

# **The Rise of Managed Care and the Decline of Physician Self-Employment**

Andrew Pearlman

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## **Introduction**

The growth of managed care as the predominant mode of health insurance in the U.S. has inspired innumerable studies of its effects on health service delivery.<sup>1</sup> One of the most striking trends has been an increase in the proportion of physicians who are employees, with no ownership stake in their medical practices. Overall, 24 percent of physicians were employees in 1985, but by 1994 this figure had risen to 43 percent. The trend is reflected among doctors at all career stages; among those in the first five years of practice, the employee proportion rose from 37 percent in 1983 to 65 percent in 1997. For doctors with more than 15 years of experience, the increase was from 19 percent to 35 percent (Kletke 1998).

During the 1980s and 1990s the market share of managed care insurers also increased rapidly. Health maintenance organizations (HMOs) – the most common and most restrictive form of managed care – insured 9.1 million Americans (4 percent of the population) in 1980, and 81.3 million (30.1%) in 1999 (National Center for Health Statistics 2000). The effects of managed care are pervasive in the health care industry, with particularly strong impacts on the incentives faced by consumers and providers of health care, and consequently on the ways in which care is organized and delivered. From the self-employed physician's perspective, managed care organizations have imposed downward pressures on revenues, increased administrative costs, and shifted

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<sup>1</sup> See, for example: Miller and Luft (1994); Baker and Brown (1999); Cutler and Sheiner (1997); Kemper, Reschovsky and Tu (1999); and Simon, Dranove and White (1997).

substantial income risk to doctors and their practices.<sup>2</sup> At the same time, physicians involved with managed care report less satisfaction with their practice choices along several dimensions (Hadley, Mitchell, Sulmasy and Bloche 1999).

Naturally, the contemporaneous trends of managed care growth and physician self-employment contraction invite inquiry into whether the timing of these trends is more than a coincidence. Mitchell and Hadley (1999) demonstrate a significant relationship between the extent of local HMO market share and individual physicians' labor supply decisions, including the "choice of practice setting (employee versus self-employment)." In particular, the authors use a 1991 survey of physicians to show that a doubling of HMO market share is associated with a 23.5% reduction in the average doctor's probability of being self-employed.

However, Mitchell and Hadley look exclusively at the role of managed care as a determinant of individual self-employment status. A more complete understanding of the impact of managed care on physician labor markets would estimate *how much* of the observed decline in self-employment can be attributed to managed care. In addition, it would be instructive to determine how much of the shift from self-employed to employees is due to other causes, and how much is unexplained. This paper seeks to complete the picture by determining how large the managed care effect is relative to other possible explanations.

### **Conceptual Framework**

The core result from Mitchell and Hadley's (1999) paper is a probit equation regressing physicians' self-employment status on local HMO market share and several individual characteristics. Data are from the 1991 Practice Patterns of Young Physicians (PPYP) survey, a cross-section of early-career physicians with between two and nine years of post-residency practice experience (Hadley 1995). To correct for endogeneity

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<sup>2</sup> See, for example, Vogel (1993).

bias in the HMO variable, the authors use predicted values from a first stage regression of HMO penetration on a set of instruments capturing local business conditions and physician labor market characteristics.

In contrast, this paper will treat aggregated local self-employment rates, rather than individual doctors' self-employment choices, as the dependent variable of interest. This will enable a direct estimation of the changes in self-employment levels associated with variation in HMO activity as well as other local market characteristics. In addition, the use of aggregated measures will enable construction of a panel. This feature is especially valuable because the research question focuses on changes that have occurred over a specific period of time. In particular, the longitudinal dimension will allow the possibility that the self-employment decline is partly a secular time trend, unrelated to the influence of managed care.

