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The Effect of Provider Control of Blue Shield Plans on Health Care Markets

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Abstract

Numerous studies have been conducted to explain rapidly raising costs of health care. Many of those studies have concentrated on the influence of health insurance, and some more specifically on the influence of provider control of health insurance plans on health care costs. Blue Shield plans are not for profit and in many states are granted regulatory advantages over other commercial insurers. A not-for-profit firm cannot distribute rents to owners. Therefore, competition between providers, plan administrators and consumers is generated for rents that accrue to the plan from monopoly power derived by the plan or regulatory advantages. Past efforts to explain the behavior of these three groups have used single equation reduced form estimations. In this paper we argue that when there are competing goals among the groups controlling the Blue Shield plans, the different possible "users" of the regulatory advantage or monopoly market power become endogenously determined. Therefore, the appropriate model is a four equation system in which doctor's fees, Blues' market shares, administrative slack, and output are determined endogenously. Testing this model we find that doctors capture rents by raising fees in doctor controlled plans, administrators capture rents in nondoctor controlled plans, and in no case is output increased. Therefore, the actual "users" of the rents serve to reduce consumer welfare.
I. INTRODUCTION

Raising health care costs have received increasing attention in national policy debates. Health insurance plans—by far the most prominent means of financing medical care—have been considered by many to be a culprit in the rapid inflation in health care costs. Feldstein (1973) provides a theoretical basis, and Sloan (1980b) and Sloan-Steinwald (1976) empirical evidence of the increase in demand for medical services resulting from health insurance. The most important single private supplier of insurance is the Blue Cross/Blue Shield group. Although it is incorrect to consider the Blues as a single national firm since individual plans have considerable autonomy, their market share has recently hovered slightly above 50% of all the private insurance business in the United States. The Blues are the dominant firm in most states. The remainder of the health insurance market is unconcentrated (Thorndike, 1976; Angus, 1976).

Such examples of relative size often are not enough to warrant significant research into the efficiency of the industry; if the health insurance industry is sufficiently competitive, market forces should lead to the proper performance on the part of the Blue Cross/Blue Shield suppliers.¹ Indeed, that half of the insurance market which is supplied by for-profit, commercial insurers has generally been assumed competitive in previous research on health insurance (Frech and Ginsberg, 1978). However economic interest in this area of research arises because of the existence of regulatory advantages granted to the Blues and the unique relationship that exists between many of these plans and the providers. The regulatory advantages provide subsidies to the Blues
that introduce the possibility of inefficient behavior. Briefly, the not-for-profit Blues plans are granted tax reductions which permit them to operate at lower costs than their for-profit counterparts. Theoretically, such advantages could be used to drive the commercial insurers out of the market. Obviously such is not the case.

Some recent research has examined the methods by which the subsidies to the Blue Shield plans are exploited. Frech (1974) and Frech-Ginsberg (1978) estimate single equation models which examine the effects of regulatory subsidies on both administrative efficiency and the market share of the Blue plans. However, as pointed out in Arnould and Eisenstadt (1981), Eisenstadt and Kennedy (1981), Sloan (1980a), and Lynk (1981), property rights and therefore, plan control, play a very important role in the behavior of not-for-profit firms. The idea that the group in control of a not-for-profit firm will extract the rent accruing to the property value of the control, has met with success in previous economic studies. We apply and extend that analysis here. Put differently, a commercial insurer would have obvious claimants for any residuals brought about by a lower cost position. However, a not-for-profit firm is, definitionally, unable to explicitly capture those rents as profits and distribute such residuals as dividends. Instead, models of economic theory predict that the groups that control not-for-profit institutions will seek to maximize their own interests. Therefore, it is important that any examination of the effects of the tax subsidy on the Blue plans' performance also consider the interests of the controlling group.
A unique relationship exists between providers and the Blue Shield plans. Most, if not all, plans were initiated by local or state medical societies (Reed, 1947). Initially, these plans were controlled by the providers. Many plans remain under various forms and degrees of provider control. The relative control of a local Blue Shield plan by physicians should have a significant effect on how the regulatory subsidy is "used" by the Blue Shield plan. The three groups competing for rents from the plans are the providers, plan administrators, and the insureds. Clearly, if the plan is operated for the benefit of the insureds the administrative loading charge of the Blue Shield plan should be minimized resulting in the exit of commercial insurers. That not being the revealed outcome strongly suggests that providers and plan administrators are extracting rents. Providers controlling plans maximize their utilities, in part, by increasing their fees and incomes. Plan administrators, likewise, maximize their utilities by engaging in various forms of expense preference behavior. Numerous studies have examined effects of Blue Shield's market dominance and find empirical support for the hypothesis that plans controlled by medical societies have higher maximum allowable charges for physicians. Sloan (1980a) finds providers are more likely to participate in the plan if they also control the plan. Arnauld and Eisenstadt (1982) found actual charges by providers to be greater in areas where the Blue Shield plan is provider controlled. This contradicts any evidence that doctors engage in fee discrimination based on insurance coverage. Finally, Frech and Ginsberg (1978), Frech (1976) and Vogel (1977) found the insurance loading charge to be greater for Blue Shield plans than for commercial plans.
All of these studies, except Vogel, rely on a generalized assumption of monopoly power held by Blue Shield and do not specifically tie the findings to the regulatory advantages. 3

