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ISSUES IN THE INDUSTRIAL ORGANIZATION OF THE MARKET FOR PHYSICIAN SERVICES

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ABSTRACT

What is the nature of the industrial organization of the market for physician services? Is the market "competitive?" Are there pareto-relevant market failures, such that there is room for welfare improving policies? Economists have devoted a great deal of attention to this market, but it remains relatively poorly understood.

Some background on early studies of this market is presented. The nature of the product being bought and sold, and of demand, are then characterized, in order to establish the character of this market. The key features of this market are that the product being sold is a professional service, and the pervasive presence of insurance for consumers. A professional service is inherently heterogeneous, non-retradable, and subject to an asymmetry of information between buyers and sellers. These characteristics are what bestow market power on sellers, further strengthened by the fact that consumers face only a small fraction of the price of any service due to insurance. The implications of this for agency relationships between patients and physicians, and insurers (both private and public) and physicians are then discussed. Agency relationships within physician firms are also considered. Both theoretical and empirical modelling of contracting between insurers and physicians and of the joint agency problems between patient and physician and insurer and physician are recommended as areas for future research. Since failures in this market are seen to derive largely from the structure of information, the potential gains from government intervention may be sharply circumscribed.

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1. Introduction

What is the nature of the industrial organization of the market for physician services? Is the market "competitive?" Are there pareto relevant market failures, such that there is room for welfare improving policies? As the Clinton Administration's health care reform proposal comes before Congress, it is widely believed that markets for health care have failed. The market for physician services is no exception. Physicians are widely perceived to earn "excessive" incomes and to be guilty of inducing demand, engaging in unnecessary surgery and pursuing practice styles which may not be to the benefit of their patients. Proponents of health care reform propose schemes in which the market for physician services would be heavily regulated, or "managed."

In 1990, expenditures on health care totaled 666.2 billion dollars, or 12.2 percent of gross national product, amounting to 2,566 dollars per capita. Of this, 125.7 billion dollars were spent on physician services, accounting for 2.3 percent of GNP, or 19 percent of the health care total. Further, these expenditures have been growing. In 1970, 45.8 billion were spent on physician services, and in 1980, physician expenditures were 66.5 billion dollars,[1] representing a growth of almost 175 percent over the last twenty years. Clearly this is a quantitatively important market in the economy. In addition, it is of intense current policy interest. As I intend to make clear in the rest of this paper, I also believe it is an extremely interesting and fertile market for research in industrial organization.

The study of the physician services market is not new. Our intellectual progenitor, Adam Smith, wrote on the importance of reputation for physicians,

"A physician's character is injured when we endeavor to persuade the world he kills his patients instead of curing them, for by such a report he loses his business." (1978, p. 399, italics added).

Smith also concerned himself with entry into the market. Scottish universities were allowed to grant medical degrees without any restriction, and some of them were in the practice of selling the degrees. It had been proposed that medical degrees only be granted after two years of study at a university and a personal examination. Smith stated that restrictions on the sale of medical degrees by Scottish universities were unnecessary because the demand for physicians' services was a function of their professional reputations, not simply their titles,

"...That Doctors are sometimes fools as well as other people, is not, in the present times, one of those profound secrets which is known only to the learned. ..." (Mossner and Ross, p. 175, italics added).

Smith also claimed that restricting the granting of degrees would create monopoly rents for the graduates of the large prestigious universities at the expense of public welfare,

"Had the Universities of Oxford and Cambridge been able to maintain themselves in the exclusive privilege of graduating all the doctors who could practice in England, the price of feeling a pulse might by this time have risen from two and three guineas... to double or triple that sum; and English physicians might, and probably would have been at the same time the most ignorant and quackish in the world." (Mossner and Ross, p. 178, italics added).

Nonetheless, physician services and medical care have changed a great deal since Smith's day. Modern economists have devoted a great deal of attention to this market, but it remains relatively poorly understood. In part, this has to do with the nature of the product which is bought and sold, and in part with some institutional peculiarities specific to health care. As I will argue, a crucial feature of this market is that an important product is information, and markets for information are not extremely well understood. In addition, the pervasive nature of insurance, such that the consumer pays for a relatively small fraction of the cost of any

service he chooses, plays an extremely important role. At the same time, the nature of the market has evolved, to the point where current issues about its industrial organization differ quite dramatically from those of even ten years ago, specifically the rise of health plans and provider networks.

In what follows I present some background on early studies of this market, which were largely traditional IO studies of monopoly power. I then characterize the nature of what is being bought and sold, and of demand, in order to establish the special character of this market. I argue that market failure in this market is due not to the usual culprit of anticompetitive behavior by suppliers, but rather due to the asymmetry of information between consumers and producers. This leads naturally to the single issue to which health economists have devoted the most effort over the past fifteen years: induced demand. I then indicate what I see as the most important and interesting current issue in the industrial organization of this market: contracting between health plans and providers, and contracting within provider groups, and discuss some directions studies of this could take. In conclusion I discuss where research on the industrial organization of this market might go, and where efforts are needed in theoretical development, data collection and empirical work. I also speculate on some of the policy issues, and come to the usual conclusion of the dismal scientist: there is less scope for welfare improvement than politicians, the media, or the public (at least as reported by the media) think. Nonetheless, some of the developments in contracting bear watching, and careful attention to the new institutions in this market could bear some fruit.

2. Background: Trends in Physician Supply and Incomes

Before proceeding to a review of the issues introduced in the previous section, it will be helpful to present some statistics describing physician supply and incomes. Table 1 contains figures describing the physician stock and the number of physicians per capita for the period 1965-1992. Physicians employed by the Federal government and those not involved in patient care are excluded, since what is relevant is the stock of physicians available to supply services to the market. Figure 1 illustrates the trend for total physicians and Figure 2 for physicians per capita. There was very little growth in the physician stock or the number of physicians per capita prior to 1970, the growth rate picked up in 1970, increased again in 1975, and has grown steadily since, with the result that the total stock of physicians more than doubled between 1970 and 1992, and the physician population ratio has increased by 63 percent. Much of the early literature on the physician services market was concerned with barriers to entry into the medical profession. While these numbers are consistent with the possibility of barriers prior to 1970, if barriers existed after 1970 they could not have been extremely effective.

Table 2 documents the numbers of physicians and physicians per capita for the 20 largest Metropolitan Statistical Areas (MSAs) in the U.S. in 1988. There are thousands or tens of thousand of physicians in these urban areas. Clearly these are very unconcentrated markets. Table 3 contains statistics on trends in the numbers of physicians and physicians per capita in urban areas with populations over 1 million. Figures 3 and 4 illustrate the total number of physicians and physicians per capita in large urban areas (population $\geq$ 1 million) from 1958-1988. Figure 5 illustrates the growth rate in physicians per capita in these cities. The numbers are large and growing over the entire period. This is consistent with these being unconcentrated

markets which have become even less concentrated over time.

Table 4 contains information on medical school applications and admissions ratios and Table 5 contains information on the number of medical schools, enrollment, and graduates. Figures 5, 6, and 7 illustrate the trends in the application/admission ratio, number of medical schools, and number of graduates. The number of applicants and applications has fluctuated, rather than growing steadily. It is especially interesting to examine the variation in the application to admission ratio over time. The application to admission ratio peaked at a high of 2.83 in 1973-74, then fell steadily to a low of 1.56 in 1988-89. It began rising again thereafter. Thus, up through 1988-89, it was becoming easier to get into medical school, rather than harder. Table 5 shows that the number of medical schools, enrollments, and graduates have grown from 1970-71 to 1992-93. This information on medical education does not seem to point to significant attempts to restrict entry into the medical profession.

Table 6 contains information on physician average annual net income over the period 1973 to 1991. Figures 8 and 9 illustrate the trend and growth rate of physician income. Physician income fell, although not steadily, from 1973 until 1983. It grew steadily until 1990, and then fell again in 1991. Trends in the physician stock or number of physicians per capita do not appear to explain the pattern of growth in physician income. The number of physicians and the number per capita did grow much more rapidly from 1973 to 1983 than previously, but the growth in both the physician stock and in their numbers per capita continued nearly unabated from 1983 to 1990, when physician incomes were rising. The trend in the ratio of applications to admissions to medical school clearly follows physician income, with a lag. Table 7 documents real physician income per hour of patient care activities. Figures 10 and 11 illustrate

the trend in income per hour from 1982 to 1991, and the growth rate over that period, respectively. Income per hour grew from 1982 to 1990 (excepting 1985), and then fell in 1991. The annual growth in hourly income is much smaller for most years than the growth in total income, indicating that a large part of the growth in incomes from the early 1980s was due to increased hours.

Table 8 shows the percentage of physicians who are members of group practices. This has been steadily growing since 1965, and stood at almost one-third in 1991. This is illustrated in Figure 12. The growth in group practice membership was rapid from 1965 to 1975, leveled off, and then accelerated in 1988. Table 9 shows the percentage of group practices with various relationships to HMOs and PPOs.[2] The greatest percentage of groups have contracting relationships with HMOs or PPOs, and the greatest growth has been in contracting, as opposed to other types of relationships. The growth of health plans, and the extent of physician contracting with them, constitute an important change in the institutions in this market.

3. Traditional Studies: Evidence on Attempts at Cartelization

In this section I review evidence on monopoly power in this market. Studies of this phenomenon are of roughly two sorts: those that attempt to infer the presence of market power by searching for evidence of monopoly rents, and those that attempt to examine the existence of anticompetitive practices themselves. The first set of studies have by and large assumed that evidence of rents constitutes evidence of barriers to entry, although as I will discuss, monopoly power in this market at present probably mainly derives from other sources. The second set tries to look for evidence of anticompetitive conduct and the associated impacts: price

discrimination, advertising bans, pricing.

3.1 Studies of Monopoly Rents: What is the Return to a Medical Education?

Early studies of the market for physician services focussed on the traditional concern of industrial organization: the exercise of monopoly power. A number of authors expressed the view that barriers to entry into medical practice in the form of control over medical education and physician licensure had been erected to enhance the monopoly power of physicians (Friedman, 1962; Kessel, 1958, 1970; Rayack, 1967).[3] Since even the smallest markets were very unconcentrated, the traditional approach of regressing structure on performance was not likely to be very successful applied to this market. Consequently one way of detecting evidence of market power is to see if physicians earn a supra-normal rate of return on the investment in their education. The earliest study taking this approach is the well known study of professional earnings by Friedman and Kuznets (1954). Friedman and Kuznets compared the incomes of physicians relative to dentists from 1929-1934 and found that physicians' mean earnings were 32.5 percent greater than dentists'. Friedman and Kuznets estimated that the additional training required by physicians could only justify a 17 percent difference, therefore they concluded that 15.5 percent of physician earnings were monopoly rents due to restriction of entry into medical school by the American Medical Association.[4]

A number of other studies have taken this approach to searching for evidence of market power in this industry (Sloan, 1970, Lindsay, 1973, Sloan, 1976; Leffler and Lindsay, 1980; Leffler, 1978; Burstein and Cromwell, 1985). The results generally show a significant positive return to medical education, but vary widely in magnitude according to methods used and time

period examined. In consequence it is hard to determine if physicians earned excess returns for the time periods examined by these studies. Further, the most recent research (Burstein and Cromwell, 1985) examines earnings from nearly twenty years ago, thus the findings may bear little relation to current reality.[5] With the systematic striking down of anticompetitive practices by the AMA and local medical societies by antitrust authorities starting in the mid 1970s, it is hard to believe that egregious forms of collusion are currently rampant. Further, it is not clear exactly what is being identified by these sorts of studies. It is possible that entry into the medical profession was restricted by the AMA to below competitive levels, but this does not necessarily imply that output markets were less than competitive. This could have simply created excess demand for physicians, which could increase their price, i.e., the rate of return to a medical education.[6] Nonetheless, the trends in physician supply, medical school admission rates, and physician incomes reported in Section 2 are not consistent with the existence of effective barriers to entry. Even if entry into the medical profession is restricted, entry into local markets is essentially free. Thus, barriers to entry into the profession cannot be viewed as a source of market power. While I think a study of physician earnings and the return to a medical degree using the most recent data would be fascinating and is called for, I don't view this as the most crucial part of an agenda for research in the industrial organization of this market. Such a study by its very nature does not identify the nature of the conduct related to market power.

A more recent paper by Noether (1986a) tries to discern evidence on the competitiveness of the market for physicians by examining the stock of physicians as a weighted average of the levels predicted by a cartel model and by a perfectly competitive model. The idea is to estimate

the weight and thus determine the competitiveness of the market. Using data covering the period from 1948 to 1982, Noether finds that the market has grown steadily more competitive since 1965. Her estimates suggest a growth of 6 to 20 percent in the physician stock over time due to increasing competition and a concomitant decline of 19 to 45 percent in incomes. In another paper Noether (1986b) empirically tests whether the AMA's power to control the physician stock has eroded over time. She models the stock of physicians as consisting of a "dominant firm" of AMA physicians plus a competitive fringe of foreign medical graduates (FMGs) and new domestic graduates (USMGs). The test consists of discriminating between whether the growing stock of physicians can be modelled as due to a shift in the supply curve of physicians or due to a shift in demand. Noether concludes that the supply has been shifting, thus entry has occurred through the competitive fringe. This implies that the AMA's power to control entry has eroded over time. Neither of these papers, however, employ data from the period after 1982, when physician incomes began rising again.

3.2 The Exercise of Monopoly Power

Another set of papers studying the physician services market explicitly attempt to gauge aspects of competition in this market. The most well known of these is the famous paper by Kessel (1958) on price discrimination in medicine. Kessel was looking for evidence of anticompetitive behavior, specifically for evidence the AMA was acting as a cartel. Since price discrimination is not possible in competitive markets, any evidence of price discrimination by physicians constitutes *per se* evidence of their monopoly power. Kessel claims that price discrimination by income in the form of a sliding scale for fees is a pervasive practice in

medicine. Kessel assumes that price discrimination cannot be maintained without cartelization.[7] One of Kessel's theses is that "control over the pricing policies of doctors is directly and immediately related to AMA control of medical education." (p.29). This is not established in any convincing way, and indeed, seems to confuse control over entry with the actual exercise of monopoly power.[8] More appropriately, Kessel examines a number of actions of the AMA and state and local medical societies to see if they are consistent with attempts to achieve and maintain market power, mainly attempts to prevent price cutting. The AMA controlled hospital certification for intern training, and advised hospitals so certified that their staff should be comprised solely of local medical society members. Interns were (are) an important source of cheap labor and involvement in postgraduate medical education enhanced a hospital's reputation. Hence, the loss of this certification implied a substantial economic loss for the hospital and the physicians practicing there. The AMA opposed prepaid health plans and supported reimbursement insurance. Further, local medical societies could and did deny hospital admitting privileges to physicians who participated in prepaid health plans or who engaged in competitive practices. While Kessel does describe attempts to enforce cartel behavior, he doesn't present systematic empirical evidence on the existence or extent of price discrimination or monopolistic pricing.[9] Consequently it is not clear how successful those attempts at cartelization were. Regardless of the success or welfare loss resulting from such practices, the systematic application of the antitrust laws to the medical profession which began in the mid-1970s has struck them down, consequently cartel behavior by the AMA or medical societies is no longer a serious concern (see Havighurst, 1980, 1983; Costillo, 1985, Lerner, 1984; and Horoschak, 1992 for reviews).[10,11]

Another set of papers has examined the effects of advertising. Prior to a 1982 suit by the Federal Trade Commission, the AMA's code of ethics forbade physician advertising.[12] While I know of no direct evidence of the effect of this ban, there are a number of papers which have examined the effects of state level advertising bans in optometry prior to 1982 and there are two papers which have examined physician advertising and its effects post-1982. Studies of optometry have consistently found that advertising lowers the price of optometric services (Benham, 1972; Feldman and Begun, 1978; Kwoka, 1984; Haas-Wilson, 1986; Gaynor and Mullahy, 1993).[13] This suggests the possibility that the same may have been true of the physician advertising ban. Rizzo and Zeckhauser (1992) studied the effects of physician advertising using post-advertising ban data from 1987 and 1988. They found that, controlling for physician choice of whether to advertise, advertising leads to higher prices, more time per visit, and fewer visits. Advertising seems to support market segmentation by physicians. In another paper, Rizzo and Zeckhauser (1990), using the same data, found that advertising is a complement to experience. This may imply that advertising could act as a barrier to entry in this market. In any event, it is far from clear that advertising in physician markets will behave in ways consistent with the evidence from advertising bans in optometric markets. One key difference is that while much of advertising for optometric services is price advertising, very little physician advertising is over price. An interesting study by Hibbard and Weeks (1989) studied the effects of disseminating information about physician prices. In this study an experimental group received a directory of fees charged by local physicians for common procedures, and a chart indicating the range of fees for each procedure. A control group received no such chart. At the end of the two year study no significant differences were found

between the two groups in the mean expense for a physician visit. Hibbard and Weeks speculate that the cost savings to the consumers were not substantial enough to affect their patterns of consumption.[14] Physician advertising is still relatively rare, although it has been growing (Rizzo and Zeckhauser, 1992 indicate that the proportion of physicians who advertise is estimated to have risen from 4 percent in 1982 to 20 percent in 1987). If consumers become more price conscious, advertising about price has the possibility of reducing welfare (Dranove and Satterthwaite, 1992; Holt and Sherman, 1990). If the use of advertising continues to grow among physicians, economists will need to pay attention to its application as a strategic variable, and the attendant normative implications.