Numerous factors influence physicians' choices of practice setting. Most factors are closely related to the reasons physicians join groups. Historically, the organization of medical practice in the U.S. was mostly based on individual doctors in solo practice. This began to change in the late 1960s and early 70s, primarily for two reasons. First, technological advances expanded the scope and cost of medical treatments, essentially broadening the range of illnesses that medical providers could treat. More advanced treatments generally entail greater costs, however, and therefore create pressure to reduce costs. Second, changes in health insurance -- public and private -- reduced doctors' price-setting autonomy and thus their ability to cover costs. [Cite literature to confirm these hypotheses, and explain more fully.]

The response among physicians has been a pronounced increase in group-based practice. There are three main reasons doctors form groups. First, group practice allows efficiencies from cost-sharing. These costs include capital equipment and technology; information and administrative systems; and non-physician labor inputs. Second, groups allow individual doctors to mitigate their exposure to income risks. And third, groups

may be able to recapture some of the market power lost to insurers. [Cite literature here.]

Offsetting these group-formation incentives are three main reasons physicians opt to practice alone (or in smaller groups). Non-pecuniary amenities of having control over one's practice choices are often cited by physicians themselves. A second reason is that many of the benefits of consolidation -- such as negotiating with insurers and cost-sharing -- can be obtained in looser agglomerations of doctors such as independent physician associations (IPAs) and physician practice management (PPM) services. Third, non-group physicians can enjoy greater returns to capital than may be possible if these returns are shared. [Add cite.]

The prevalence of self-employment among doctors is closely tied to the size of physician groups. For purposes of this paper, self-employment can be defined most simply as having an ownership stake in one's practice, and implies that a share of profits constitutes a meaningful portion of the self-employed physician's earnings.<sup>3</sup> By definition all solo practitioners are self-employed, and the majority of doctors in two-person practices are as well. In general, the reasons doctors opt for self-employment are much the same as the set of tradeoffs in choosing whether to be part of a group.

The above discussion implies that a wide range of characteristics in markets for health services, physician labor, and health insurance are likely to affect observed physician self-employment rates. In this paper we consider factors that fall into three broad categories, described below. More precise variable definitions are presented in the "Data" section.

*Physician labor market conditions.* Overall physician/population ratios are a

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<sup>3</sup> This is a working definition. It is complicated by the fact that many employees -- doctors as well as in occupations -- are compensated with bonuses and other contract structures that are tied to the firm's performance. In addition, the compensation (and thus incentives) of self-employed doctors in larger groups often resembles that of employees. Ideally, an accurate definition of self-employment would encompass these gradations. However, most surveys treat self-employment as a binary characteristic, a simplification this paper reluctantly follows. A more detailed treatment of the role of these "hybrid" employment arrangements could be a worthwhile area for future study.

basic measure of the degree of competition for doctors' services. Separate ratios for specialists and generalists may capture competitive conditions more precisely. In addition, the presence of medical schools and teaching hospitals can affect local labor market conditions. New doctors entering the market may have a preference to practice nearby, generating more supply of doctors in locations with medical education facilities. Also, the presence of such institutions as large employers of doctors may disproportionately add to demand for employee physicians relative to the self-employed.

Also on the labor supply side, there have been shifts in the composition of the physician labor force. Doctors of different race, sex, age/experience and specialty have different propensities for being self-employed (Mitchell and Hadley 1999). Consequently, it is important to control for these shifts when considering the extent to which managed care has driven down physician self-employment.

*Demand for health services.* Separate from the physician/population ratios mentioned above, health care demand proxies can include the age distribution of the local population and common disease patterns. In addition, public health care financing and policies constitute a large portion of demand for health services. Along these lines, state laws relating to Medicaid, its funding and reimbursement levels are likely to determine physician labor market conditions to an extent.

It is difficult to predict exactly how these demand measures are likely to affect observed self-employment rates. Their impact on doctors is somewhat indirect, affecting the revenue and cost flows for all medical practices. It is ambiguous exactly how these effects might differ for self-employed doctors, who face earnings risks tied to practice profits, versus for employees, who do not.

The variable of interest, managed care penetration, can be considered as part of this "health services demand" category. Unlike the other demand measures, however, the effect of managed care on self-employment is predictable. The mechanisms of managed care work primarily to make self-employment less attractive. This is due to the increases

in fixed administrative costs, shifting of income risks from insurers to doctors, and decreases in practice autonomy. [More discussion here about the effects of managed care separately for generalists and specialists; why does the literature consistently draw this distinction?]