Arnould and Eisenstadt (1981) found evidence of a significant relationship between fee inflation among medical society controlled plans and tax advantages granted to Blue Shield plans. Similarly, Eisenstadt and Kennedy (1981) found higher loading charges existed in nonprovider controlled plans when those plans had tax advantages over the commercial insurers. In contrast, Lynk (1981) found either no relationship or an inverse relationship between provider control and provider fees with various model specifications. Similarly, Kass and Pantler (1979) found no relationship to exist between administrative slack and provider control.

All of the previous studies have estimated the effects of a controlling group on performance of Blue Shield plans using reduced form single equation models. Unfortunately a significant problem is encountered with such single equation estimates. When there are competing goals among the groups controlling the Blue Shield plans, the different possible "uses" of the regulatory advantage or monopoly market power become endogenously determined. The extent to which each possible goal is satisfied will be simultaneously determined and should be greatly influenced by the distribution of property rights in the Blue Shield plans controlling body (Oats, 1981). In fact, the several studies mentioned above clearly demonstrate the wide range of possible uses of Blue Shield residuals. We suggest that biases resulting from the specification problems of the single equation models are the causes of the non-robust results.
The present study simultaneously accounts for the effects of control by various groups on the efficiency of Blue Shield plans while differentiating between rents derived from regulatory advantages and those derived from other sources of market power. As such, a multi-equation estimation is required to avoid biased estimates. Two stage least squares estimation is performed on the equations. In the next section we develop a model of the interaction of the various control groups primarily based on models developed in earlier studies. This model by separating generalized monopoly power held by Blues' plans from that resulting from regulatory advantages and by explicitly accounting for output, and therefore, welfare effects of provider control provides a stronger basis for policy prescriptions. Section III describes the data and results of empirical estimation of the model developed in Section II. Finally, conclusions and policy recommendations are presented in Section IV.

II. THE PROPERTY RIGHTS FRAMEWORK

Provider control dates back to the origins of Blue Shield plans. State medical societies were instrumental in forming the first Blue Shield plans (Sloan, 1980a). Close medical society ties were built into the development of most plans that emerged through the 1940's and 1950's. The initial capital for many plans was even advanced by jurisdictional medical societies (Reed, 1947). Individual doctors further underwrote plans by signing participation agreements. These agreements stated the fees that doctors would accept as reimbursements for patients insured by the Blues. Many states, as a condition of Blue Shield enabling acts, require medical society approval of the plans or majority
representation by providers on the board of directors. An extreme case of provider control exists in Wisconsin where Blue Shield of Milwaukee is contained in the corporate structure of the Milwaukee County Medical Society. In other plans where providers do not control the boards of directors the medical societies have veto power over any changes in reimbursement policies. Thus, substantial influence over plan policy was placed in the hands of the providers.

The enabling legislation in the states required Blue Shield plans to operate on a not-for-profit basis. Blue Shield plans also received substantial regulatory advantages over commercial insurers. The Blues were exempt (or subject to reduced rates) from payment of state income and premium taxes, and many plans face lower local and state property taxes (Prech, 1974) permitting them to operate at a lower level of costs, ceteris paribus, than their counterparts, the commercial insurers.

Bylaws and Membership Standards of the Blue Cross-Blue Shield Association proscribe much of the behavior of Blue Shield plans. However, there remains within the power of the individual plans substantial autonomy from the Association. Casual observation of differences in coverage, participation agreements and methods of reimbursement of doctors provides evidence of the leeway granted individual plans by the national association. Even though the Association requires a plan to have the support of jurisdictional medical societies, eleven plans did not have much support in 1977 and one plan had developed an adversary relationship with the state medical society (AMA, 1978).
Actions of Competing Groups

Provider control of some Blue Shield plans has diminished considerably since the inception of those plans. Organized buyers of the insurance coverage offered by the plans have offered resistance to provider control. This breakdown of control has provided the opportunity for providers, consumers and plan administrators to compete for rents accruing to these not-for-profit entities. In what follows, we develop an analytical framework that explains the motivations and interactions of these competing groups.