Last, an interesting paper by McCarthy (1985) tries to assess the competitiveness of the market by estimating the price elasticity of demand facing the physician firm. McCarthy estimates a price elasticity of three using 1975 data. This is consistent with physicians possessing market power, since they operate on the elastic portion of their demand curve. Nonetheless, it indicates that the demand facing physician firms is quite elastic, which certainly limits the extent to which they can price above marginal cost. McCarthy also found that demand is negatively influenced by waiting time, and that the number of physicians in the market shifts in the firms' demand curve. Both of these are also consistent with a characterization of the market as monopolistically competitive.

3.3 What Does the Evidence Tell Us?

In summary, the evidence indicates that the AMA and local medical societies engaged in anticompetitive practices in the past and that these endeavors met with a certain amount of

success. These practices have gradually been struck down by antitrust decisions, however, starting in the 1950s and culminating in the 1970s. The evidence seems to indicate that physicians earned monopoly rents up through the 1970s. There are no studies which use more recent data, so we do not know what has happened since then. However, the downward trends in physician incomes, applications to medical school, and the medical school rejection rate through the 1980s described in Section 2 are consistent with declining returns to a medical education. Recently however, these trends have been reversed, leading to the question of what has changed. It does not seem plausible that collusion is very extensive. It may be that physicians have found new means of obtaining market power in the aftermath of the elimination of previous anticompetitive practices.[15] In the sections that follow, I will explore what I believe to be the current sources of market power for physicians, and describe how they might or might not have anticompetitive effects. I will also suggest what I view as useful avenues for future research, both from the point of view of how industrial organization research can inform our knowledge of the physician services market, but also how studying this market might provide some empirical evidence on current issues in industrial organization.

4. Agency Problems

Agency problems exist when the preferences of two parties to an exchange do not coincide, and one of the parties possesses more relevant information than the other (Arrow, 1985, Ross, 1973).[16] Agency problems are so prevalent that they can be said to characterize this market.[17] There are three sets of exchanges for which agency problems exist. First is the exchange between the patient and the physician. The consumer does not know his true

condition, nor the technology of producing health from health care, thus the physician has the opportunity to recommend services which the patient would not choose if he had full information. Quality of care (or physician effort in producing care) can be observed far less precisely by the patient than by the physician, providing the physician with an opportunity to skimp on quality. The same is true of diagnosis, as opposed to treatment. If the quality of diagnosis is increasing in costly physician effort, diagnosis effort is unobservable to the patient, and effort is costly to the physician, then an agency problem exists here as well. All of these problems are exacerbated by the presence of insurance in this market, since consumers bear only a small part of any pecuniary costs associated with agency problems. Indeed, these types of agency problems exist elsewhere. The factor which distinguishes this market from others is that consumers only pay a small fraction of the price of the service.

The second area in which agency is relevant is the exchange between the insurer and the physician.[18] This includes both private and public insurers. Since the consumer pays a small fraction of the cost of any physician services chosen, the insurer pays the bulk of the expense associated with any suboptimal choices made due to agency problems. Thus the insurer has an incentive to try to provide the physician with incentives to make optimal choices. Many recent developments in insurance seem to be efforts to do just that (e.g., managed care policies, various forms of contracting).

The third area for agency problems in this market is within the firm. The majority of nonfederal physicians in patient care are now members of medical group practices (Marder and Thran, 1988).[19] As in any firm, agency problems abound (see e.g., the survey by Holmstrom and Tirole, 1989). These problems differ somewhat in physician firms due to the nature of the

production process (e.g., the important capital is human, rather than physical) and the market (if firm reputation is important, this creates an opportunity for free-riding by individual members).[20] The internal structure of these firms could serve to either blunt or reinforce incentives designed to deal with the patient-physician agency problems or physician-insurer agency problems.

Since successful collusion between physician firms seems unlikely, market failure must be derived from another source. As described in the following sections, the asymmetry of information between physicians and patients and between physicians and insurers, combined with product and preference heterogeneity, confers market power on physicians. In what follows I will take up each of these areas in turn. I will briefly review the relevant theoretical literature, then turn to the empirical literature. I will conclude by making some recommendations for future research.

4.1 Physician-Patient Agency Problems

4.1.1 The Nature of the Product

Before proceeding to a discussion of what I view as the salient issues regarding physician-patient agency it is essential to discuss the nature of what is exchanged by physicians and patients. The market for physician services is a market for a service, as opposed to a tangible product. This in and of itself gives the product certain characteristics which have a fundamental impact on exchanges in the market. Moreover, I will argue that diagnosis is a fundamental aspect of the product's character and that it is crucial to understanding the industrial organization of this market.

First, consider health care as a service. All services are by their nature inherently heterogeneous. A haircut, an oil change, a will preparation, are never the same thing twice.[21] This is even more true of made to order, or customized, services, e.g., a fashion makeover, music lessons, catering, investment advice, or representation in divorce proceedings. This certainly applies to physician services, from those which are routine, such as check-ups, to those which are specific to the patient (i.e., made to order, or "customized"). Further, preferences are heterogeneous. Some patients will prefer extensive explanation and discussion of their case, others would prefer the bare minimum. Some will prefer "Cadillac" or "gold-plated" treatment, whereas others will only wish to pay for only that which is adequate or necessary, the "Ford" or "Chevrolet" treatment. This may also be the case with immutable physician characteristics (or those which cannot be changed ex post, like "putty-clay" investment, e.g., board certification, medical school). Individuals may prefer physicians of a particular age, sex, race, or ethnic background, or with a particular appearance (tall, short, brown hair, blue eyes, conservatively dressed, fashionably dressed, hip, etc.). Some may prefer a general practitioner for their primary care, while others may favor a board certified internist. Satterthwaite (1979, 1985) has stressed the idiosyncratic nature of preferences in this market.

It is this combination of a heterogeneous product with heterogeneous preferences which is key.[22] As Satterthwaite has argued persuasively, this bestows the seller with market power. Patients choose physicians who produce the type of services and have characteristics which best match their preferences. The fact that patients choose physicians who give them the highest utility gives physicians market power, since switching to another physician will reduce a patient's utility. The less substitutable are physicians for one another, the greater the degree of

market power, i.e., the lower is the elasticity of demand a physician faces. Since the vast majority of physicians are located in urban markets with many other physicians, the market can be characterized as monopolistically competitive.[23] This is a powerful paradigm which can help to explain observed patterns in this market.

4.1.2 The Structure of Information

While I believe that this characterization is essentially correct, there are still some crucial pieces missing from this puzzle. Let us consider the pieces which may be missing. First, nothing has been said yet about the structure of information, and this is vitally important. Uncertainty is an integral part of demand and supply in this market. Patients are uncertain about their condition, the accuracy of the physician's diagnosis, his honesty, and the amount of effort or quality he has expended on their case. They have even less information about these factors for other physicians in the rest of the market. Physicians do not know the patient's condition, they are uncertain about the technology of producing health from health care, and they do not (generally) know the patient's reservation price. Second, it is also crucial to account for the influence of third party payment. The vast bulk of physician services bought and sold in this country are covered by insurance. This means that the consumer of the service himself pays only a small fraction of the cost, while the majority is reimbursed by third-party payers. Third, it is not complete to represent the product in this market as a typical service. Physicians do not provide only medical care, or treatment, but also diagnosis and advice. Indeed, there are very few patients who demand only care, with no diagnosis or advice. Usually a patient will demand diagnosis and advice first, and then treatment.[24] In what follows these points will be

elaborated by first considering the search for a physician and next the nature of exchange in diagnosis and treatment.

4.1.3 The Process of Search for a Physician

To illustrate, consider the process a consumer goes through when seeking care. A consumer first decides they want to see a physician. They may feel ill, or simply want a check-up. I will not consider emergency, life-or-death situations, since demand in those cases is fundamentally different. If they have an established relationship with a primary care physician (general practitioner or internist), and are satisfied with that relationship they will make an appointment to see that physician. If the consumer does not have an established relationship with a primary care physician, or if they are not satisfied with their current physician, they must search for a new one. The most common form of searching is obtaining recommendations from relatives, friends, and colleagues.[25] Regardless of the actual search mechanism, it is clear that search is costly. In addition, many physicians charge more for initial visits, presumably to take the patient's history and get acquainted.[26] Thus there is a very clear cost associated with switching physicians. Patients will only switch if the expected gains are at least as great as the expected costs of switching. This has a negative effect on the elasticity of demand facing the individual physician, and the greater the search costs, the less elastic will be demand (Satterthwaite, 1979). Thus uncertainty over the characteristics and prices of all physicians in the market plays a key role in determining equilibrium in this market.[27]

It is important at this point to note a few further factors about the search for a physician. First, although search costs for consumers confer power over price to physicians, physicians may

also be ignorant. Physicians are not very likely to be perfectly informed about consumers' reservation prices.[28] Gaynor and Polachek (1994) provide some empirical evidence on this. They consider a model in which patients may pay more than a sellers reservation price due to their ignorance and physicians may accept less than a buyers reservation price due to their ignorance. A two-sided frontier price function is used to estimate measures of patient and physician ignorance. Their results indicate that there is significant physician ignorance in the market, although patient ignorance outweighs physician ignorance by roughly a factor of two. Measured patient relative to physician ignorance is larger for services which are more heavily insured, purchased infrequently, or associated with severe illness. Second, the presence of third party payment for medical expenses affects the benefits of search to the consumer. If insurance pays eighty percent of physician fees, the savings to the consumer of finding a less expensive physician are relatively small (Newhouse, 1978).[29] Dionne (1984) shows that insurance can have a strong effect on search.[30] The presence of insurance will tend to lead to greater dispersion in prices. This may lead consumers to search less, or more, in equilibrium. It is possible that consumers may search more because the increased dispersion in the price distribution means that there is a bigger potential payoff to search, since the expected gap between the current price and the lowest price is larger. Third, and most importantly, consumers are concerned about not only price, but quality. Consequently any decision to switch will be based on information about both of those. Insurance leads to quality being the salient factor, since consumers bear very little of the expense. Dranove and Satterthwaite (1992) examine equilibrium in such a market. In this case, search may focus entirely on quality. Search over quality is arguably more costly than search over price, however. Physician services

are arguably what Satterthwaite (1979) calls a reputation good, or what Darby and Karni (1972) call a credence good. The implication is that the demand facing a physician firm may be relatively inelastic, due to the combination of price being covered by insurance, and the costliness of searching over quality.[31]

4.1.4 Diagnosis and Treatment

Now consider the next step in seeking care. The consumer has chosen a physician. The patient sees the physician and describes his symptoms. The physician asks some questions. He may do a physical examination or recommend some tests. The physician then makes a diagnosis and recommends a course of action. The action may be to do nothing, it may be to prescribe some medication, it may be to return for another exam after a specified period of time, it may be to undertake further diagnostic testing, it may be to undertake a procedure, or it may be a referral to a specialist. The patient weighs the expected costs versus the expected benefits of the recommendation and accepts the recommendation, rejects it and does nothing, or seeks another opinion (and diagnosis). I would first like to consider what is being exchanged in this transaction, and then to discuss the structure of information. Last, I want to discuss the role of insurance, the market, and repetition in the relationship between buyer and seller.

4.1.4.1 The Product

What is being bought and sold primarily is information. The physician is hired to make a diagnosis and provide advice on the appropriate course(s) of action. This in and of itself is not unique to health care markets. Repair services generally have this characteristic. An auto

mechanic diagnoses a car problem and provides a recommendation for action. Appliance repairmen operate in the same way. Stockbrokers or financial advisers diagnose an individual's financial situation and advise them on investment strategies and on particular investments. Taxi drivers are told the destination of the passenger and allowed/requested to choose the route. The purchase of such services has been analyzed under the literature known as "games of persuasion."[32]

4.1.4.2 The Structure of Information in Diagnosis and Treatment

Such games have the following information structure. The consumer observes a symptom (engine knocking, pain in the side). The consumer observes only the symptom, but does not know the nature of the problem. There is some probability, known to all, that the problem is a serious problem, with an expensive treatment/repair and some probability it is minor (inexpensive treatment). The expert can observe (let's say with certainty) whether the problem is serious or minor, and can perform both the expensive and the inexpensive treatments.[33] The consumer prefers the appropriate treatment/repair, but cannot observe the problem. There is an asymmetry of information between the buyer and seller, and thus an agency relationship. This creates the possibility for the seller to misrepresent the nature of the consumer's problem to him. An incentive to do so exists when the more expensive repair is also more profitable. What limits this sort of behavior? The most complete analysis is in Wolinsky (1993). Wolinsky shows that in equilibrium, consumer search will act as a constraint on the opportunistic behavior of sellers. One of the equilibria, which he finds to be more likely, is one in which sellers specialize in repairing serious or minor problems, and price at their respective marginal costs.

Another equilibrium is one in which there is fraud, which is limited by the incentive for consumers to search. In the health care setting, insurance limits consumer benefits to search, consequently the fraud equilibrium may be likely. I know of no papers on the physician services market which have explicitly analyzed this phenomenon. The closest are Pauly (1980), Dranove (1988), Glazer and McGuire (1991), and Frank, Ma, McGuire, and Salkever (1993).

4.1.4.3 Theoretical Models

A very large part of the literature in health economics is on this topic, which has been dubbed "induced demand" or "demand creation."[34] This notion is often traced to Roemer (1961), who observed a positive correlation between the number of hospital beds per 1,000 population and the number of hospital days per 1,000 population. Roemer posited that supply creates its own demand. One of the earlier theoretical papers is by Evans (1974), in which he speculated that physicians had a "target income," and would induce demand if a shock reduced their earnings below that level.[35] The amount of inducement was limited by professional disutility, or "ethics," associated with inducement activities.[36] In what follows I review the papers in this literature which have explicitly considered the agency relationship between physician and patient.[37] In particular, I focus on games of persuasion.

Pauly (1980) explicitly analyzes the physician-patient relationship as an agency relationship. Physicians supply diagnostic information to patients, and choose the accuracy of the information. Patients are less informed, although they can use previous experience to help them estimate the accuracy of the physician's diagnosis. Physicians may choose to provide less than perfectly accurate diagnoses, even if patients know that physicians engage in this behavior.

This is similar in spirit to Darby and Karni (1972), where fraud exists in equilibrium due to the costs to consumers of obtaining information. Pauly briefly discusses market equilibrium (Model 2 in Chapter 4), but does not really analyze it.

Dranove (1988) examines how the market can act as a constraint on physicians' behavior. Physicians and patients play a two-stage game. Physicians can recommend treatments for which the costs outweigh the benefits. Their recommendations, conditioned on exogenous factors, constitute their recommendation strategy. Dranove points out that this can be thought of as a reputation. Patients use the physician's recommendation combined with their beliefs about the physician's recommendation strategy to make an inference about the seriousness of their illness. They are more likely to consent to a physician's recommendation who has a reputation for honesty than one who has a reputation for inducement. Physicians know patients' decision rules, and choose their recommendation strategy using those decision rules as a constraint. Physicians choose the amount of inducement which just balances increased revenues from improperly advised treatments with revenues lost from the (negative) impact on reputation. Again, this has the same flavor as Darby and Karni, in that there is an optimal amount of "fraud" in equilibrium. The physician is assumed to be a monopolist, however, so issues associated with market equilibrium are not dealt with explicitly.[38]

Rochaix (1989) explicitly considers patient search among physicians as a constraint on physician behavior. The paper shows, via simulation, that there exist distributions of accuracy in equilibrium. She finds that it only takes a relatively small number of informed patients to force physicians to act as better agents in equilibrium.

Wolinsky (1993) is a recent paper on markets for experts' diagnostic and treatment

services which explicitly models equilibrium in the market.[39] This is the only paper on games of persuasion of which I am aware which specifically considers market equilibrium. In this model customer search and reputation concerns serve to discipline experts' incentives to engage in opportunistic behavior. Consumers have problems which can be treated with a major or a minor treatment. Consumers do not know which type of problem they have, but experts can diagnose it. Major treatments are more profitable, thus the asymmetry of information creates an opportunity for opportunistic behavior by experts. Consumers can search by obtaining multiple diagnoses, but diagnoses are costly. Wolinsky first considers a model without reputations. There are multiple equilibria in this market. In one of the equilibria, if search/diagnosis costs are not too high, experts specialize and price at marginal cost. Consumers start searching at a minor treatment expert. If rejected they go to a major treatment expert. Minor treatment experts have no incentive to diagnose dishonestly as major treatments, since they lose this business. Competition will drive the prices of both types of experts to marginal cost. In this equilibrium the diagnosis and treatment of major problems is separated, since minor treatment experts diagnose all problems first. This bears a resemblance to some proposals (see Dranove, 1988) that separating diagnosis and treatment is a solution to the inducement or overprescribing problem. We certainly see some of this in this market, since there is a separation between generalists and specialists. For example, patients typically see a GP or internist for diagnosis first, and are then referred to a specialist. Completely separating diagnosis and treatment probably doesn't occur because of economies of scope in the production of these services. There are also economies to the patient in terms of time costs. Another equilibrium is one in which there is an optimal amount of fraud, à la Darby and Karni. This

requires a certain markup of price over marginal cost to be sustained as an equilibrium. Wolinsky indicates that this will not be an equilibrium if there are sufficiently many experts in the market, since the markup will elicit price cutting. It is not entirely clear this will hold true in the market for physician services, since consumer demand is so price inelastic due to insurance coverage.

