of business. Thus, even though the problem of demand generation is evidently not a pervasive one for reimbursement policy, it may be significant in certain geographic areas or for certain types of health insurance coverage. By the same token, an across-the-board program of utilization controls or similar restrictions to limit demand generation is likely to be unnecessary in many instances, and its adminstrative costs could easily exceed its savings.

The results do not suggest novel or ideal solutions for curbing fee and benefit cost inflation, maintaining access to physicians' care, and promoting the quality of services. However, they do raise serious doubts that ways can be found of satisfying all current policy objectives simultaneously.