A variety of analytical models have been developed to explain the process of health care insurance. For the initial framework, we use a standard model, such as in Frech (1981). In Figure 1, we model the theoretical demand for quality-constant units of health care as DD. A constant cost of health or medical care production equal to $MC_0$ results in an equilibrium output of medical care $Q_0$ at price $P_H$ per unit. The introduction of Frech's "idealized" insurance has the effect of reducing the marginal cost of medical care, $P_H$, to the consumer, thereby rotating the demand curve around its intersection at D on the horizontal axis. In the case of complete insurance, in the absence of time and travel costs, demand can be represented by the vertical line $DD_c$ in Figure 1. In the present context most Blue Shield insurance requires some co-insurance, rotating demand in Figure 1 to some level between DD and $DD_c$ depending on the level of copayment, e.g., $DD'$, with equilibrium output $Q_B$. 
Figure 1
Consumer Behavior

To explain the competition for rents consider a Blue Shield plan
that is operated for the benefit of the consumers in a state where the
Blues are not granted regulatory advantages. Assume that such a plan
is described by DD' in Figure 1. In the absence of regulatory advan-
tages and if the remainder of the insurance market is competitive, the
equilibrium output of medical care would be $Q_B$. Assume that consumers
choose the optimal amount of insurance according to the optimization
process described by Ehrlich and Becker. Then consumers maximize uti-
ality of income $I$ over two states of nature, the well state, $I_W$, and the
sick state, $I_S$, where $U(I_W) > U(I_S)$, and $S$ occurs with probability $p$.
Then maximizing expected utility,

$$E(U) = (1-p)U(I_W) + p U(I_S)$$

subject to a zero profit constraint for the not for profit insurers

$$E(\pi) = (1-p)(I^e_W - I_W) + p(I^e_S - I_S)\alpha$$

where $I_W$ and $I_S$ represent the consumers' initial endowment of income
in the well and sick states respectively and $\alpha$ is the insurance
loading charge yields first order conditions

$$(1-p)U'(I_W)/pU'(I_S) = \frac{(1-p)}{\alpha p}.$$ 

These conditions state that the consumer purchases insurance to the
level where the ratio of the marginal utilities of income in $W$ and $S$
are equal to the fair price of insurance times the load factor.
Therefore, anything that reduces $\alpha$ will increase the demand for
insurance reducing $P_H$ to the consumer in the period insured, thus, pivoting DD further to the right.

In the absence of regulatory advantages, it is shown by Sloan (1980a) that not-for-profit firms can expand output to the level where average revenue products of inputs are equated to marginal input costs. The Blues could choose to offer more attractive insurance packages than the commercial insurers forcing the latter from the market. Even though the Blues dominate most health insurance markets, the commercials remain a significant fringe.

In those markets where Blue Shield is granted regulatory advantages in the form of tax reductions over those paid by commercial insurers the insurance loading charge, $\alpha$, will be lowered for the Blues by the amount of the tax reductions. As stated earlier, a reduced $\alpha$ results in a greater demand for insurance coverage and, therefore, a greater demand for medical care, e.g., $DD_R$. Insurance packages are not homogeneous, the differentiation in quality of coverage and price responds to differences in consumer attitudes toward the risk of incomplete coverage in the event of illness. However, a Blues plan operating in a market with a regulatory advantage over other insurers, at the margin, can offer more attractive insurance in any one (or more) of the quality or price characteristics. Thus, if all rents accruing from regulatory advantages granted to the Blues were captured by the consumers, output would expand to $Q_1$ in Figure 1 and the commercials would be driven from the market. Doctors' incomes would increase as a result of the expanded units provided but prices would not increase if MC are constant.
Administrator Behavior

The continued existence of commercial insurers who face higher costs than Blue Shield insurers implies that the regulatory advantage is not being used to offer substantially more attractive packages than the commercial insurers. The extent of coverage may be different, but the fact remains that higher cost commercial firms are able to retain, on average, roughly half the market.