In the model with reputation consumers live two periods (there are overlapping generations, but this does not play a central role). Experts have reputation concerns since there is the possibility of repeat business from consumers. Consumers have beliefs about experts' strategies, which are updated in the second period based on their first period experience. Reputation is patient-specific, rather than marketwide. In this sense the model is similar to Pauly (1980) and Dranove (1988). Wolinsky, however, also considers the possibility of search by consumers. He indicates that if search costs are low enough, the search equilibrium described previously will dominate the reputation equilibrium. The opposite is true if search costs are high. He also points out that there may be an equilibrium with both search and reputation, since consumers are heterogeneous in their search costs, and different kinds of problems will vary in their diagnosis costs.

These papers all have the common theme of examining the extent to which consumer information can act as a check on physicians' opportunistic behavior. One approach which has not been explored insofar as I am aware is considering dynamic aspects of physician-patient relationships. Repetition can limit the scope for opportunistic behavior in agency relationships. Wolinsky's model of reputation considers this, but expanding this could yield some useful insights. Specifically, incorporating information transmission among consumers such that there

is a marketwide reputation could be important. One possibility is to consider information transmission across overlapping generations. If the old, with experience, transmit information to the young, this could have dramatic effects on equilibrium and efficiency. Salant (1991) has shown generally that in this kind of game second-best equilibria exist which are improvements on the noncooperative outcome.

4.1.4.4 Empirical Evidence

There is a vast empirical literature on induced demand in physician markets. See Sloan and Feldman (1978), Feldman and Sloan (1988), Dranove and Wehner (1993) for summaries. Most of these studies use cross-sectional data to examine the relationship between the number of physicians per capita in an area and either price or quantity. The notion is that entry should reduce equilibrium price or quantity if the market is competitive, whereas evidence of a positive relation between the number of physicians per capita and price or quantity per physician constitutes evidence of induced demand. As Reinhardt (1978) points out, just about any pattern is consistent with demand inducement, rendering this hypothesis non-falsifiable by these sorts of data. In addition, there are serious econometric problems with most of these studies, as pointed out by Feldman and Sloan (1988). A number of other authors have pointed out that there are other models which predict the same patterns in the data. Entry could lead to increased non-price competition, which could increase price and quantity. It could also decrease consumers' travel and waiting times, which could lead to a higher equilibrium price and quantity. Entry could increase the cost of acquiring information, which would make switching physicians less likely and this could increase price. Last, probably the most damning criticism

is to show that this approach produces empirical results consistent with the inducement hypothesis where inducement is impossible. Dranove and Wehner (1993) do just this. They examine the demand for childbirths using the methodology standard to most studies of induced demand and find evidence consistent with it. Presumably, most physicians find it rather difficult, if not impossible, to induce demand for childbirths!

Rather than re-summarize this literature, I would like to consider what would constitute evidence of opportunistic or fraudulent behavior with regard to physicians' diagnosis and treatment decisions. There are two issues: what sorts of data would allow for valid tests, and what are some refutable hypotheses? Clearly, micro level data on physician-patient interactions is necessary in order to identify any inducement effects. What are some testable hypotheses? One obvious counterfactual is to consider the choices of well-informed consumers and compare them against those of less well-informed consumers. Hay and Leahy (1982) compared the quantity of care received by doctors and their families with that received by the rest of the population, controlling for other relevant factors. Presumably physicians and their families are well-informed, and opportunism is more difficult with them. Hay and Leahy found that doctors and their families received more care than others, rather than less. Kenkel (1990) uses survey responses about patient knowledge of the meaning of symptoms as a measure of patient information. He then estimates the demand for medical care, allowing information to be endogenous. Information increases the probability than medical care is utilized, but has no impact on the quantity demanded conditional on there being any utilization. The results also suggest that poorly informed patients underestimate the productivity of medical care in treating illness. Thus, if anything, it seems as if physicians may not be able to persuade consumers to

use enough medical care, rather than inducing excessive consumption.

Dranove (1988) suggests that a test would be to examine the patterns of patient compliance with physician recommendations. Compliance rates should be lower when the condition is not acute, patients are more informed (educated), the benefits of treatment are lower, and the costs of treatment borne by the patient are higher (this includes the non-insured pecuniary costs, plus time costs, physical discomfort, and the riskiness of the treatment). The work by Rossiter and Wilensky (1983) provides some evidence on this. Rossiter and Wilensky examined the difference between patient-initiated visits and other visits. Presumably patient-initiated visits are not subject to physician advice. They found some evidence consistent with a very small inducement effect for non-patient initiated visits, and nothing for patient-initiated visits.

Further, incentives in the form of physician compensation should matter. Physicians who are salaried, or paid on a capitation basis (a fixed rate per patient, rather than per service), should have no incentive to engage in opportunistic behavior, unless the change in their compensation over time is somehow linked to providing more or more costly services. There is no question that physicians paid on an incentive basis produce a higher quantity (Gaynor and Pauly, 1990; Gaynor and Gertler, 1993) and charge higher prices (Gaynor, 1989). However, it is not clear that this constitutes evidence of overprescribing behavior. Physicians whose compensation is not based on incentives may be shirking, or there may be a combination of shirking by physicians on fixed compensation and opportunistic behavior by those on incentive compensation. There is some evidence consistent with this from a randomized controlled trial from a hospital clinic (Hickson, Altmeier, and Perrin, 1987). Half of the clinic doctors were

randomly selected to be paid on a fee-for-service basis, and half were paid a fixed salary. Patients were randomized among the doctors. The fee-for-service physicians saw more patients and exceeded guidelines for pediatric care. The salaried physicians were in less conformity with guidelines for pediatric care than those paid by salary. This suggests that the fee-for-service doctors may have been engaging in overprescribing, while the salaried doctors may have been shirking.

4.1.4.5 What Do We Know About Opportunistic Diagnosis and Advice by Physicians?

In spite of the large literature in health economics on this topic, I would suggest that we know relatively little, in a quantitative sense, about this behavior. There is some evidence consistent with some overprescribing by physicians, but by and large the studies do not use the right data or look at the kinds of behavior which would allow testing of this hypothesis. As I indicated previously, I believe that micro data on physician-patient interactions are really necessary to sort this out. While there are no such data sets among those commonly used by economists, it may still be possible to examine this behavior. There is a body of research which examines physician-patient interactions done by physicians, anthropologists, sociologists, and communications researchers. There very well may be extant data sets gathered for these sorts of studies which would shed some light on the problem. Alternatively, it also may be possible for economists to collaborate on such studies and design data collection activities which would make it possible to test hypotheses. Perhaps most importantly, further work on the theory of games of persuasion, with an eye toward the institutions in this particular market, could generate hypotheses which would allow us to test for the existence and importance of opportunistic

diagnosis and advice by physicians.

4.2 Physician-Insurer Agency Problems

As I mentioned previously, the major factor which seems to separate the market for physician services from other markets for experts' services is the presence of third-party insurance, both private and public.[40] In spite of the importance of insurance coverage in this market, many of the papers which model the physician-patient agency problem do not consider the impact of insurance. Insurance effects the physician-patient agency relationship through its effect on consumer demand. This weakens patients' incentives to constrain physicians' opportunistic behavior. Physicians may provide services to patients for which the patients' private costs are less than the patients' benefits, but for which the total of their costs and insurers' costs exceed the benefits.[41] Consequently, services provided which fit this description are simply another form of moral hazard. Insurers have attempted to limit this behavior by patient cost-sharing. However, increases in patient cost-sharing also increase the risk they bear. Taking this as given, there is an agency relationship between the insurer and the physician. The question here is whether there is some scope for insurers to improve matters, and if so, what the optimal contract(s) might look like. Many papers have considered physician response to the form of the compensation contract, generally focusing on fee-for-service versus capitation reimbursement (see Newhouse, 1992 and Ellis and McGuire, 1993 for reviews).[42] Some papers which have considered this problem with a single insurer are Ellis and McGuire (1990), Selden (1990), and Blomqvist (1991).

Ellis and McGuire (1990) consider a model of bargaining between patient and physician.

There is no asymmetric information between the patient and physician, although physicians are modeled as patients' agents by placing a weight on the patient's preferences a part of their own utility. Patient-physician pairs are assumed fixed, so market equilibrium is not considered. The major finding is that an optimal payment for health care will lead to conflict between patient and physician. Insurance for the patient carries with it moral hazard. The optimal payment for the physician will lead him to provide less than the patient's insured demand, hence the conflict. They also find that supply-side policies are optimal for controlling costs and that cost-based reimbursement to providers is never optimal.

Selden (1990) derives the third party payer's optimal provider reimbursement where treatment may be influenced by the provider. The optimal payment system is a mix of capitation (per-patient fixed payment) and cost-based reimbursement. Here also there is no explicit modeling of the patient-physician agency relationship nor of the insurer-physician agency relationship. The agency problem which is modeled is between insurer and patient. Quantity is determined by a function which has the patient's and physician's objective functions as arguments. There is no treatment of equilibrium in any of the markets.

Blomqvist (1991) considers a problem in which the patient knows whether they are ill or not, but they do not know the exact nature of the illness. Physicians can observe the exact nature of the illness, and insurers cannot even observe if the patient is actually ill. Under a fee-for-service payment contract from the insurer, the physician will always have an incentive to supply too much. If patients pay only a small fraction of the cost, they do not necessarily act as a sufficient check on this behavior. There is a welfare loss due to this opportunistic behavior which is essentially a welfare loss due to moral hazard. If physicians would reveal the true

nature of the patients' illness to the insurer, then it would be possible to write contingent contracts against the state of health (e.g., these could take the form of indemnity insurance in which the insured is paid a prespecified dollar amount for each state of nature). However, these first-best contracts are not possible, since patients and physicians always have an incentive to misrepresent the patient's state of health as worse than it truly is. Blomqvist assumes that HMO type contracts in which doctors are employees of the insurer solve the physician-insurer agency problem, but the patient-physician problem remains. However, physician behavior is not explicitly modeled nor is it shown that the strategies analyzed are a best response.

These papers all focus on optimal payment methods for health providers. They do not, however, explicitly model agency problems between the insurer and physician nor between the patient and physician. Neither do they consider market equilibrium.

Certainly other theoretical approaches to this problem should yield important insights. It is important to emphasize the problem of asymmetric information in contracting. The optimal contracting literature (Hart and Holmstrom, 1987) suggests it should be possible for insurers to write better contracts with physicians than pure reimbursement insurance. This agency approach applies both to private and public insurers. The vast bulk of papers which consider optimal public payments to health care providers do so under conditions of certainty. Some very important insights have been obtained with this approach, but it is important to remember that public payers face the same problems of asymmetric information as do private payers. The next step is considering public payment as an agency relationship between regulator and firm (Laffont and Tirole, 1993; Spulber, 1989).

Gal-Or (1993) is a recent paper which uses contracting theory to analyze the agency

relationship between an insurer and provider. She shows that the optimal contract will be a combination of a fixed rate and a share of costs. Further, the levels of the fixed rate and cost share will vary with the reported severity of a case. In order to induce truthful reporting of severity by providers it is necessary that the fixed rate be a non-increasing function of reported severity and that the cost share be a non-decreasing function of severity. Insurers' objective functions are a weighted sum of consumers' and providers' surpluses. When consumers' welfare is more important the provider will optimally be reimbursed a larger share of costs, and vice versa. If cost sharing is not employed (e.g., capitation reimbursement), the threat of losses from malpractice can improve outcomes, but will in general be inferior to a combination of cost sharing and a fixed rate. Competition in the insurance and provider markets is not modeled explicitly.

Considering the agency problem between physicians and insurers in a market equilibrium model may lead to important results. Consider contracting between physicians and insurers in markets with multiple insurers. Suppose there exists an optimal contract between an insurer and a physician. Will this optimal contract be offered by insurers? If there are many insurers, competition for physicians may force insurers to offer more generous contracts which are non-optimal. This will be tempered by competition in the insurance market itself, as well as by competition in the market for physician services. There should be important differences across medical specialties. Presumably markets for general practitioners are more competitive than the markets for the services of pediatric oncologists. Analyzing this problem and providing scenarios under which optimal contracts will be written and under which they won't is an important agenda for research in this market. Further, empirical research can help to determine

whether these hypotheses are correct. In markets with many insurers, such as California, has competition forced efficient contracting, or led to inefficiency? Another issue associated with multiple insurers is physician response to each payer when there are multiple payers. Obviously relative prices across payers matter (see McGuire and Pauly, 1991).

However, there is an additional issue associated with optimal contracting with multiple insurers. Many insurers report that physician response to incentives is weak or nonexistent because they don't command a large enough proportion of the physician's caseload. What this may suggest is that as the diversity of insurance plans in a physician's patient population increases, the cost to the physician of determining each patient's insurer and the incentives in that contract prior to diagnosis or treatment may be too high. Given the tremendous advances in information technology, it seems hard to believe that these information costs are particularly large for any computerized physician's office. Further, it should be the practices with the largest, most diverse (in terms of insurance contracts) patient populations for which computerization is most useful, if the incentives in insurers' contracts are strong enough to be important. I know of no research on this topic, theoretical or empirical. Since the evidence is anecdotal, some careful systematic empirical research is necessary to first establish whether there is convincing evidence of the existence of this phenomenon. If this phenomenon exists, theoretical explorations into the form of optimal contracts in this situation would be useful.

The approach taken by Ellis and McGuire (1990) strikes me as the right one, however. Ellis and McGuire consider all the relevant exchanges, between consumer and insurer, consumer and physician, and physician and insurer. The "true" market is a market for contingent claims (Arrow, 1963), and these exchanges are components of that market.[43] Thus agency relations

in all these exchanges have to be considered simultaneously in order to determine the optimal contract. A complete theory should thus model agency in all of these exchanges and equilibrium in the physician services and insurance markets. This is undoubtedly a difficult problem, but may very well yield important new insights. Considering dynamic aspects of the relationship between physicians and insurers may also be important. Insurers presumably learn about physician behavior over time. They also observe the behavior of other physicians. Trigger strategies may be available which would punish a physician when some aspect(s) of his claims deviate by too much from some standard. The "double agency" problem proposed by Blomqvist could be considered as a problem of common agency (Bernheim and Whinston, 1986).

Certainly there are strategic aspects to the problem as well. Groups of physicians may contract with insurers collectively as a way to increase market power. This case of provider organized PPOs (preferred provider organizations) has been extensively discussed (see Leffler, 1983; Dranove, Satterthwaite, and Sindelar, 1986; Frech, 1986). Leffler (1983) discusses a case in which such a contract can be anticompetitive in the context of the *Maricopa* case in which physicians agreed to a price ceiling. Greaney and Sindelar (1987) discuss how such contracts may provide opportunities for anticompetitive behavior. Vistnes (1992) formally models such contracts using the concept of network goods. He finds that these associations can increase the market power of the firms in them. Pauly (1988) considers the effects of insurer market power on the medical care market. He shows that insurers with market power can enforce prices to providers which are welfare reducing. This is true for both private and public insurers.

It seems as if a tightening of the demand constraint in the insurance market has prompted the growth of institutions designed to correct physician-insurer agency problems. There has been

a tremendous amount of change in the institutions in this area over the last few years, so that relations between physicians and insurers have changed in a very fundamental way. Prepaid health plans have been increasing, and traditional reimbursement insurance is on the wane. While at one time, almost all prepaid health plans integrated the insurance and production of health services functions, that is no longer true. The dominant model is now one in which health plans contract with physicians or groups of physicians for services. Most physicians contract with multiple health plans and treat patients with reimbursement insurance. Further, the President's plan for health care reform calls for the formation of large health plans which contract with physicians for services.

Nonetheless, at this point very little is known about the contracting between physicians and health plans. The rapid change and tremendous variation in the institutions should offer excellent opportunities for empirical work on the economics of contracting. Why have health plans by and large stopped "making" physician services and "buying" them? What forms of contract are written between health plans and physician firms, and under what circumstances? Are there strategic aspects to this contracting? An interesting question is what the role of entry is in the insurance market. If physicians divide their activities between many insurers does it make it more difficult for insurers to gather information about physicians? Does this make physicians less responsive to any one insurer's incentives? Does entry reduce the ability of any one insurer to punish physicians? Unfortunately, the reason we know so little is that at present there are no readily available data sets on the existence or form of these contracts. I think that here some data gathering is called for. Given the tremendous data requirements of insurers, much of this information should be available in their own internal databases. Obtaining access

to such databases may not be easy, but should be possible.

4.3 Agency Problems within the Physician Firm

At present, over 50% of American physicians actively engaged in patient care are members of medical group practices. Further, that proportion has been growing over time. The vast bulk of models of the physician firm suppose that it consists of a single physician entrepreneur. Agency problems exist within any organization (Holmstrom, 1982), thus the behavior of physicians in groups will differ from that of the single entrepreneur. Consequently, models which ignore the internal structure of the physician firm may not accurately represent behavior.