*Practice costs.* Certainly an important category of determinants of doctors' self-employment decisions would include various measures of practice costs. These include local medical input cost indices (such as health aides and other labor) and malpractice insurance premiums. In addition, the spread of medical technologies can have an impact on costs. We would expect higher practice costs to create stronger group-formation incentives and thus be associated with less self-employment.

### Estimation Strategy

To estimate the effects of managed care on physician self-employment rates, empirical analogues to the theory described above are defined as:

$$\dot{y} \quad SE_{it} \equiv \left( \frac{\text{self - employed MDs}}{\text{total MDs}} \right)_{it}$$

$$\dot{y} \quad HMO_{it} \equiv \left( \frac{\text{HMO enrollment}}{\text{total population}} \right)_{it}$$

where  $i$  indexes local markets and  $t$  is time. Using panel data on local health care markets [probably PMSAs] over an 18-year period (at three-year intervals), we examine the extent to which HMO market penetration ( $HMO_{it}$ ) affects physician self-employment ( $SE_{it}$ ). In the most basic formulation, we estimate:

$$(3) \quad SE_{it} = \lambda\alpha_i + \gamma_t + \mathbf{X}'_{it}\beta + \delta HMO_{it} + \varepsilon_{it}$$

where  $\alpha_i$  is a market fixed effect;  $\gamma_t$  captures a secular trend unrelated to observables,  $\mathbf{X}_{it}$  contains measures of market forces that affect physicians' incentives (labor market conditions, health services demand and practice costs, described above);  $\lambda$ ,  $\beta$  and  $\delta$  are parameters; and  $\varepsilon_{it}$  is an error term. Taking first differences,

$$(4) \quad SE_{it} - SE_{it-1} = (\gamma_t - \gamma_{t-1}) + (\mathbf{X}'_{it} - \mathbf{X}'_{it-1})\beta + \delta(HMO_{it} - HMO_{it-1}) + (\varepsilon_{it} - \varepsilon_{it-1})$$

eliminates the market-specific fixed effect. If the differenced regressors on the right hand side are exogenous with respect to the changes in the physician self-employment rate ( $SE_{it} - SE_{it-1}$ ) -- that is, uncorrelated with  $(\varepsilon_{it} - \varepsilon_{it-1})$  -- then least squares estimation of the above fixed-effects model will yield unbiased parameter estimates  $\hat{\beta}$  and  $\hat{\delta}$ .

A key question is whether  $\alpha_i$ , the market fixed effect, captures the characteristics that make a local market more or less attractive for managed care. If it does, then the regressors in equation (4) -- particularly, the change in HMO activity,  $(HMO_{it} - HMO_{it-1})$  -- can be treated as exogenous. If not, however, then the effect of self-employment changes on HMO changes implies that the HMO change measure  $(HMO_{it} - HMO_{it-1})$  is correlated with the error term  $(\varepsilon_{it} - \varepsilon_{it-1})$ , and thus  $\hat{\delta}$  will be a biased estimate of  $\delta$ .

[Show this mathematically, including the HMO equation.]

Is it plausible that changes in local HMO activity are exogenous with respect to changes in physician self-employment rates? For guidance, consider research by Dranove, Simon and White (1998) that examines the determinants of HMO activity. The authors use two different measures of managed care activity (share of local physician revenues and share of health insurance enrollments) in a single-cross section to find how various supply and demand characteristics are associated with managed care activity. Their results indicate that several measures appear to be significantly related to managed care: 1) education level of the local population, 2) size distribution of employers, 3) hospital market conditions (particularly, the degree of concentration in hospital markets), and 4) the prevalence of physician group practice *before* the advent of managed care (1986).