Thus, we turn to plan administrators for a potential explanation of the use of the residual rents provided Blues' plans by the regulatory advantage. With regulatory-advantages X-inefficiency, or administrative slack, can be explained by the property rights model of not-for-profit firm behavior.

Eisenstadt and Kennedy (1981) and Kass and Pautler (1979) argue that administrators use plan control to capture the rents generated by regulatory advantages in a manner that maximizes their utility functions. Clearly this goal is inconsistent with the goal of output maximization of a plan conducted for the benefit of the insureds. Utility maximization may take the form of excessive administrative salary and compensation packages (Williamson, 1964; Arnould, 1982), inefficient expansion of the administrative staff (Edwards, 1977), and the provision of a variety of managerial emoluments. The result of any of these forms of expense preference behavior is an increase in a potentially equivalent to the cost reductions generated by the regulatory advantage or monopoly rents in the absence of regulatory advantages. Thus, as depicted in Figure 1, equilibrium output would not expand to $Q_c$, but would remain at $Q_8$ if all units were extracted by plan administrators.
**Provider Behavior**

If monopoly rents and/or rents generated independently by regulatory advantages are captured by consumers or plan administrators prices of providers' services will remain constant. Alternatively, providers may use plan control to gain rents from the plans. A variety of analytical models have been used to explain this behavior.

First, we will describe health insurance markets in which the dominant Blue Shield plans have no regulatory advantages and are controlled by providers. Eisenstadt (1979) used a dominant firm price leadership model to explain the behavior of provider controlled plans. He argued that doctors would increase reimbursement levels of Blue Shield plans. Blue Shield plans not having regulatory advantages will not be placed at a competitive disadvantage with commercial insurers because, in the absence of fee discrimination, higher reimbursement levels will raise the cost or force a reduction in the level of coverage provided by the commercial insurers as well as the Blues. The parallel oligopsony model developed to explain the behavior of plans not controlled by providers predicted that those providers would receive a competitive level of remuneration, as would commercial suppliers. Sloan (1980a) used a bilateral monopoly model to predict similar results. In the context of our graphical analysis, the real price of medical care, in this case units of doctors services, is increased to, e.g., $P_1'$, with equilibrium output reduced to $Q_0$. As mentioned earlier, many single equation estimates have confirmed this result.

Medical societies have a number of methods available to raise provider fees. Methods of reimbursing providers differ across Blue Shield
Traditionally, most Blue Shield plans used fee schedules developed from relative value scales to set maximum reimbursable charges. Providers' incomes may be enhanced by setting the fees at higher levels and requiring more frequent updates of the fees. However, the difficulty and cumbersome problems of establishing and updating fee schedules restricts the rate of increases in fees. Therefore, it is not surprising to find that four of the five Blue Shield plans using fee schedules to determine reimbursement rates were not controlled, at the time of our sample, by the jurisdictional medical society.

Most Blue Shield plans have adopted the more flexible usual, customary, and reasonable (UCR) method to determine reimbursement rates. Fee profiles are established for physicians in an area. UCR reimbursement in the current period is defined as a certain percentile (usually the 90th) of actual fees charged in the previous period. The lagged relationship between actual charges and UCR levels provides an automatic update of fees, thus avoiding the cumbersome problem of determining the appropriate amount by which to increase fee schedules. Provider controlled boards can increase the frequency of the UCR update, e.g., from 12 months to 6 months, increasing provider reimbursements if actual charges are increasing. Also, Blue Shield boards have the authority to define the conditions for determining UCR methods. By establishing more lenient methods, e.g., by recognizing specialties, providing area pricing within plan areas, and more frequent updating, reimbursement will be greater.

Alternatively, many authors [Pauly (1968), Sloan (1980b), Freck and Ginsberg (1978)] have suggested that doctors use this market power to
Figure 2
induce increased demand for their services, i.e., generate "moral hazard" in the insurance market. This form of moral hazard increases the probability, \( p \), of state, \( S \). In the absence of significant income effects increases in \( p \) result in increases in the demand for medical care covered by the insurance. The result is shown in Figure 2 in the form of increased demand for medical care, DD'. Equilibrium output is increased to \( Q_M \) from \( Q_R \); price per unit of care is not increased but providers' incomes are increased through the provision of more units. An obvious alternative is one in which the monopoly power is dissipated in some combination of induced demand and price increases.