Further, physician (and other professional) firms differ in a fundamental way from most other firms, however, in that the important capital is human, not physical. This has several implication. First, risks to human capital can not generally be diversified through the market. This suggests that the structure of these organizations may be determined in part by the desire to diversify risks to physicians' human capital. Gaynor and Gertler (1993) show that compensation contracts within physician groups trade off moral hazard for risk spreading. Physicians in more risk averse groups adopt compensation contracts with more revenue sharing, such that the most risk averse sacrifice approximately 10 percent in income relative to the least risk averse.[44]

Second, reputation, both firm and physician-specific, is potentially very important in this market. This has been discussed in a few papers. Getzen (1984) argues that groups are optimal institutional responses to the importance of reputation in the market, due to what he terms

"reputational economies of scale". It is not clear exactly what is meant by this term in an operative sense. It might mean economies of scale in the technology of monitoring, say, but that would only explain larger versus smaller groups, not group versus solo practice. Gaynor and Salant (1993) show that efficient outcomes are harder to sustain in groups when reputation is important. Reputation is modelled as an investment determined by lagged collective group effort. This simply increases the possibilities for free-riding and thus makes cooperation more difficult to implement. They do not consider monitoring, however. The difference in the results between Gaynor and Salant and Getzen is due to modelling different aspects of reputation. The truth may lie somewhere in between. Groups likely exist for reasons other than reputation, but reputation may play an important role in determining group size and structure. Most of the recent growth in physician groups is in small and large groups (Marder and Zuckerman, 1989). This could be due to the technology of monitoring. In small groups, monitoring is informal and inexpensive. If there are fixed costs to monitoring (e.g., cost of a manager, information system, etc.), then there may be a critical group size necessary to cover these fixed costs. Thus, small groups and groups of at least the critical size would be the most viable.

Finally, the importance of reputation and the interaction of firm-specific and individual-specific human capital creates the possibility of potentially severe hold-up problems. Groups want physicians to invest in firm specific human capital. A large part of this is investing in reputation. New physicians invest in reputations. While they are investing, their earnings are relatively low if they rely solely on their own reputation. Thus group practices or HMOs are attractive, since there are firm reputations which have some public good aspects to them for those who work there. A group practice will share its reputation with a new physician but must

provide the new physician with incentives to invest in the group's reputation. The firm has to credibly demonstrate they won't exploit the new physician. Groups typically have a waiting period of 2 to 4 years before a new physician can be considered for ownership. This is similar to an associate position in a law firm. As has been shown elsewhere (Malcolmson, 1984; Gilson and Mnookin, 1989) up-or-out contracts are an incentive-compatible means of inducing junior members of the group to post a performance bond in the form of compensation deferred until after being admitted to ownership. The firm commits not to hold-up the juror member by making promotion at a fixed point in time necessary to remain in the firm. However, it is not clear that the time period is long enough, or that enough junior members are denied promotion for this arrangement to be effective. Alternatively, investments in human capital may be more general than firm-specific, and occur prior to employment (internships and residences), consequently investments in firm-specific human capital may not be particularly important in medicine.

The flip side of the problem occurs for the group when the new physician is established. The physician's reputation is now much more specific to him than to the firm, so the firm must devise a way to keep him from leaving and moving to solo practice. It seems that it is crucial that the firm own the rights to the patient lists of all the physicians in the group (see Grossman and Hart, 1986), i.e., the physician is not entitled to take his patients with him if he leaves. The issue seems less critical for HMOs, because consumers are tied to the physicians employed by the HMO, thus a physician can not practically take his patients with him if he leaves. It seems as if monitoring could solve the firm's problem of getting physicians to behave as desired and eliminate the potential for exploitation, but it wouldn't solve the problem of physicians leaving

and taking their patients with them when they become established. There may be a compensation contract which could solve this problem, however. Let physicians' shares increase with their reputations (roughly, with time). The group need only pay them what they could earn on their own minus the value of the advantages of being in the group (sharing fixed costs, risk spreading, smoothing work schedules, the value of the group's reputation). I think this implies that shares should increase with age and perhaps that specialists should have greater shares than GPs (although internal transfer pricing for referrals could affect this). If there is no holdup problem in HMOs, then there is no reason that HMO compensation contracts should look like those for medical group practices. The optimal forms of contracts when there is a potential hold-up problem have been studied extensively (MacLeod and Malcomson, 1993; Rogerson, 1992; Grossman and Hart 1986). The form of the efficient contract hinges on the nature of relationship-specific investment among the parties, among other factors. Extension of these models to cover the institutional details of medical group practices and econometric testing of the resulting hypotheses may be a good way to empirically test the implications of these theories.

This may also be a fertile laboratory for empirical analysis of other issues in the economics of the firm. Medical group practices are typically relatively simple organizations. They tend to be very horizontal in structure, and not particularly large relative to corporations. In a typical medical group practice there is some sharing of revenues and costs. In addition, decisions about pricing and the hiring of inputs are made collectively (Held and Reinhardt, 1979; Kralewski et al. 1985). There also may be internal referrals among doctors within the group. Thus an individual's actions affects the collectivity through the profit-sharing scheme and possibly through referrals. The collectivity affects the individual through pricing and input

decisions. Nonetheless, there is a great deal of variation in the internal organization of these firms. Some share income equally, some allocate it on a pure productivity basis, some are small and some are large, some have extensive internal controls and monitoring, some have none, some have a hierarchical structure while others are completely horizontal. Some research has been done on the economics of these organizations.

Gaynor (1989) specifies and tests a theory of competition within the firm. He shows that pure productivity compensation may lead to excessive competition within the firm if physicians compete with each other over patients. It has been shown that physicians respond to financial incentives (Hillman, Pauly, and Kerstein, 1989; Gaynor and Pauly, 1990), compensation contracts trade off incentives for risk spreading (Gaynor and Gertler, 1993), and internal controls are adopted to reduce opportunism (Lee, 1990). Gaynor and Salant (1993) show that optimal payoffs in a group with overlapping generations of members may involve paying older members more, even though their productivity is lower than younger members. This is necessary in order to provide younger workers with an incentive to provide optimal effort and to punish those who don't. Nonetheless, data on medical group practices could be used to address many more issues in the economics of organizations, such as the adoption of monitoring versus incentives, hierarchical versus horizontal structures. Further, alternative modelling approaches could be employed, such as taking account of the repeated interactions of physicians in the group (Gaynor and Salant, 1993). These may yield testably different implications than previous theoretical analyses.

5. Summary, Recommendations for Future Research, and Policy Implications

5.1 Summary

This paper has reviewed the literature and considered current issues in the market for physician services. What is bought and sold is not only a service, but advice on which service to use and how much of it to buy. Given that, agency issues are clearly paramount. Games of persuasion seem the natural tool for modelling physician-patient interactions. In particular, Wolinsky (1993) has modelled such a game in a market equilibrium context. However, there is not convincing empirical evidence that a great deal of successful persuasion by physicians is occurring, in the sense of patients purchasing more than is optimal, given the prices they face under insurance.

Since patients do not pay for most of what they consume, the more relevant relationship may be between the insurer and physician. Existing models which consider optimal insurer payments to physicians do not incorporate asymmetric information between the insurer and physician, nor do they consider market equilibrium. A complete model would consider all the exchanges which comprise a market for contingent claims. This involves agency relations between consumers and insurers, patients and physicians, and physicians and insurers. Which forms of contracts emerge will depend on competition in all of these markets. For example, if the market for insurance is very competitive, this could force insurers to write contracts with physicians which optimally constrain their opportunistic behavior. Alternatively, if there are relatively few physicians, then efficient contracts with physicians might not emerge even in competitive insurance markets.

Agency problems are also present within physician firms. The importance of human

capital and reputation may make these problems more pervasive than in other markets. Since risks to human capital cannot be diversified through the market, one function of the physician firm is to spread this risk. Medical groups also face potentially severe holdup problems because of the importance of human capital and reputation. In addition, since medical groups are particularly simple firms, they provide a fertile ground for testing hypotheses from theories of the firm.

5.2 Recommendations for Future Research

It is clear that the most relevant issues in the market for physician services revolve around information and agency. I see future research in the following areas as being particularly interesting and useful.

1) Modelling the joint agency problems of the patient with the physician and the insurer with the physician. This is a fascinating and difficult problem, and will undoubtedly take considerable ingenuity,

2) Modelling the contracting between health plans and physicians, particularly examining strategic considerations on the part of both physicians and health plans,

3) Data gathering and empirical research on contracting between health plans and insurers. This is an area in which virtually nothing is known, but these contracts seem as if they will come to characterize the structure of this market. Further, data on these contracts and the behavior of physicians may provide excellent opportunities to test hypotheses regarding the internal organization of the firm,

4) Empirical research on the internal organization of medical group practices. The market for

physician services cannot be analyzed without taking account of the presence of medical group practices, and their internal organization has striking effects on the behavior of their members. Again, empirical examination of these simple firms may be a particularly fertile ground in which to examine hypotheses on the economics of the firm.

5.3 Policy Implications

Unlike markets traditionally studied by industrial organization economists, market failure in the physician services market derives not from anticompetitive behavior, but from the structure of information between buyers and sellers. The implications of this paper are that agency problems between insurers and physicians are likely to have the most impact on the market. After long decades of quietude, health insurers are actively trying to control physicians' behavior. PPOs seek out price discounts, HMOs and IPAs utilize financial incentives, and most health plans utilize various controls such as prior authorization for procedures, utilization review, etc., which are collectively referred to as "managed care." Research on optimal contracting between insurers and physicians could provide a very useful input into this process.

The Clinton health care reform proposal is built around the notion of "managed competition," in which health insurance purchasing cooperatives ("Health Alliances") contract with private health insurers. Consumers will be offered a financial incentive to choose health plans (HMOs, IPAs) rather than fee-for-service insurers, although each Health Alliance must offer at least one fee-for-service option. Premiums will be capped at a maximum for a basic set of benefits. Health plans will be required to report uniform information on utilization, costs, and health outcomes to the Health Alliances, which will be available to consumers to compare

the various health plans. President Clinton has proposed price controls if the rate of health care cost inflation has not fallen to the rate of increase in the CPI by a certain date.

At this juncture managed competition appears to be envisioned as embodied in health plans utilizing capitation contracts on salaries combined with managed care controls. Physicians would be allowed to contract with any number of health plans, although the Congressional Budget Office is considering advising that physicians be restricted to contracting with a single health plan. As reviewed in Section 4.2, pure capitation, or fixed contracts, are never optimal. Further, not only is it far from clear whether restricting contracting is welfare improving or decreasing, the welfare optimal prescription will likely be different across specialties and across geographic markets within the same specialty. The premium cap could have the impact of forcing insurers to adopt methods to constrain physicians' behavior, although it is not clear that insurers are not under competitive pressure to do so currently. Price controls, if enacted, could have very undesirable impacts. As Glazer and McGuire (1993) point out, restricting physicians' abilities to set fees may lead to welfare reducing decreases in quality. Further, government is faced with the same asymmetric information problem in controlling physicians that insurers are. It is not clear that there are gains from direct public involvement.

A widely proposed alternative to the Clinton Administration's managed competition scenario is a "single payer" system, in which the insurance market is supplanted by a single payer, either the government or a large private insurer, as in Canada. As discussed in Section 4.2, this type of scheme may have merits if competition in the insurance market causes efficient contracts to fail to be offered, or if the information costs to physicians of processing multiple insurers' incentives are too high. A single payer system will not result in efficiency gains if

competition forces insurers to be efficient. Research on the relations between insurers and physicians in local markets with differing structures would be very useful in informing the policy debate on this issue.

Last, regardless of the system, it is important to remember that government is faced with the same asymmetric information problem in controlling physicians that private insurers are. Unless there is some advantage on the part of government in collecting information, or unless competition in the insurance market causes contractual failure, it is not clear that the market failures discussed in this paper are pareto-relevant, that is, that actions taken by a party(ies) external to the market will result in an increase in social welfare. The rate of increase in Federal expenditures on physician services (129%) relative to private physician expenditures (105%) over the last decade (1980-1990) does not seem to indicate any special advantage on the part of the federal government in addressing these issues.[45]

NOTES

1. These are in 1990 dollars. Adjustments were made using the all-items CPI.

2.Note that the categories are not mutually exclusive.

3. Starr (1982) traces the history of the process by which physicians eliminated or greatly curtailed competition from other kinds of health care practitioners. Shaked and Sutton (1981) show that granting monopolistic power to self-regulating is likely to be welfare reducing, and allowing entry of rival para-professions will definitely increase social welfare. Interestingly enough, recent evidence indicates that consumers are once again spending a significant amount on non-physician health care providers (Eisenberg et al., 1993). I am restricting my attention purely to the market for physician services.

4. There was some trenchant criticism of Friedman and Kuznets's calculations at the time. See Lewis (1963) and Hansen (1964).

5. It seems hard to believe that there are barriers to entry to medicine which effectively raise the incomes of physicians generally. Indeed, admission rates to medical schools increased over the decade of the 1980s, indicating, if anything, that barriers were lower. Where there may be effective barriers to entry are into some of the specialties, where the specialty societies seem to have effectively limited the number of medical school graduates admitted to residencies.

6. It is also possible that these were markets in disequilibrium, with supply lagging behind increases in demand.

7. This may not be true if information about prices is costly to obtain. Consumers may choose (optimally) to search very little, thereby bestowing market power upon the physician as seller. See Phelps (1992, pp. 193-204), Newhouse and Sloan (1972), Cantwell (1981), Marquis (1985), Pauly and Satterthwaite (1981), White-Means (1989), Haas-Wilson (1990), and Gaynor and Polachek (1994) for empirical evidence on this topic. I will discuss consumer search, particularly as the presence of insurance bears upon it, more extensively in Section 3.1.3.

8. The links between the market for medical education, the market for physicians, and the market for physician services are not made explicit.

9. For some other examinations of price discrimination see Ruffin and Leigh (1973), Masson and Wu (1974), Hoerger (1989), and Lachs, Sindelar, and Horwitz (1990). Ruffin and Leigh find charity as motivation for price discrimination to be consistent with their data. Lachs, Sindelar, and Horwitz do not. Hoerger finds empirical evidence of price discrimination between new and established patients consistent with the profit maximizing exercise of market power.

10. Prior to 1975 there seemed to be an implicit antitrust exemption for the learned professions. There was very little application of antitrust principles to the profession of medicine, or to other professions.

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11. This is not to imply that anticompetitive or collusive behavior by physicians or physicians and hospitals is not of concern (see Horoschak, 1992).

12. Nitzan and Tsur (1989) show that professional codes of ethics which ban advertising can actually improve quality and may increase or decrease welfare. McGuire (1983) shows that if patients judge physicians purely by experience, then all physicians will gain by the suppression of information, regardless of whether they are high quality or incompetent.

13. These papers differ in the data used, the presence of controls for quality, and econometric methods.

14. There were two groups of consumers in this study: Medicare beneficiaries and state employees, both of whom have very generous insurance coverage.

15. An alternative is that this is a byproduct of government regulation. In 1983 Medicare adopted a method of paying for hospital services via a system of fixed (roughly) prices for diagnosis-related groups (DRGs), the Prospective Payment System (PPS). In the aftermath of this change in reimbursement policy, many services which had previously been produced on an inpatient basis were now produced in outpatient settings. This may have led to windfall rents for physicians.

16. I only consider here moral hazard, i.e., what Arrow (1985) terms "hidden actions," not adverse selection, or "hidden types."

17. Arrow (1963) is probably the first to discuss the health care market in this way. See also Dranove and White (1987).

18. I will take the relationship between the insurer and the insured as given.

19. Marder and Thran report that the percentage of nonfederal patient care physicians in non-solo settings stood at 61.5 percent in 1988, and had grown from 54.4 percent in 1982.

20. These problems are essentially those encountered in all professional firms, e.g., law, accounting, consulting, architecture, not just in medicine.

21. Strictly speaking, this is true of tangible products as well. Steel of a certain grade produced at the same foundry varies between runs. No two cars are identical, even if they are produced on the same assembly line by the same workers. Even simple tap water varies in its composition. This is simply the nature of the physical world. Regardless, it is commonly agreed that services are inherently more heterogeneous than manufactured or mined goods.

22. It would probably be more accurate to say that it is preference heterogeneity which is critical, since this should call forth heterogeneity in production by producers. This is especially likely to be true for services, since the cost of altering the product to suit the customer (e.g.,

a barber chatting more with his garrulous customers and less with his laconic ones) is likely to be low.

23. Over 88 percent of all physicians were located in metropolitan areas in 1989 (Roback et al., 1990).

24. There are undoubtedly some patients who self-diagnose, but there are very few physicians who will simply respond to a request for treatment without any diagnosis. Further, there are some services, such as a check-up or physical, which are not preceded by a diagnosis, but their purpose is to provide information for diagnosis and advice. In any event, such services constitute a minority of a physician's practice.

25. Satterthwaite (1979, 1985) and Pauly and Satterthwaite (1981) document this behavior.

26. Hoerger (1990) documents this. He also presents evidence consistent with price discrimination between new and established patients.

27. Satterthwaite (1979), Pauly and Satterthwaite (1981), Satterthwaite (1985), and Dranove and Satterthwaite (1992) have extensively explored the effects of this type of uncertainty on equilibrium in this market.