The main problem with applying the Dranove, Simon and White results here is that those authors focus on the effect of (lagged) physician practice organization measures on the level of managed care -- which they implicitly assume to be equal to the

*growth* of managed care.<sup>4</sup>

[I haven't worked this out explicitly yet, but essentially where I'm going is that we don't know whether HMOs are looking at *changes* in physician practice organization when they make decisions about expansion, only that they appear to consider the *level* of how common physician groups are. I'm working on an argument that the change in physician self-employment rate is small relative to the importance of the level of self-employment. Also, that the change in managed care activity is a more powerful determinant of changes in self-employment rates than the other way around.]

[However, to the extent that this argument falls short, I'll use Dranove et al as guidance in identifying the variation in HMO activity changes. I suspect that the local education and firm size measures could make reasonably good HMO penetration instruments without having any obvious effects on physician self-employment. Firm size measures reflect the fact that larger firms are traditionally more likely than small firms to contract with managed care insurers and offer this benefit to their employees. Education measures reflect information about the types of jobs people hold -- though mysteriously, Dranove et al don't find that local labor force distributions by occupation are significant determinants of managed care activity. Investigate this further using my own data.]

## **Data and results**

To estimate the effects of HMO penetration and other market characteristics on self-employment, the unit of observation will be the local health care market. There is some debate as to how large such markets are; see Gaynor and Wilson (1999) for a useful discussion. The essential questions are how far patients travel to obtain health services, as well as to what extent various types of service providers are substitutes. A thorough

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<sup>4</sup> The logic appears to be as follows: prevalence of physician groups is measured in 1985, which the authors assert is before the advent of managed care -- in other words, when managed care penetration was essentially zero. Thus 1985 physician practice organization is proposed as a "determinant" of 1994 managed care penetration, which is equivalent to the growth of managed care from an initial level of zero.

consideration of these issues is beyond the scope of this paper. Consistent with other literature, we use metropolitan statistical areas (MSAs) as the unit of observation.<sup>5</sup> To the extent that this choice overstates or understates the true size of health services markets, it is nonetheless still likely that measures of physician self-employment, managed care penetration and other variables are correlated with those for other market size definitions.

The dependent variable, local physician self-employment rates, is calculated from the American Medical Association's (AMA) Physician Masterfile. This source is designed to be a census of all medical doctors in the U.S. Since 1985, the Masterfile has been updated by re-surveying one-third of all physicians each year. In addition, physicians who are known or expected to have changed practice information are surveyed each month. (Prior to 1985, each physician received an update questionnaire once every four years.)

Except where indicated otherwise, data on local health market conditions are compiled from the Area Resource File (ARF) (1999) of the U.S. Department of Health and Human Services. The ARF consists of county-level information from a wide range of primary sources.

Firm size distributions for each MSA are obtained from the U.S. Census Department's County Business Patterns, which contains annual breakdowns at the county level.

The time period under consideration is 1980 to 1997, with observations at three-year intervals (except the 2-year interval from 1995 to 1997). This time frame encompasses the most rapid growth of managed care in the U.S. and much of the decline in self-employment among physicians.

The dependent variable is the percentage of active patient care physicians in the

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<sup>5</sup> For examples, see Dranove, Simon and White (1998) and Mitchell and Hadley (1999) in addition to the discussion in Gaynor and Haas-Wilson (1999).

local market who are self-employed in a solo or two-physician practice.<sup>6</sup> This self-employment rate will be measured separately for two types of physicians: family and general practice doctors, and most specialists. Throughout the physician labor literature, this basic distinction is drawn because [explain why, and cite a source]. In the current context, separating generalists from specialists is especially important because managed care alters their incentives differently. The most prominent difference is that managed care organizations seek to achieve reductions in the cost of patient care by relying on primary care (generalist) physicians to act as "gatekeepers" to reduce unnecessary use of more expensive specialist services. [Cite source.]

Excluded from the measures of generalist and specialist self-employment rates above will be doctors in the hospital-based specialties: radiologists, anesthesiologists, pathologists and emergency care ("RAPs"). This is also a convention in the physician labor market literature [Cite], the key distinction being that these specialists' services are most often demanded by other physicians, rather than on the patient's own initiative.