Finally, if provider controlled plans enjoy regulatory advantages the monopoly power of the providers will be further enhanced. All of the regulatory advantages could be exhausted by the provision of more insurance coverage, as shown by DD in Figure 1. Providers' incomes are enhanced by the provision of additional units of output to \( Q_R \). The welfare implications of this use of the regulatory advantages are identical to those plans run for the benefit of consumers. However, this would result in the exit of the commercial insurers not receiving regulatory advantages from the market, something that observation confirms has not occurred. Thus, these plans must be operated as doctors' cooperatives with the regulatory advantages being exhausted in higher prices per unit of provider service or some combination of higher prices and greater output. If the rents are captured in either of these manners, the provider controlled plans will be "administratively" efficient.

**Summary of Hypotheses**

Summarizing the hypotheses then, it is clear that the existence or nonexistence of provider control on Blue Shield plans can have different
effects. The most obvious variable affected is doctors' fees; this has been adequately examined in the previous single equation estimation studies. Clearly, administrative costs are also endogenous to the model; the controlling group will allow more or less of such expenses according to their own utility function. However, as was just demonstrated, the degree of provider control should also affect the number of insureds which choose Blue Shield over commercial firms. Additionally, it was also clear that the degree of provider control may affect the output in the market. Whether provider control is used to offset output has important obvious welfare implications relevant to the appropriate public policy actions pointed out by Crew (1969). Enhanced output may be of benefit to the insureds whereas price increases generate a deadweight loss to society. These effects are summarized by the following system of equations:

(1) \[ RCF = f(C, R, AC, DR, Q_S, X) \]

(2) \[ BMS = f(R, C, RCF, Q_S, X) \]

(3) \[ AC = f(C, R, BMS, Q_S, X) \]

(4) \[ Q_S = f(RCF, DR, X) \]

where

RCF = doctors' fees
C = doctor control
R = regulatory advantages
BMS = Blue Shield market share
AC = administrative cost
DR = doctor/population ratio
\( Q_S \) = quantity of physician services supplied

\( X \) = demographic variables describing plan area.

The predicted signs of the partial derivatives are as follows: For provider controlled plans with regulatory advantages:

\[ \frac{\partial Q_S}{\partial C} > 0, \]
\[ \frac{\partial BMS}{\partial C} < 0 \]
\[ \frac{\partial O}{\partial C} > 0 \]
\[ \frac{\partial AC}{\partial C} < 0 \]

All previous studies confirming or denying these hypotheses may have provided biased estimates due to their failure to account for the simultaneous process through which provider fees, coverage (or output levels), and market share of the Blues are determined. Clearly, where provider controlled plans have a regulatory advantage, output and the market share of the Blues may be influenced by the mechanism through which provider control is used to increase fees. Therefore, the inclusion of an output variable in equations containing control and regulatory advantages could bias the results. Similarly, controlled plans without regulatory advantages may increase both fees and output, generating a similar bias. Finally, regulatory advantages afforded noncontrolled plans may result in increases in output and Blue Shields' market shares. This follows from the fact that the rents to the regulatory advantage may be used to provide more attractive insurance policies. This generates further biases when control is included in a reduced form equation with market share and output.

Similarly, administrative slack should be minimized in provider controlled plans with regulatory advantages but, as in the case of
providers', fees Eisenstadt and Kennedy (1981) and Kass and Pautler (1979) found conflicting results. We suggest that the lack of robustness may be the result of endogeneity problems that can be overcome with the proposed simultaneous equation system.

DATA AND EMPIRICAL RESULTS

The data used to estimate the system of equations were drawn from various sources. Data for variables that describe provider control of Blue Shield plans come from Blue Shield plan applications for renewal of membership in the National Association of Blue Shield plans and Blue Shield plans' bylaws. Market shares of Blue Shield plans were calculated from Blue Shield Enrollment Reports and the Health Insurance Association of America's Source Book of Health Insurance Data. Administrative cost data were taken from Renewal Applications and premiums charged were found in Blue Shield Fact Books. Regulatory advantages were taken from the Survey of Extent of Regulation and Taxation of Blue Cross-Blue Shield Plans published by the National Association of Life Underwriters. The price variable, RCF, was taken from the Health Insurance Association of America's Prevailing Health Care Charges System. All other data including fees for specific procedures, are taken from the 1975 and 1976 annual surveys of doctors conducted for the Health Care Financing Administration.