28. Telser (1978, Chapter 8) explores equilibrium price distributions in markets where both buyers and sellers and imperfectly informed.

29. The evidence from Hibbard and Weeks is consistent with this conjecture.

30. He assumes a homogeneous product. It is not clear what impact introducing product heterogeneity might have on the results. The papers which consider patient search with a heterogeneous product, e.g., Dranove and Satterthwaite (1992), do not consider the effects of insurance.

31. Nonetheless, the evidence from McCarthy (1985) indicates that demand is quite elastic.

32. See e.g., Darby and Karni (1972), Milgrom (1981), Wolinsky (1993), Plott and Wilde (1980), Crawford and Sobel (1980), Pitchik and Schotter (1987), Green and Stokey (1981), Nitzan and Tsur (1991) generally, and Pauly (1980), Dranove (1988), and Glazer and McGuire (1991) for discussions of this in health care.

33. A recent paper by Frank, Ma, McGuire, and Salkever (1993) analyzes the case where the accuracy of the diagnosis is increasing in physician effort. Physician effort is noncontractible, and this noncontractibility causes physicians to shirk and undersupply effort.

34. See Sloan and Feldman (1978) and Feldman and Sloan (1988) for reviews of this material.

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35. See McGuire and Pauly (1991) for a trenchant criticism of the target income model. They point out that the target income model is simply a standard model in which income effects are extremely strong.

36. Arrow (1963) discusses the role that professional ethics play in limiting opportunistic behavior by physicians.

37. There are of course many other important models of the physician-patient relationship. I confine myself, however, to those which explicitly consider the agency aspects of that relationship. Agency problems between physicians and insurers/payers are considered in the next section.

38. Dranove discusses issues such as entry and consumer search in Section VI.

39. Glazer and McGuire (1991) is a closely related paper which considers the question of appropriate referrals in such markets.

40. There is some insurance in some other markets, e.g., autobody repair, but it is by no means as dominant as in health care.

41. If insurers earn zero profits, then this corresponds to social costs.

42. Some papers have examined physician response to insurance companies' reimbursement policies (Sloan, 1982, Lee, 1989).

43. In this sense the analysis should not be confined to physicians, but all sellers of health care services from whom consumer might purchase when an event of illness occurs.

44. These findings are corroborated by Gordon and Lang (1993) for legal firms.

45. These rates are unadjusted for differential composition, e.g., age, or compositional ages, changes, e.g., the large increases in Medicaid enrollments in the 1980s.

References

Arrow, Kenneth J., 1963, "Uncertainty and the Welfare Economics of Medical Care, *"American Economic Review,* 53, 5, 941-973.

Arrow, Kenneth J., 1985, "The Economics of Agency," in *Principals and Agents*, John Pratt and Richard J. Zeckhauser, eds., Cambridge: Harvard Business School.

Benham, Lee, 1972, "The Effect of Advertising on the Price of Eyeglasses," *Journal of Law and Economics*, 15,2, 337-352.

Bernheim, B. Douglas and Michael D. Whinston, 1986, "Common Agency," *Econometrica*, July, 54,4, 923-942.

Blomqvist, Åke, 1991, "The Doctor as Double Agent: Information Asymmetry, Health Insurance, and Medical Care," *Journal of Health Economics*, 10,4, 411-432.

Burstein, Philip L. and Jerry Cromwell, 1985, "Relative Incomes and Rates of Return for U.S. Physicians," *Journal of Health Economics,* 4, 63-78.

Cantwell, James R., 1981, "Copayments and Consumer Search: Increasing Competition in Medicare and Other Insured Medical Markets," *Health Care Financing Review*, December, 3,2, 67-76.

Costilo, L. Barry, 1985, "Anti-Trust Enforcement in Health Care: Ten Years After the AMA Suit," *New England Journal of Medicine*, October 3, 313,14, 901-904.

Darby, Michael R. and Edi Karni, 1973, "Free Competition and the Optimal Amount of Fraud," *Journal of Law and Economics*, 16, 67-88.

Dionne, Georges, 1984, "Search and Insurance," *International Economic Review*, June, 25,2, 357-367.

Dranove, David and Mark A. Satterthwaite, 1992, "Monopolistic Competition when Price and Quality are Not Perfectly Observable," *Rand Journal of Economics,* 23, 4, 518-534.

Dranove, David and Paul Wehner, 1993, "Physician-Induced Demand for Childbirths," unpublished manuscript, Evanston: Department of Management and Strategy, Kellogg Graduate School of Management, Northwestern University, July.

Dranove, David and William D. White, 1987, "Agency and the Organization of Health Care Delivery," *Inquiry*, Winter, 24,4, 405-415.

Eisenberg, David M., Kessler, Ronald C., Foster, Cindy, Norlock, Frances E., Calkins, David R., and Thomas L. Delbanco, 1993, "Unconventional Medicine in the United States: Prevalence, Costs, and Patterns of Use," *New England Journal of Medicine,* January 28, 328,4, 246-252.

Ellis, Randall P. and Thomas G. McGuire 1993, "Supply-Side and Demand-Side Cost Sharing in Health Care," *Journal of Economic Perspectives*, Fall, 7, 4, 135-151.

Ellis, Randall P. and Thomas G. McGuire, 1990, "Optimal Payment Systems for Health Services," *Journal of Health Economics*, December, 9, 4, 375-396.

Evans, Robert A., 1974, "Supplier-Induced Demand: Some Empirical Evidence and Implications," in *The Economics of Health and Medical Care*, Mark Perlman, ed., London: MacMillan.

Feldman, Roger and James Begun, 1978, "The Effects of Advertising Restrictions: Lessons from Optometry," *Journal of Human Resources*, 13, Supplement, 247-262.

Feldman, Roger and Frank Sloan, 1988, "Competition Among Physicians, Revisited," *Journal of Health Politics, Policy and Law,* Summer 13, 2, 239-261.

Frank, Richard G., Ma, Ching-to Albert, McGuire, Thomas G., and David S. Salkever, 1993, "Demand Response, Physician Behavior, and Design of Optimal Health Insurance," unpublished manuscript, Baltimore: Johns Hopkins University, June 1.

Frech, H.E. III, 1986, "Preferred Provider Organizations and Health Care Competition," in *Private and Public Health Insurance: Research and Policy*, H.E. Frech III, ed., Cambridge, MA: Ballinger Publishing Co.

Friedman, Milton, 1962, *Capitalism and Freedom,* Chicago: University of Chicago Press.

Friedman, Milton and Simon Kuznets, 1954, *Income From Independent Professional Practice,* New York: National Bureau of Economic Research.

Fuchs, Victor R., 1978, "The Supply of Surgeons and the Demand for Operations," *Journal of Human Resources,* 13 (Supplement), 35-56.

Fuchs, Victor R. and Marcia Kramer, 1972, "Determinants of Expenditures for Physicians' Services in the United States 1948-1968," Washington, D.C.: National Center for Health Services Research.

Gal-Or, Esther, 1993, "Asymmetry of Information and Optimal Reimbursement Rules in Health Care Markets," unpublished manuscript, Pittsburgh: University of Pittsburgh.

Gaynor, Martin, 1989, "Competition Within the Firm: Theory Plus Some Evidence from Medical Group Practice," *Rand Journal of Economics*, Spring, 29,1, 59-76.

Gaynor, Martin and Mark V. Pauly, 1990, "Compensation and Productivity in Partnerships: Evidence From Medical Group Practice," *Journal of Political Economy*, 90.

Gaynor, Martin and Paul J. Gertler, 1993, "Moral Hazard and Risk Spreading in Medical Partnerships," unpublished manuscript, Baltimore: Johns Hopkins University.

Gaynor, Martin and David S. Salant, 1993, "Overlapping Generations and the Internal Organization of Medical Groups," unpublished manuscript, Baltimore: Johns Hopkins University.

Gaynor, Martin and Solomon W. Polachek, 1994, "Measuring Information in the Market: An Application to the Market for Physician Services," *Southern Economic Journal,* April, 60, 4, Forthcoming.

Gaynor, Martin and John Mullahy, 1993, "Advertising and the Distribution of Prices: More Evidence from Optometry," unpublished manuscript, Baltimore: Johns Hopkins University.

Gaynor, Martin, 1989, "Competition Within the Firm: Theory Plus Some Evidence from Medical Group Practice," *Rand Journal of Economics*, Spring, 20, 1, 59-76.

Getzen, Thomas E., 1984, "A 'Brand Name' Theory of Medical Group Practice," *Journal of Industrial Economics,* 33, 199-215.

Gilson, Ronald and Robert Minookin, 1989, "Coming of Age in a Corporate Law Firm" *Stanford Law Review,* 412, 567-595.

Gilson, Ronald and Robert Mnookin, 1989, "Coming of Age in a Corporate Law Firm: The Economics of Associate Career Patterns," *Stanford Law Review*, 41, 567-595.

Glazer, Jacob and Thomas G. McGuire, 1993, "Should Physicians be Permitted to 'Balance Bill' Patients?" *Journal of Health Economics*, 12, 3, 239-258.

Glazer, Jacob and Thomas G. McGuire, 1992, "The Economics of Referrals," unpublished manuscript, Boston: Department of Economics, Boston University.

Gordon, Peter-John and Kevin Lang, 1993, "Partnerships as Insurance Devices," unpublished manuscript, Boston: Boston University.

Greaney, Thomas L. and Jody L. Sindelar, 1987, "The Anticompetitive Effects of Preferred Provider Organizations," *Inquiry*, Winter, 24,4, 384-391.

Green, Jerry and Nancy Stokey, 1980, "A Two-Person Game of Information Transmission," HIER Discussion Paper 751, Cambridge, MA: Harvard University, March.

Grossman, Sanford J. and Oliver D. Hart, 1986, "The Costs and Benefits of Ownership: A Theory of Vertical and Lateral Integration," *Journal of Political Economy*, August, 94, 4, 691-719.

Haas-Wilson, Deborah, 1986, "The Effect of Commercial Practice Restrictions: The Case of Optometry," *Journal of Law and Economics*, 29,1, 165-186.

Haas-Wilson, Deborah, 1990, "Consumer Information and Providers' Reputations," *Journal of Health Economics,* November, 999,3, 321-333.

Hansen, W. Lee, 1964, "'Shortages' and Investments in Health Manpower," in *The Economics of Health and Medical Care,* ed. S.J. Axelrod, Ann Arbor: The University of Michigan Press.

Hart, Oliver and Bengt Holmström, 1987, "The Theory of Contracts," in *Advances in Economic Theory, Fifth World Congress*, Truman Bewley, ed., Cambridge, UK: Cambridge University Press.

Havighurst, Clark C., 1980, "Anti-Trust Enforcement in the Medical Services Industry," *Milbank Memorial Fund Quarterly*, Winter, 58,1, 89-124.

Havighurst, Clark C., 1983, "The Contributions of Antitrust Law to a Procompetitive Health Policy," in Jack A. Meyer, ed., *Market Reforms in Health Care: Current Issues, New Directions, Strategic Decisions,* Washington, D.C.: American Enterprise Institute for Public Policy Research, 295-322.

Hay, Joel and Michael Leahy, 1982, "Physician-Induced Demand: An Empirical Analysis of the Information Gap," *Journal of Health Economics*, 3, 231-244.

Held, Philip J. and Uwe E. Reinhardt, 1979, *Analysis of Economic Performance in Medical Group Practices,* Project Report 79-05, Princeton, N.J.: Mathematica Policy Research, Inc.

Hibbard, Judith A. and Edwin Weeks, 1989, "Does the Dissemination of Comparative Data on Physician Fees affect Consumer Use of Services?," *Medical Care*, 27,12, 1167-1174.

Hickson, G.B., Altmeier, W.A., and J.M. Perrin, 1987, "Physician Reimbursement by Salary of Fee-For-Service: Effect on Physician Practice Behavior in a Randomized Prospective Study," *Pediatrics*, 80,3, 344-350.

Hoerger, Thomas J., 1989, "Two-Part Pricing and the Mark-Ups Charged by Primary Care Physicians for New and Established Patient Visits," *Journal of Health Economics,* February, 8,4, 399-417.

Holmström, Bengt and Jean Tirole, 1989, "The Theory of the Firm," in *Handbook of Industrial Organization, Volume 1*, Richard Schmalensee and Robert Willig, eds., Amsterdam: North-Holland.

Holmström, Bengt, 1982, "Moral Hazard in Teams," *Bell Journal of Economics*, 13, 324-340.

Holt, Charles and Roger Sherman, 1990, "Advertising and Product Quality in Posted-Offer Experiments," *Economic Inquiry*, 28,1, 39-56.

Horoschak, Mark J., 1992, "Antitrust and Health Care: Policy and Enforcement," prepared remarks before the Ohio CLE Institute, Columbus Ohio, November 6, Washington, D.C.: Federal Trade Commission.

Kenkel, Don, 1990, "Consumer Health Information and the Demand for Medical Care," *Review of Economics and Statistics,* November, 72, 4, 587-595.

Kessel, Reuben A., 1958, "Price Discrimination in Medicine," *Journal of Law and Economics,* 1, 2, 20-53.

Kessel, Reuben A., 1970, "The AMA and the Supply of Physicians," *Law and Contemporary Problems,* Spring.

Kralewski, John E., Pitt, Laura, and Deborah Shatin, 1985, "Structural Characteristics of Medical Group Practices," *Administrative Science Quarterly*, 30, 34-45.

Kwoka, John A., 1984, "Advertising and the Price and Quality of Optometric Services," *American Economic Review*, 74,1, 211-216.

Lachs, Mark S., Sindelar, Jody L., and Ralph I. Horwitz, 1990, "The Forgiveness of Coinsurance: Charity or Cheating?," *New England Journal of Medicine,* May 31, 322,22, 1599-1601.

Laffont, Jean-Jacques and Jean Tirle, 1993, *A Theory of Incentives in Procurement and Regulation,* Cambridge, MA: MIT Press.

Lee, Robert H., 1989, "Insurance and Medical List Prices," *Journal of Human Resources,* 24, 4, 689-708.

Lee, Robert H., 1990, "Monitoring Physicians: A Bargaining Model of Medical Group Practice," *Journal of Health Economics*, 9,4, 463-481.

Leffler, Keith B., 1978 "Physician Licensure: Competition and Monopoly in American Medicine," *Journal of Law and Economics,* 21, 1, 165-186.

Leffler, Keith B. and Cotton M. Lindsay, 1980, "Markets for Medical Care and Medical Education: an Integrated Long-Run Structural Approach," *Journal of Human Resources*, 16,1, 21-40.

Leffler, Keith B., 1983, "*Arizona V. Maricopa County Medical Society*: Maximum-Price Agreements in Markets with Insured Buyers," *Supreme Court Economic Review*, 2, 187-211.

Lerner, Arthur N., 1984, "Federal Trade Commission Anti-Trust Activities in the Health Care Services Field," *Antitrust Bulletin*, Summer, 29,2, 205-224.

Lewis, H. Gregg, 1963, *Unionism and Relative Wage Rates in the United States,* Chicago: University of Chicago Press.

Lindsay, Cotton M., 1973, "Real Returns to Medical Education," *Journal of Human Resources,* 8, 331-348.

MacLeod, W. Bentley, and James M. Malcolmson, 1993, "Investments, Holdup, and the Form of Market Contracts," *American Economic Review,* September, 83, 4, 811-837.

Malcolmson, James M., 1984, "Work Incentives, Hierarchy, and Internal Labor Markets," *Journal of Political Economy,* 92, 486-507.

Marder, William D. and Sarah L. Thran, "Medical Practice in the 1980s as Measured by the AMA Socioeconomic Monitoring System in 1988, *Socioeconomic Characteristics of Medical Practice in the U.S.*, Gonzalez, Martin and David Emmons, eds.,Chicago: American Medical Association.

Marder, William D. and Stephen Suckerman, 1985, "Competition and Medical Groups: A Survivor Analysis," *Journal of Health Economics,* 4, 167-176.

Marquis, M. Susan, 1985, "Cost Sharing and Provider Choice," *Journal of Health Economics*, 4, 137-157.

Masson, Robert T., and S. Wu, 1974, "Price Discrimination for Physicians' Services," *Journal of Human Resources,* 9, 63-79.

McCarthy, Thomas R., 1985, "The Competitive Nature of the Primary-Care Physician Services Market," *Journal of Health Economics,* 4, 2, 93-117, 1985.

McGuire, Thomas G., 1983, "Patients' Trust and the Quality of Physicians," *Economic Inquiry,* April, 21:203-222.

McGuire, Thomas G. and Mark V. Pauly, 1991, "Physician Response to Fee Changes with Multiple Payers," *Journal of Health Economics*, 10,4, 385-410.

Milgrom, Paul, 1981, "Good News and Bad News: Representation Theorems and Applications," *Bell Journal of Economics*, Autumn, 12,2, 380-391.

Mossner, Ernest C. and Ian S. Ross (eds.) 1987, *The Correspondence of Adam Smith,* Oxford: Clarendon, Second Edition, 1987.

Newhouse, Joseph P., 1992, "Pricing and Imperfections in the Medical Care Marketplace," in *Health Economics Worldwide*, H.E. Frech III and Peter Zweifel, eds., Dordrecht: Kluwer Academic Publishers.