Managed care market share can be defined in several ways. The most common and simplest is the percentage of individuals with health insurance who are enrolled in a managed care plan, referred to as the "enrollment share." (At this point I do not have data on the number of people with any health insurance, so the denominator for my market share measure is total population.) A useful alternative is the share of physician revenue in a local market that comes from managed care-insured patients, or "revenue share." There are advantages to each measure. Revenue share more precisely targets the idea of market share, because it approximates the amounts spent for managed care, rather than merely tallying the number of individuals who demand any amount. However, revenue share measures are derived from surveys of physicians, which limits their availability to

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<sup>6</sup> Ideally, I would like to include doctors who are self-employed in any size group practice as well. However, I am not currently able to identify self-employed doctors in larger groups in the AMA data. The self-employment rate based on solo and two-physician groups is likely a good proxy for self-employment overall.

certain years. In addition, they directly measure an element of managed care organizations' *costs* -- their payments to physicians -- rather than the insurers' *revenues*. On the other hand, enrollment shares are available annually, and they can include *all* individuals in a market, therefore having less stochastic variation than the survey-based revenue share measures. (For a more complete discussion of the pros and cons of each type of market share measure, see Dranove, Simon and White 1998.) In this paper I use the enrollment share measure of managed care penetration because of its consistent availability over the 18-year period of this study.

Other variables included in the study are: the number of teaching hospitals in the area (1996 only); number of physicians per thousand population (separate for specialists and generalists), percent of population that is old (age 65 and up) and young (less than 15); deaths per thousand population; and population density (per square mile).

Additional variables to identify the HMO penetration equation are: percentage of the adult population (age 25 and up) with at least four years of college; and the percentage distribution of local business establishments by number of employees (1-19, 20-99, 100-499, 500 and up).

Table 1 presents descriptive statistics for all variables, including separate figures for each of the seven years of data available. The two basic trends under consideration are both evident here: physician self-employment declines from 48% to 26% of general practice physicians, and less sharply (from 42% to 30%) among specialists; and HMO enrollment rises from 2% to 17% of the total population.<sup>7</sup>

Tables 2 and 3 contain regression results for self-employment among general practitioners and specialists, respectively. The first column (OLS) presents least squares

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<sup>7</sup> Because of data limitations, this 17% figure is considerably smaller than most current estimates of managed care market share. One reason is that the figures reported here are expressed as a percentage of the total population, rather than of the insured population. Another reason is that much of the rise in managed care penetration has been through less-restrictive forms (such as preferred provider organizations and point-of-service plans), particularly in the 1990s. Enrollment data for these managed care variants have been available only since about 1991, which is why they have been excluded from this study.

results for the sake of comparison to the other two specifications that adjust for endogeneity bias. In this specification, the association between HMO activity and self-employment appears to be small. Most of the 22 percentage point decline in the self-employment rate among general practitioners appears to be associated with the time trend, separate from any HMO growth. A one percentage point increase in the share of local population enrolled in an HMO is correlated with only a 0.04 percentage point decline in physician self-employment.

Results using instrumental variables to identify the variation in HMO market share are presented in the second column (IV) of both tables.<sup>8</sup> Controlling for its endogeneity with respect to physician self-employment rates, HMO penetration appears to have a considerably larger influence on reducing self-employment for both generalists and specialists; the magnitude is 0.25 and 0.30 of a percentage point decline in self-employment for each one-percent increase in the managed care enrollment share.

The third column controls for unobserved heterogeneity across market regions by using a fixed-effects specification. Here the association between HMO activity and physician self-employment appears to be insignificantly different from zero. [Under what circumstances would this result occur?]

[To be added: Discussion of possible reasons why IV and FE estimates vary so widely. More discussion of the apparent effects of other variables/market forces besides HMOs. Also, give examples and counterfactuals to illustrate the magnitude of HMO effects under various assumptions about market characteristics and managed care growth.]

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<sup>8</sup> Table A1 contains first-stage results.

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