Plan Specific Endogenous Variables

In an analysis of Blue Shield plans' bylaws it was found that potential medical society control of Blue Shield boards of directors does not take on a unique form. Some plan bylaws provide that a certain
number of board members be doctors; others that the medical society select a certain number of board members (M.D.'s and others), and still others provide for no medical society selection of board members but grant the medical society veto power over any changes in provider reimbursements. Therefore, we use a binary measure of medical society control, TMSCBD. TMSCBD is a dummy variable that takes on the value of 1 when the medical society either (1) elects, nominates, or approves physician and public members of the various Blue Shield boards or (2) has veto power over any board approved change in provider reimbursements. Clearly, TMSCBD provides the most comprehensive measure of medical society control.

The measures of doctors' fees used in the estimations, RGF, is the weighted average fee for all surgical procedures in each plan area as developed by Arnould and Eisenstadt (1981). Average charges for each plan area were deflated by an area cost of living index.\(^\text{10}\)

The market share of Blue Shield plans, BMS, is defined as the percentage of total policyholders (Blue Shield and commercial major-surgical) with Blue Shield surgical coverage.

We follow the lead of Eisenstadt and Kennedy (1981) by defining administrative costs as total administrative costs net of premium taxes and revenue earned from fiscal arrangements. The variable AC is administrative costs divided by the number of enrollees in the plan. As pointed out by Eisenstadt and Kennedy (1981, p. 30), this measure is more exclusive of revenues available for expense preference behavior of provider fees.

Output is measured as the number of operations performed, TOP. Unfortunately, the data available do not permit a measure of output
exclusively provided to Blue Shield patients. Therefore, factors influencing output other than provider control are included in the output equation. However, this measure should not cause significant bias because of Blue Shields' plans dominance of most markets. These other factors are the doctor/population ratio, Blue Shield market shares, and non-physician input costs.

**Exogenous Variables**

A number of exogenous factors may shift demand and supply for both doctors' services and Blues' plan membership. Clearly, there are a number of determinants of the demand for physicians' services. In this study we include median income in the plan area, MEDINC. Higher income increases the cost of lost work days, etc., thereby increasing the demand for doctors' services. Also, due to the labor intensity of doctors' practices, MEDINC may provide a measure of office practice costs. Percent of the population unionized, UNION, should decrease the extent of BMS if employee benefit packages provide greater medical insurance coverage than exists for the population as a whole. The percent of the population over 65 and eligible for Medicare coverage, POP65, will increase the demand for medical services if the elderly have a greater incidence of health care problems. However, Medicare reimbursements tend to be lower than those of private insurers, potentially reducing doctors' willingness to provide more than the necessary services for these patients. The surgeon/population ratio, SURPOP, is included. Moral hazard or supply generated demand may lead to greater demand due to more doctors practicing in the plan area. Additionally, SURPOP may lead to supply shifts. Therefore, the effect
of SURPOP on price may be positive or negative depending on its influence on demand. Other physician specific variables were not appropriate for this study because the unit of observation is the Blue Shield plan. Region dummies are included in the output equation to control for interregional differences in health, climate, etc.

Finally, recall that the central thesis of this paper has been that doctor control of Blue Shield plans which enjoy regulatory advantages will lead to effects on several important variables. Thus, in order to get a clearer picture of the dual effects of provider control and the regulatory advantage, we must add an interactive term. This term, DIFDUM, is the result of multiplying TMSCBD and DIFTX; by its nature, it allows comparison of joint effects. When doctors do not control the board of the Blue Shield plan, this term has a value of zero. However, when the plan is provider controlled, the term takes the value of the regulatory advantage.

Names and explanations for each of these variables are shown in Table 1.

**Empirical Results**

In this section, we present the results from the various estimations performed. As has been adequately emphasized, the estimation procedure employed was two stage least squares (2SLS).

The four structural equations used to explain the endogenous variables are:

\[
(1') \quad RCF = a + a_1TMSCBD + a_2DIFTX + a_3DIFDUM + a_4SURPOP + a_5MEDINC + a_6YEAR + a_7TOP + a_8AC + e_R
\]
Table 1