Newhouse, Joseph P., 1978, "The Structure of Health Insurance and the Erosion of Competition in the Medical Marketplace," in *Competition in the Health Care Sector: Past, Present, and Future*, Lawrence Goldberg and Warren Greenberg, eds., Washington, D.C.: Federal Trade Commission.

Newhouse, Joseph P., Ware, John E., and Cathy A. Donald, 1981, "How Sophisticated Are Consumers About the Medical Care Delivery System," Medical Care, March, 19,3, 316-328.

Nitzan, Shmuel and Joseph Tzur, 1989, "Price and Quality of Professional Services and Codes of Ethics," *European Journal of Political Economy*, 5, 31-48.

Pauly, Mark V., 1980, *Doctors and Their Workshops,* Chicago: University of Chicago Press.

Pauly, Mark V. and Mark A. Satterthwaite, 1981, "The Pricing of Primary Care Physicians' Services: A Test of the Role of Consumer Information," *The Bell Journal of Economics,* 12, 2, Autumn, 488-526.

Pauly, Mark V., 1988, "Market and Power Monopsony, and Health Insurance Markets," *Journal of Health Economics,* 7, 2, 111-128.

Phelps, Charles E., 1992, *Health Economics,* New York: Harper Collins Publishers.

Pitchik, Carolyn and Andrew Schotter, 1987, "Honesty in a Model of Strategic Information Transmission," *American Economic Review*, December 77,5 1032-1036.

Plott, Charles R. and Louis L. Wilde, 1980, "Professional Diagnosis versus Self-Diagnosis: An Experimental Examination of Some Special Features of Markets with Uncertainty," Social Science Working Paper 269, Pasadena, CA: California Institute of Technology, September.

Rayack, Elton, 1967, *Professional Power and American Medicine: The Economics of the American Medical Association,* Cleveland: World Publishing Co.

Reinhardt, Uwe E., 1978, "Parkinson's Law and the Demand for Physician Services," in *Competition in the Health Care Sector: Past, Present, and Future*, Lawrence Goldberg and Warren Greenberg, eds., Washington, D.C.: Federal Trade Commission.

Rizzo, John A. and Richard J. Zeckhauser, 1990, "Advertising and Entry: the Case of Physician Services," *Journal of Political Economy*, 98,3 476-500.

Rizzo, John A. and Richard J. Zeckhauser, 1990, "Advertising and the Price, Quantity, and Quality of Primary Care Physician Services," *Journal of Human Resources*, 27,3, 381-421.

Roback, Gene, Randolph, Lillian, and Bradley Seidman, 1990, *Physician Characteristics and Distribution in the U.S., 1990 Edition,* Chicago: American Medical Association.

Rochaix, Lise, 1989, "Information Asymmetry and Search in the Market for Physicians' Services," *Journal of Health Economics*, March, 8,1, 53-84.

Roemer, Milton I., 1961, "Bed Supply and Hospital Utilization: A National Experiment," *Hospitals*, 35, 36-42.

Rogerson, William P., 1992, "Contractual Solutions to the Hold-Up Problem," *Review of Economic Studies*, October, 59, 4, 777-794.

Rossiter, Louis F. and Gail R. Wilensky, 1983, "A Reexamination of the Use of Physician Services: The Role of Physician-Induced Demand," *Inquiry*, 20,2, 162-172.

Ross, Steven, 1973, "The Economic Theory of Agency: The Principal's Problem," *American Economic Review*, 63, 134-139.

Ruffin, Roy J., and Duane E. Leigh, 1973, "Charity, Competition, and the Pricing of Doctors' Services," *Journal of Human Resources,* 8, 212-222.

Salant, David S., 1991, "A Repeated Game with Finitely Lived Overlapping Generations of Players," *Games and Economic Behavior*, 3, 244-259.

Satterthwaite, Mark A., 1979, Consumer Information, Equilibrium, Industry Price, and the Number of Sellers. *Bell Journal of Economics,* 10:483-502.

Satterthwaite, Mark A., 1985, Competition and Equilibrium as a Driving Force in the Health Services Sector. In *Managing the Service Economy,* ed. R. Inman, Cambridge: Cambridge University Press, 239-267.

Selden, Thomas P., 1990, "A Model of Capitation," *Journal of Health Economics*, 9, 4, 397-410.

Shaked, Avner and John Sutton, 1981, "The Self-Regulating Profession," *Review of Economic Studies*, 48, 217-234.

Sloan, Frank, 1970, "Life Time Earnings and Physicians' Choice of Specialty," *Industrial and Labor Relations Review,* October, 24, 47-56.

Sloan, Frank, 1976, "Comments on 'Real Returns to Medical Education'," *Journal of Human Resources,* Winter, 11, 118-127.

Sloan, Frank, "Effects of Health Insurance on Physicians Fees," *Journal of Human Resources,* 17(4);533-557.

Sloan and Feldman, 1978, "Competition Among Physicians," in *Competition in the Health Care Sector: Past, Present, and Future*, Lawrence Goldberg and Warren Greenberg, eds., Washington, D.C.: Federal Trade Commission.

Smith, Adam, 1978, *Lectures on Jurisprudence,* Ronald L. Meek, David D. Raphael, and Peter G. Stein (eds.), Oxford: Clarendon.

Spulber, Daniel, 1989, *Regulation and Markets,* Cambridge, MA: MIT Press.

Starr, Paul, 1982, *The Social Transformation of American Medicine,* New York: Basic Books, 1982.

Telser, Lester G., 1978, *Economic Theory and the Core*, Chicago: University of Chicago Press.
Vistnes, Gregory, 1992, "Strategic Alliances, Cliques, and Competition in Markets with Network Goods," unpublished paper, Washington, D.C.: Antitrust Division, U.S. Department of Justice.

White-Means, Shelly, 1989, "Consumer Information, Insurance, and Doctor Shopping: The Elderly Consumer's Perspective," *Journal of Consumer Affairs,* 23, 45-64.

Wolinsky, Asher, 1993, "Competition in a Market for Informed Experts' Services," *Rand Journal of Economics*, Autumn, 24,3, 380-398.

Table 1: Nonfederal Patient Care Physicians and Physician/Population Ratio
United States, Selected Years 1965 - 1992

Year	Nonfederal Patient Care Physicians	Average Annual Growth in Physicians	Physicians per 100,000 Civilian Population	Average Annual Growth in Physician-Population Ratio
1965	237482		124	
1970	252778	1.26%	125	0.16%
1975	285345	2.45%	135	1.55%
1980	358470	4.67%	159	3.33%
1981	370096	3.24%	162	1.89%
1982	389468	5.23%	169	4.32%
1983	403956	3.72%	174	2.96%
1984	416809	3.18%	178	2.30%
1985	426721	2.38%	180	1.12%
1986	439580	3.01%	184	2.22%
1987	455729	3.67%	189	2.72%
1989	471692	1.74%	193	1.05%
1990	487796	3.41%	198	2.59%
1992	520216	3.27%	204	1.50%

Source: American Medical Association, Physician Characteristics and Distribution in the United States, various years.

Table 2: Number of Nonfederal Physicians and Physicians per Capita for the 20 most populous MSAs, 1988

Rank	Metropolitan Statistical Area	Number of Physicians	Physicians per Capita
1	Los Angeles, CA	20359	2.37
2	New York, NY	27839	3.25
3	Chicago, IL	15279	2.46
4	Philadelphia, PA-NJ	12465	2.53
5	Detroit, MI	7989	1.84
6	Washington, DC-MD-VA	10172	2.72
7	Boston, MA	11346	3.43
8	Houston, TX	6747	2.08
9	Atlanta, GA	4963	1.81
10	Nassau-Suffolk, NY	7772	2.95
11	St. Louis, MO-IL	5265	2.12
12	Dallas, TX	4564	1.84
13	Minneapolis-St. Paul, MN-WI	4964	2.08
14	San Diego, CA	4755	2.01
15	Baltimore, MD	6624	2.83
16	Riverside-San Bernadino, CA	3190	1.4
17	Anaheim-Santa Ana, CA	5121	2.27
18	Pittsburg, PA	5275	2.52
19	Phoenix, AZ	3722	1.83
20	Oakland, CA	4253	2.12

Table 3: Number of Nonfederal Physicians and Physicians per Capita in Metropolitan Statistical Areas with Populations over 1 Million

Year	Average Number of Physicians per MSA (population weighted)	Physicians per 1000 Persons in MSA (population weighted average)	Annual Growth in Physicians per Capita in MSAs (population weighted)
1958	4870.6	1.113	
1970	6774.5	1.652	3.35%
1971	6846	1.687	2.12%
1972	6810.9	1.697	0.59%
1973	6742.1	1.715	1.06%
1974	6753	1.734	1.11%
1975	6886.5	1.774	2.31%
1976	6862.2	1.791	0.96%
1977	6936.7	1.886	5.30%
1978	7029.5	1.937	2.70%
1980	7541.3	2.077	3.55%
1982	8072.6	2.193	2.75%
1983	8331.2	2.243	2.28%
1985	8586.2	2.306	1.39%
1986	8863.6	2.359	2.30%
1988	9125.2	2.383	0.51%

Source: American Medical Association

Table 4: Number of Medical School Applicants and Application/Admission Ratio, United States, 1970 - 1993

Academic Year	Applicants	Total Applications	Application/Admission Ratio
1970-71	24987	148797	2.17
1971-72	29172	210943	2.36
1972-73	36135	267306	2.63
1973-74	40506	328275	2.83
1974-75	42624	362376	2.83
1975-76	42303	366040	2.75
1976-77	42155	372282	2.67
1977-78	40569	371545	2.54
1978-79	36636	335982	2.22
1979-80	36141	335217	2.14
1980-81	36100	330888	2.11
1981-82	36727	339975	2.12
1982-83	35730	334897	2.07
1983-84	35200	319340	2.05
1984-85	35944	331937	2.09
1985-86	32893	307427	1.91
1986-87	31323	295744	1.83
1987-88	28123	266900	1.65
1988-89	26721	258442	1.56
1989-90	26915	262426	1.59
1990-91	29243	290489	1.70
1991-92	33301	354017	1.91
1992-93	37410	405720	2.14

Source: Medical School Admissions Requirements, Association of American Medical Colleges. As presented in the Journal of the American Medical Association, various years.

Table 5: Number of Medical Schools, Enrollment. and Graduates
United States, 1970 - 1993

Academic Year	Number of Medical Schools	1st Year Enrollment	Graduates
1970-71	103	11348	8974
1971-72	108	12361	9551
1972-73	112	13726	10391
1973-74	114	14185	11613
1974-75	114	14963	12714
1975-76	114	15351	13561
1976-77	116	15667	13607
1977-78	122	16134	14393
1978-79	125	16620	14966
1979-80	126	17014	15135
1980-81	126	17204	15667
1981-82	126	17320	15985
1982-83	127	17230	15824
1983-84	127	17175	16327
1984-85	127	16992	16319
1985-86	127	16929	16125
1986-87	127	16779	15836
1987-88	127	16686	15887
1988-89	127	16781	15620
1989-90	127	16749	15336
1990-91	126	16803	15481
1991-92	126	17027	15386
1992-93	126	17001	15554

Source: Medical School Admissions Requirements, Association of American Medical Colleges. As presented in the Journal of the American Medical Association, various years.

Table 6: Real Physician Income After Expenses, Before Taxes[1]

Year	Average Annual Income (In Thousands of 1991 Dollars)	Average Annual Growth in Real Net Income
1973	135.00	
1974	132.41	-1.92%
1975	130.78	-1.23%
1977	123.40	-2.86%
1978	123.03	-0.30%
1979	135.40	10.06%
1981	131.50	-1.45%
1982	134.34	2.16%
1983	137.76	2.55%
1984	138.39	0.46%
1985	139.11	0.52%
1986	144.39	3.79%
1987	154.95	7.32%
1988	164.03	5.86%
1989	169.08	3.08%
1990	170.89	1.07%
1991	170.60	-0.17%

Source: American Medical Association, Socioeconomic Characteristics of Medical Practice, 1993

[1]Deflated by Gross National Product deflator.

Table 7: Real Physician Net Income per Hour[1]

Year	Income per Hour (In 1991 Dollars)	Annual Growth in Hourly Income
1982	56.19	
1983	56.71	0.91%
1984	57.05	0.61%
1985	56.97	-0.15%
1986	58.23	2.22%
1987	62.19	6.80%
1988	65.58	5.46%
1989	67.35	2.70%
1990	68.51	1.72%
1991	67.97	-0.78%

Source: American Medical Association, Socioeconomic Characteristics of Medical Practice, 1993

[1]In patient care activities

Table 8: Group Physicians as a Percentage of Nonfederal Physicians, 1965 - 1991

Year	% Group Physicians	Total Nonfederal Physicians
1965	10.6	268,040
1969	17.6	227,758
1975	23.5	284,760
1980	26.2	337,514
1984	28.4	440,672
1988	30.0	494,356
1991	32.6	565,667

Source: American Medical Association, Medical Groups in the U.S.: a Survey of Practice Characteristics, 1990 & 1993.

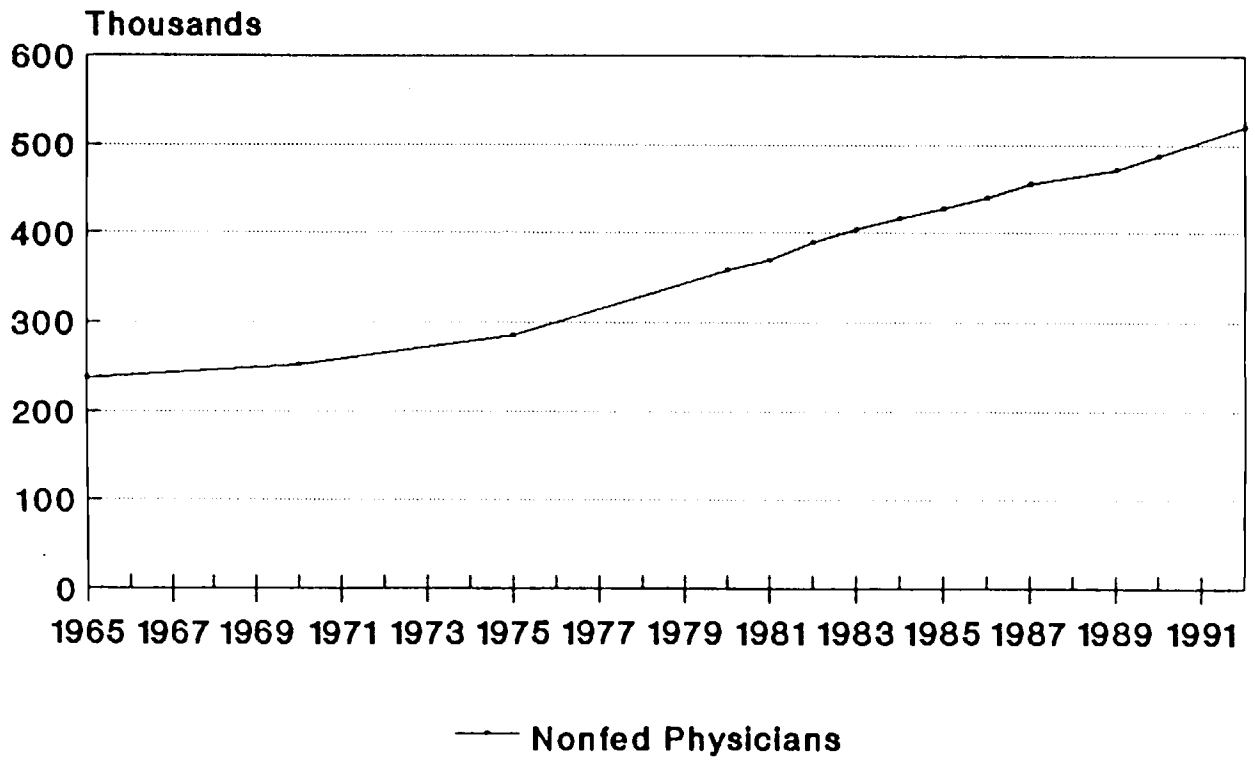
Table 9: Percentage of Group Practices Related to HMOs and PPOs

Type of Relationship	Percent in 1988	Percent in 1991	Percent Growth
Staff Model HMO	-	0.7	-
Organized to Provide Services to HMO	7.8	6.6	-15.39%
One or More HMO Contacts	50.3	53.8	6.96%
HMO Referrals	19.8	15.4	-22.22%
PPO Contracts	55.8	69.3	24.19%

Source: American Medical Association, Medical Groups in the U.S.: A Survey of Practice Characteristics, 1990 & 1993.

FIGURE 1

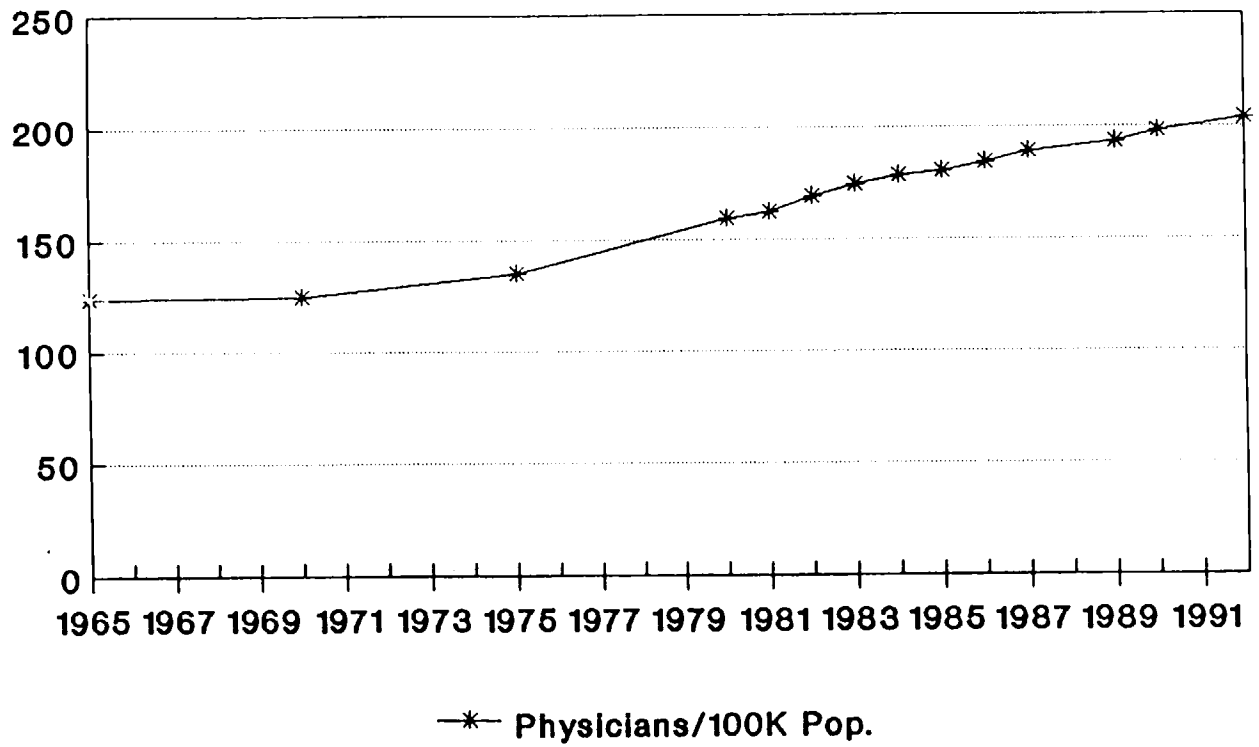
Nonfederal Patient Care Physicians
United States



Source: American Medical Association

FIGURE 2

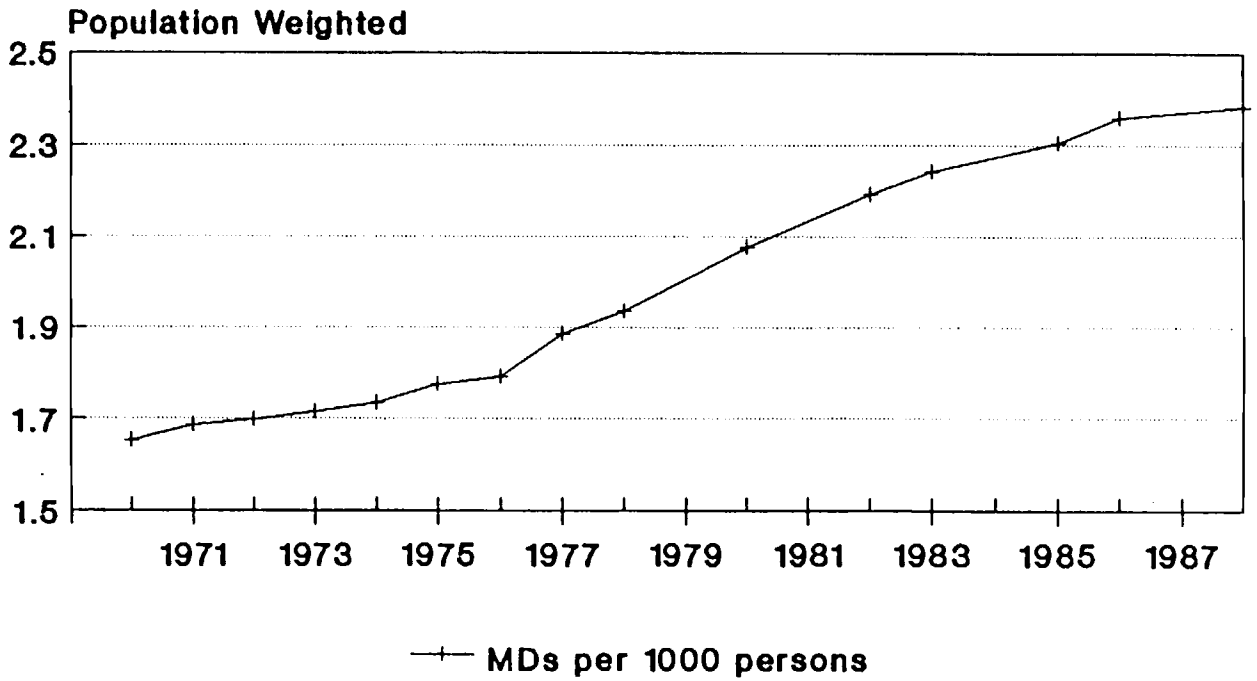
Nonfederal Patient Care
Physicians Per Capita, United States



Source: American Medical Association

FIGURE 3

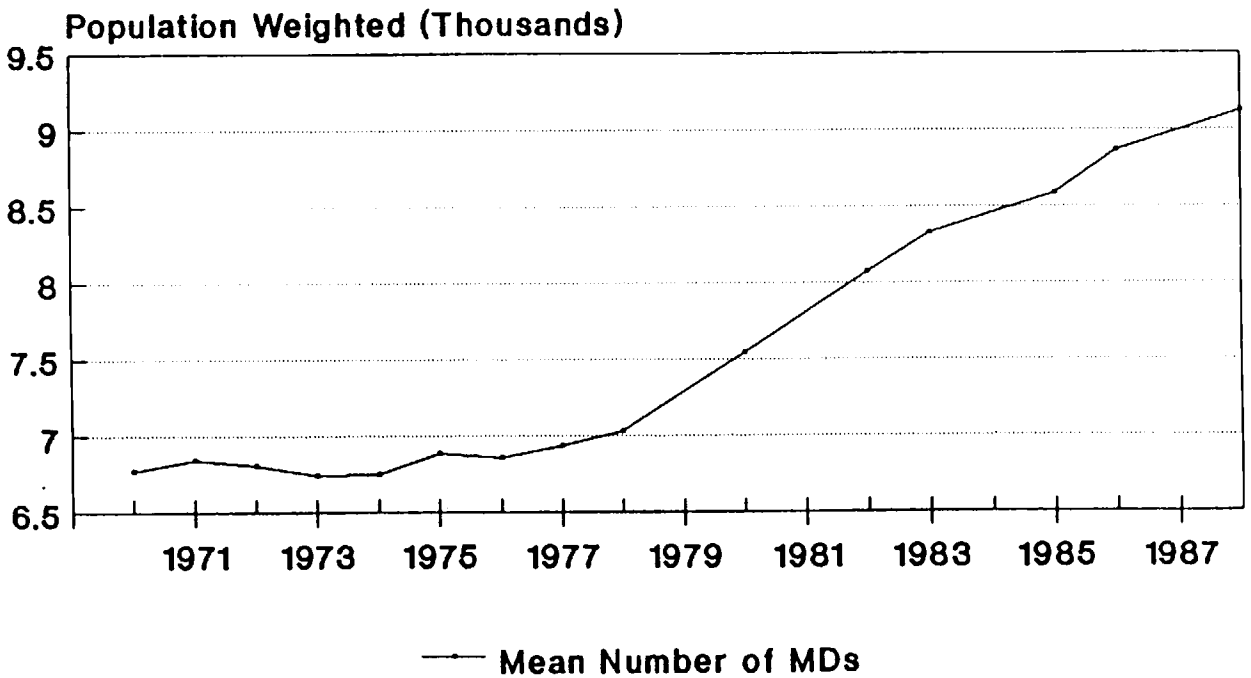
Number of Nonfederal Physicians
in Metropolitan Statistical Areas with Populations over 1 Million



Source: American Medical Association

FIGURE 4

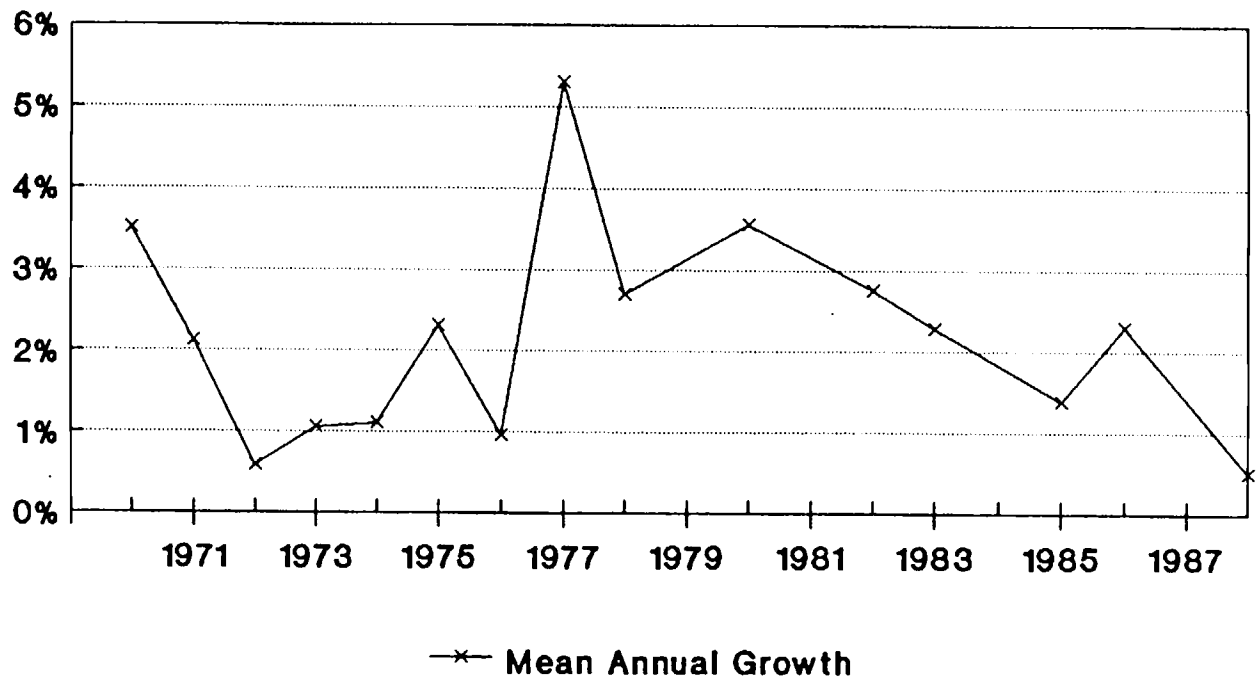
Number of Nonfederal Physicians
in Metropolitan Statistical Areas with Populations over 1 Million



Source: American Medical Association

FIGURE 5

Growth in Average MDs per Capita
in Metropolitan Statistical Areas with Populations over 1 Million