Variable List

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BNS</td>
<td>Blue Shield market share.</td>
</tr>
<tr>
<td>RCF</td>
<td>Weighted average prices of surgical procedures physicians charged commercial insurers in Blue Shield plan area.</td>
</tr>
<tr>
<td>TOP</td>
<td>Average number of operations performed per doctor in the Blue Shield plan area.</td>
</tr>
<tr>
<td>AC</td>
<td>Administrative costs net of premium taxes per enrollee.</td>
</tr>
<tr>
<td>DIFTX</td>
<td>Blue Shield tax advantage = Premium tax rate paid by commercial insurers - Premium tax rate paid by Blue Shield.</td>
</tr>
<tr>
<td>TMSCBD</td>
<td>Medical society control of Blue Shield board = 1 if the medical society either (1) elects, nominates, or approves physician and public members of the board or (2) has veto power over any board approved change in provider reimbursements.</td>
</tr>
<tr>
<td>SURPOP</td>
<td>Ratio of surgeons to population in the plan area.</td>
</tr>
<tr>
<td>POP65</td>
<td>Percent of population in the plan area over 65 years of age.</td>
</tr>
<tr>
<td>UNION</td>
<td>Percent of nonagricultural workers in the plan area who belong to a union.</td>
</tr>
<tr>
<td>YEAR</td>
<td>Dummy variable equal to 1 for year 1975.</td>
</tr>
<tr>
<td>MEDINC</td>
<td>Median income in plan area.</td>
</tr>
<tr>
<td>DIFDUM</td>
<td>Interactive term = (DIFTX) \cdot (TMSCBD).</td>
</tr>
<tr>
<td>REGIONS</td>
<td>A set of 3 dummy variables used to indicate the Northeast, North-central, South and West.</td>
</tr>
<tr>
<td>REGADV</td>
<td>The effect of regulatory advantages on provider controlled plans derived as the sum of the estimated coefficients on TMSCBD and DIFDUM.</td>
</tr>
</tbody>
</table>
\( (2') \quad \text{BMS} = b + b_1 \text{TMSCBD} + b_2 \text{DIFTX} + b_3 \text{DIFDUM} + b_4 \text{MEDINC} + b_5 \text{POP65} + b_6 \text{UNION} + b_7 \text{YEAR} + b_8 \text{TOP} + b_9 \text{AC} + \epsilon_B \)

\( (3') \quad \text{TOP} = c + c_1 \text{TMSCBD} + c_2 \text{DIFTX} + c_3 \text{DIFDUM} + c_4 \text{SURPOP} + c_5 \text{MEDINC} + c_6 \text{POP65} + c_7 \text{YEAR} + c_8 \text{RCF} + c_9 \text{REGIONS} + \epsilon_T \)

\( (4') \quad \text{AC} = d + d_1 \text{TMSCBD} + d_2 \text{DIFTX} + d_3 \text{DIFDUM} + d_4 \text{MEDINC} + d_5 \text{UNION} + d_6 \text{YEAR} + d_7 \text{TOP} + d_8 \text{BMS} + \epsilon_A \)

The results of the 2SLS estimation of these equations are shown in Table 2.\(^{11}\)

Recall that from the earlier discussion we identified 4 hypothesized effects of provider control of subsidized Blue Shield plans. First, we expected reimbursement to the physicians to increase, \( \partial \text{RCF}/\partial C > 0; \) second, we expected administrative expenses to decrease with provider control, \( \partial \text{AC}/\partial C < 0; \) third we expected that Blue Shield market shares in such provider controlled plans will be less than for non provider controlled plans as we should see doctors capturing the regulatory tax advantage enjoyed by Blue plans, \( \partial \text{BMS}/\partial C < 0; \) and finally, we are unsure as to the effect of provider control on output.

In addition to these hypotheses regarding doctor control of the Blue Shield plans, we also posited that either regulatory advantage or market power from other sources permitted doctors to exploit their controlling interest. In order to isolate the importance of the regulatory advantage from other potential sources of market power to any effects of doctor control, we must consider the joint effects of provider control and regulatory advantage; that is, we are interested in the sum of the coefficients on TMSCBD and DIFDUM. This is shown as \( \text{REGADV} \) at the bottom of Table 2. The proper \( t \) statistic to test the significance of a linear combination is
Table 2
Primary Specification I Structural Equations

<table>
<thead>
<tr>
<th>Dependent Variables</th>
<th>RCF</th>
<th>BMS</th>
<th>TOP</th>
<th>AC</th>
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<td>Intercept</td>
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<td>-0.025</td>
<td>-10.10</td>
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<td>(3.38)**</td>
<td>(.069)</td>
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<td>TMSCBD</td>
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<td>(1.87)*</td>
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<td></td>
<td>(2.05)*</td>
<td>(2.56)**</td>
<td>(1.02)</td>
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\[
t = \frac{(a_1 + a_2)}{\sqrt{\text{Var}(a_1) + \text{Var}(a_2) + 2\text{Cov}(a_1,a_2)}}
\]

where \( \mu \) is the mean value of \( \Delta P^TX \) and \( \text{Var}(\cdot) \) and \( \text{Cor}(\cdot) \) represent variance and covariance respectively. The value of this test statistic is shown under the label in parentheses under \( \text{REGADV} \) in Table 2.