Source: American Medical Association

FIGURE 6

Medical School Applicant/Admission Ratio
United States, 1970 - 1993

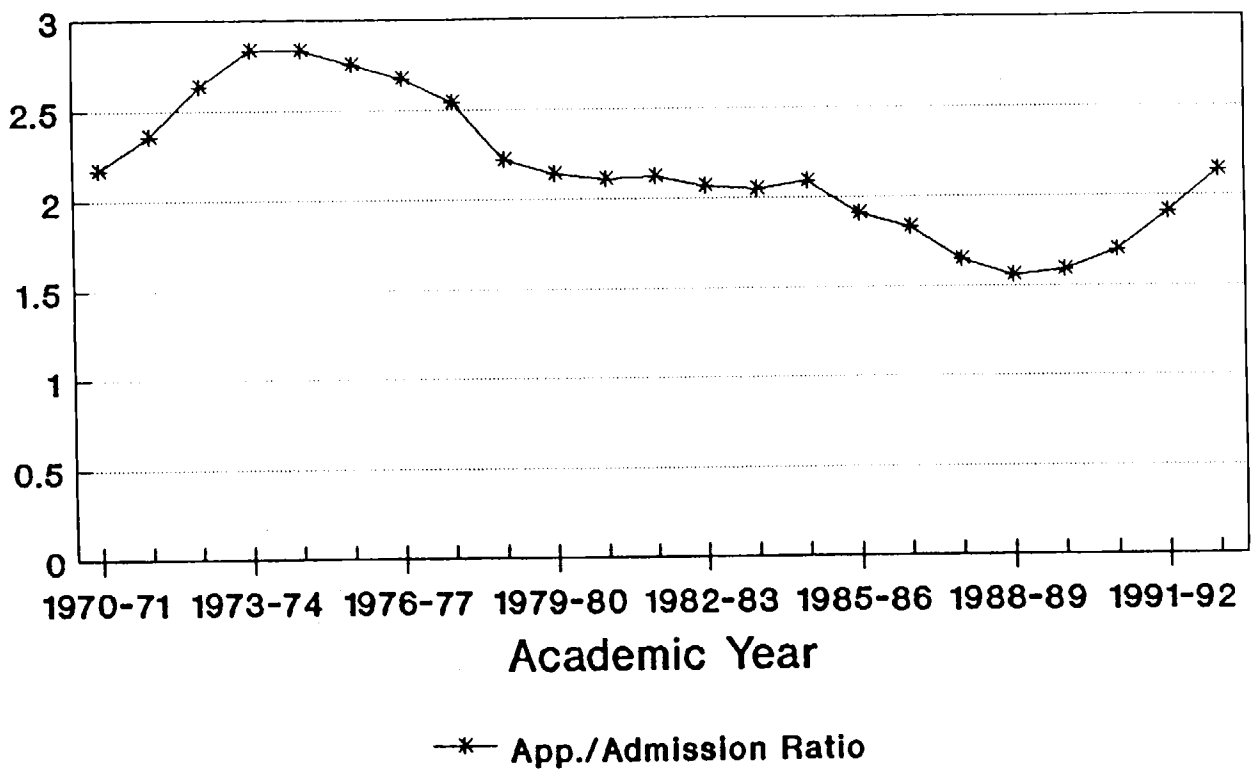


FIGURE 7

United States Medical Schools
1970 - 1993

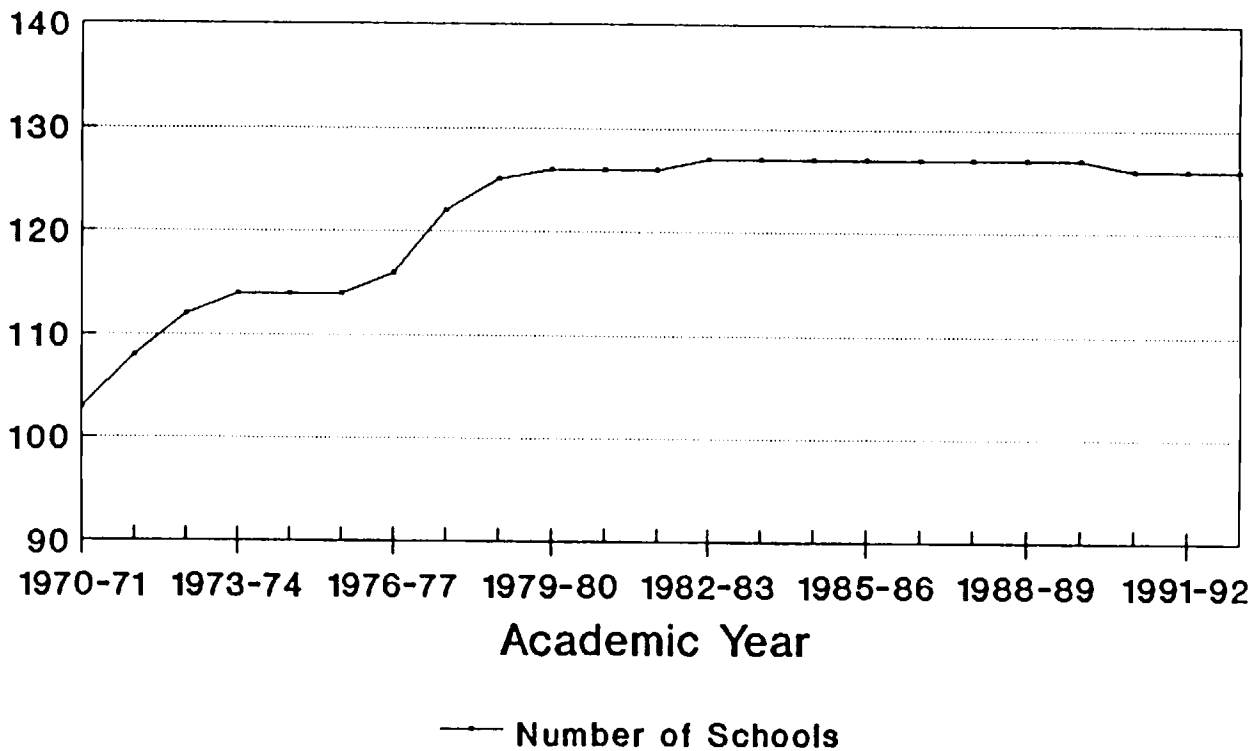


FIGURE 8

United States Medical Schools
Number of Graduates, 1970 - 1993

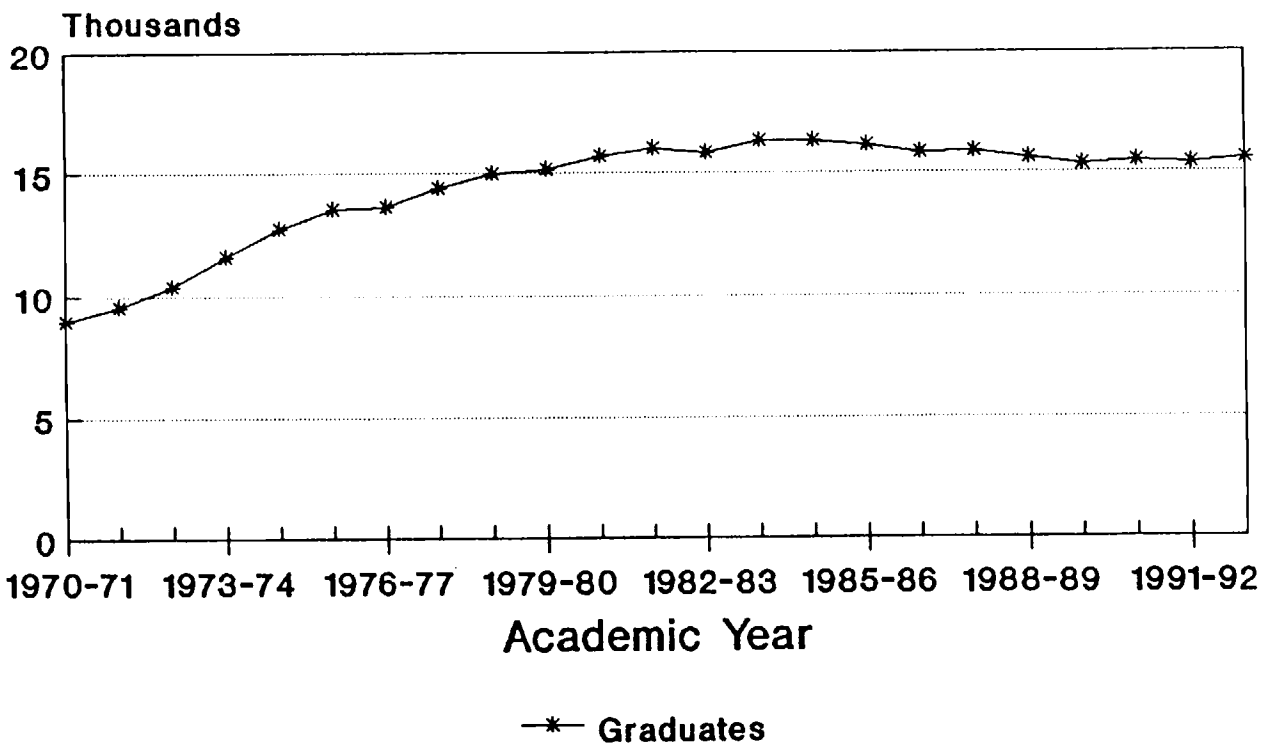
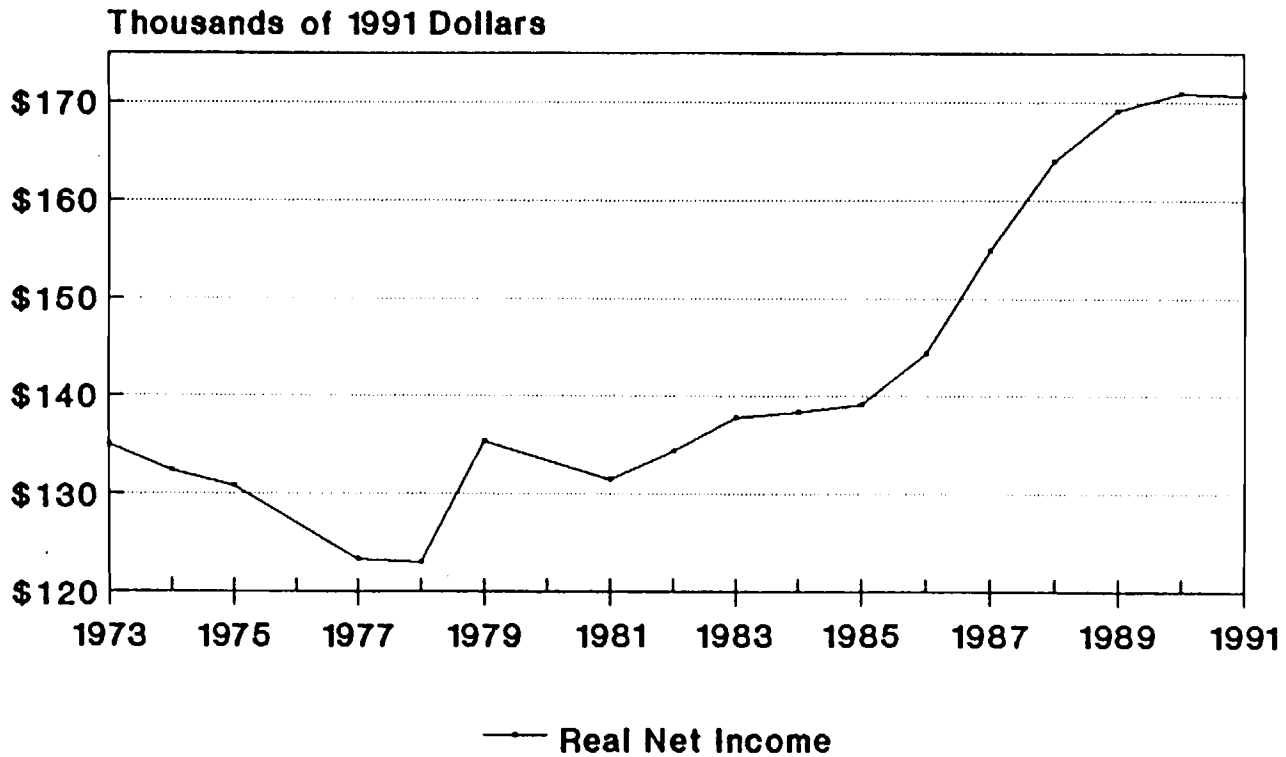


FIGURE 9

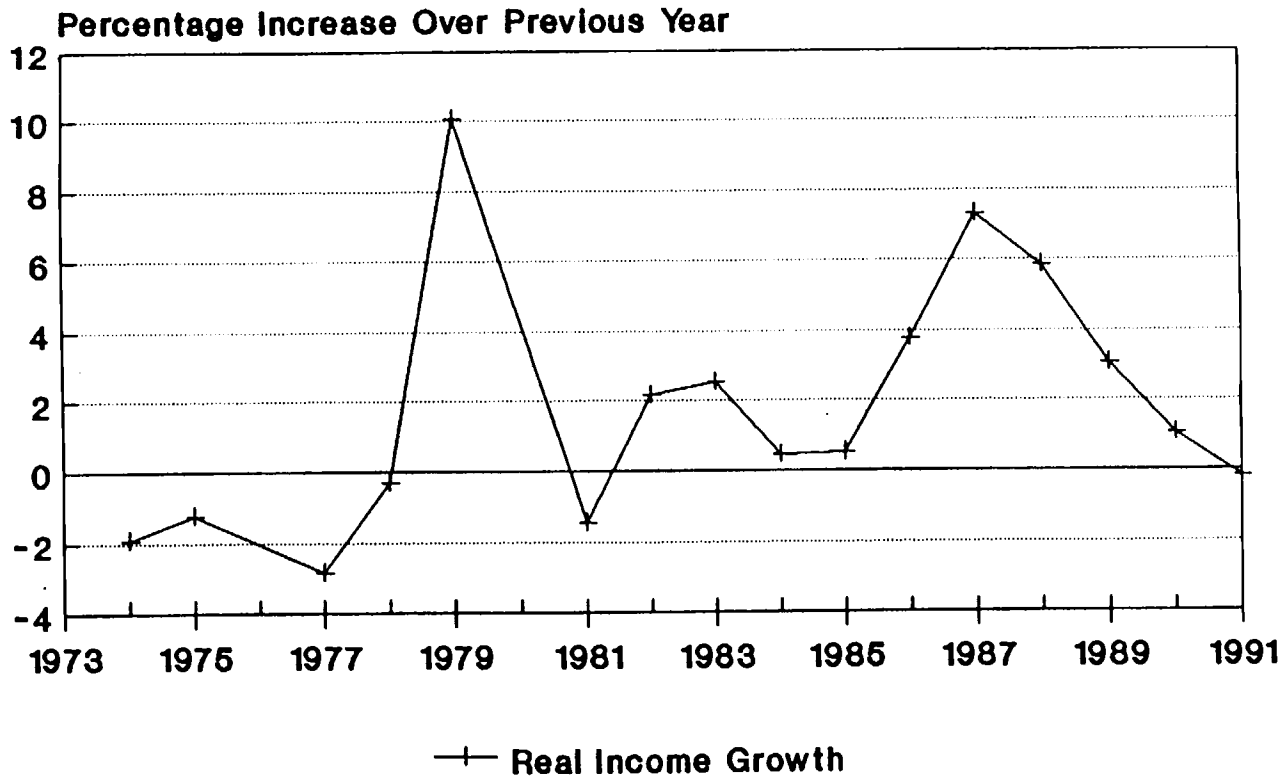
Mean Real Physician Net Income
After Expenses, Before Taxes



Source: American Medical Association

FIGURE 10

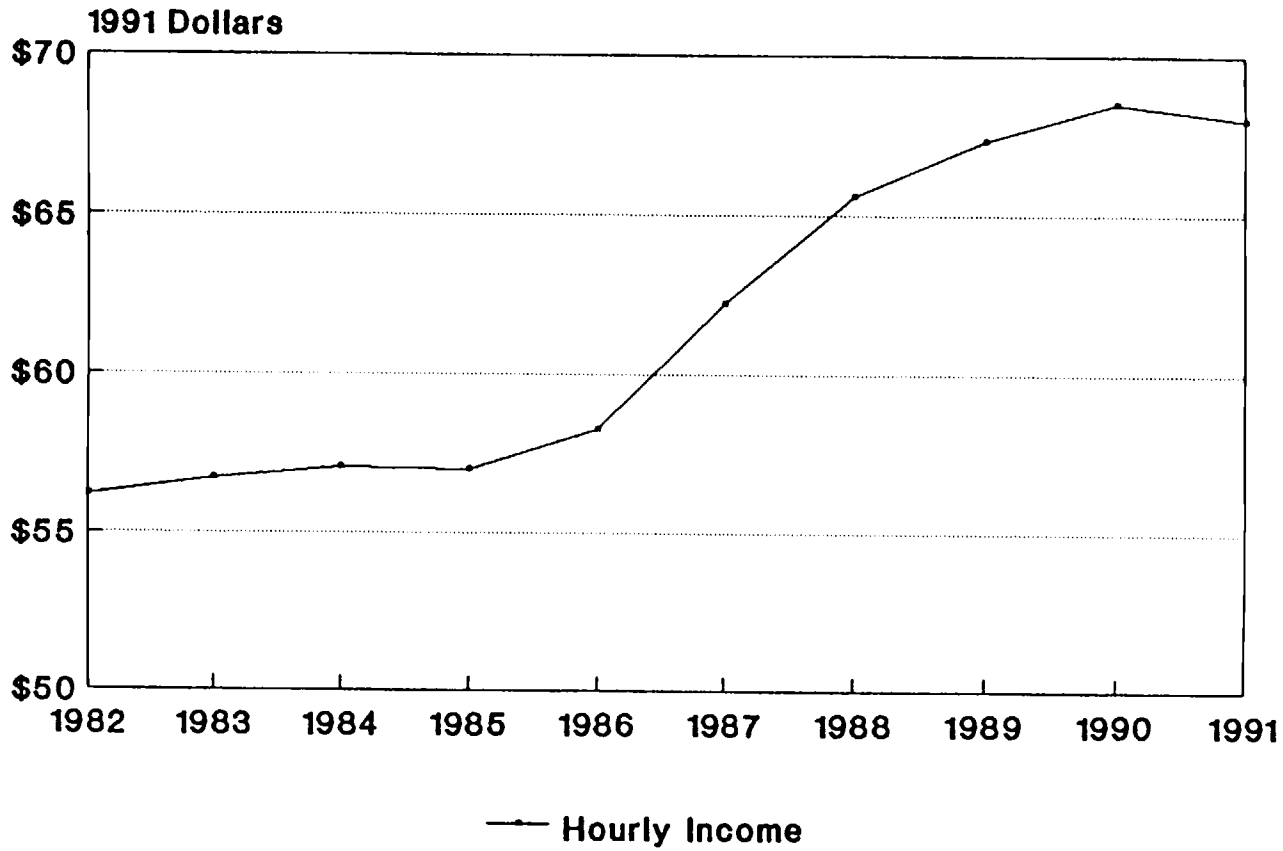
Growth in Mean Real Physician Net Income
After Expenses, Before Taxes



Source: American Medical Association

FIGURE 11

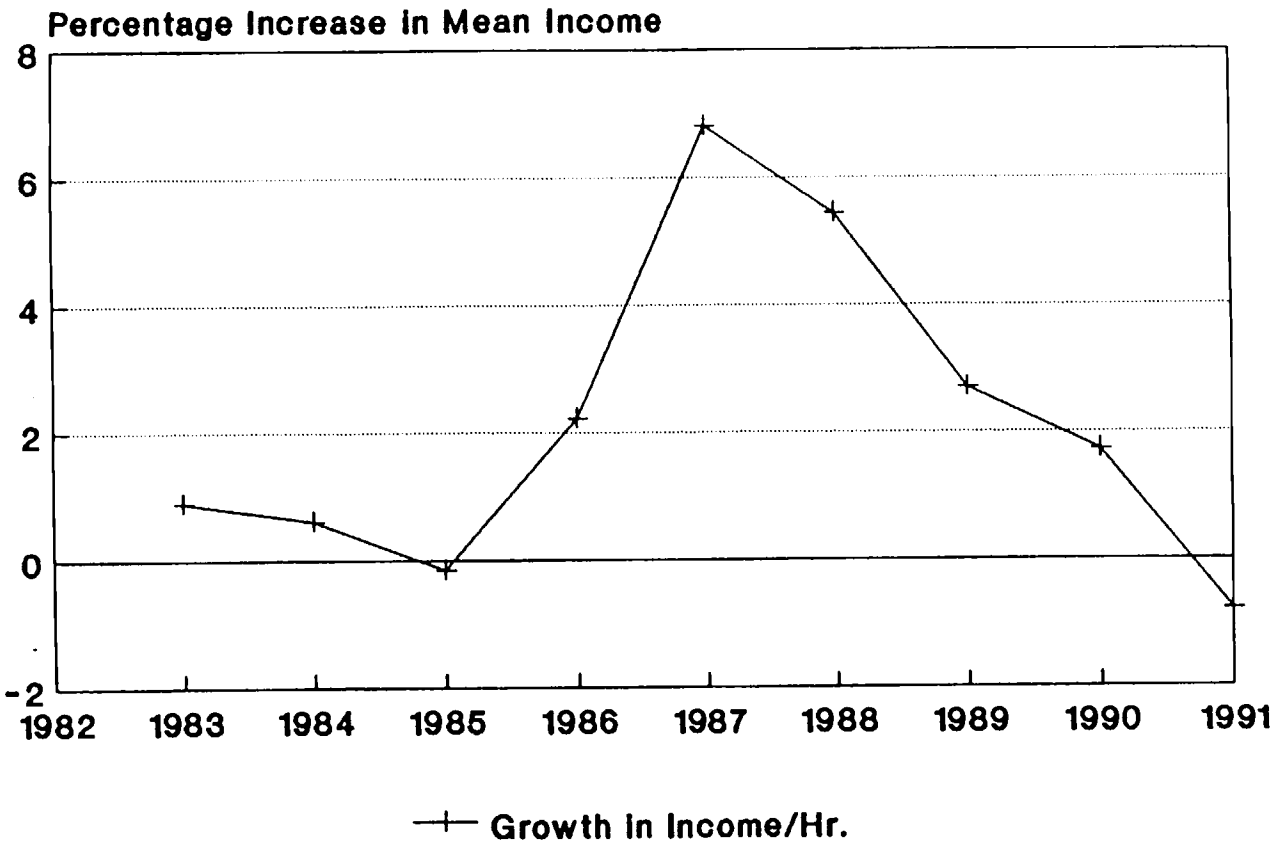
Mean Physician Real Net Income per Hour



Source: American Medical Association

FIGURE 12

Growth in Physician Hourly Real Income



Source: American Medical Association

FIGURE 13

Group Physicians as a Percentage of Nonfederal Physicians, 1965-1991