Before turning to the examination of our hypotheses, note that the results in Table 2 show that the coefficients on the explanatory variables are of the expected sign in almost every case. We shall not dwell on these obvious explanations but we do point out those numbers that appear more interesting. The significantly negative effect of Blue market share on administrative cost signals the existence of economies of scale; all other things equal, the average administrative expense is lower for Blue plans with a greater share of the market. The very strong coefficient on \( \text{YEAR} \) in the output equation indicates that physician utilization dropped over time. The positive effect of \( \text{AC} \) on physician fees indicates that plans with higher costs had higher prices, a result which helps to confirm the validity of the estimation.

Turning to the coefficients dealing with doctor control and regulatory advantages, we find the estimation to be precise enough to refute several of the null hypotheses.

As can be seen from Table 2, the coefficient on doctor control has the expected sign in the fee equation, the market share equation, and the administrative cost equation; additionally, the value of the
t-statistic indicates rejection of the null hypotheses in each case. That is, we find that provider control leads to increased fees, lower market share for Blue Shield plans and less administrative expenses. These estimates imply that when doctors control the Blue Shield board of directors, they succeed in raising their own rents at the expense of subscriber advantages and administrative slack (X-inefficiency).

The output equation, TOP, provides ambiguous results. Recall, we were not certain as to the predicted effect of doctor control on output. While the coefficient of control in the TOP equation is negative, it is not significant at the 10% level for a two-tailed test. Thus, we cannot support the hypothesis that output changes, and we certainly found no evidence suggesting an increase in output in doctor controlled plans.

We now examine the value of REGADV to determine if regulatory advantage provides further price and/or output enhancement in provider controlled plans. REGADV has the same sign as the coefficient on doctor control. The t-statistic associated with this term indicates that regulatory advantages in provider controlled plans have a significant effect on the dependent variables in the fee equation, the market share equation and the administrative cost equation. In fact, in each case the level of confidence in the estimate is greater than in those plans without regulatory advantages. As before, there is no evidence of significance in the output equation.

The implication of this result combined with those above is that the regulatory advantage is crucial in the ability of doctors to use any control over Blue Shield plans. While the coefficient on doctor
control, TMSCBD, indicates the effect of doctor control on a plan with no concern over the presence of regulatory advantages, the interaction term reflects the total effect of doctor control and the regulatory tax advantages. Although the estimates are of more statistical significance in the latter, surprisingly they have less absolute impact on the explained variables, RCF, RMS, and AC. Evidence of significantly greater output being consumed by insureds will provide support for the hypotheses that providers share the rents with the insureds in markets where the Blue Shield plans operate with regulatory advantages. However, no such evidence was found.

CONCLUSIONS

This research should put to rest many issues pointing to weaknesses in previous attempts to document the effects of provider control of Blue Shield plans. Numerous hypotheses are supported under the scrutiny of two stage least squares estimations. Provider control results in higher fees and, as might be expected, a reduced Blue Shield market share due to the doctor controlled plans being relatively less competitive with commercial plans.

No support was found for the hypothesis that providers extracted rents in controlled plans by increasing output. This may be a phenomena resulting from the service benefit plans common to Blue Shield. Consider the scenario where the plan is not doctor controlled. Under a service benefits plans providers can extract higher incomes by engaging in a form of activity that results in moral hazard by encouraging forms of elective surgery covered by the plan. However, our results indicate
that market power and regulatory advantages permit providers to extract higher rents without enhancing output.

Evidence was found to support the hypothesis that provider controlled plans are more efficiently administered. It was found that administrative costs tend to be less in provider controlled plans. This follows from the expectation that when providers control plans rather than administrators, less administrative slack occurs; doctors will capture a large share of any residual rents. However, this also provides strong evidence that nonprovider controlled plans, at least a significant proportion of the rents, are captured by plan administrators and are not passed on to consumers in the form of greater coverage.

Finally, we found strong evidence that three of the endogenous variables were consistently significantly influenced by regulatory advantages enjoyed by Blue Shield plans. While earlier single-equation studies that assumed doctors with control used the Blue plans' market power to extract rents, we find that the regulatory advantage is a significant source of those rents. As shown in Figures 1 and 2, Blue plans controlled by doctors use those rents to increase their reimbursement at the expense of insured subscriber coverage and administrative costs.
Footnotes

1. See Arnould and DeBrock (1982) for a discussion of the relative importance of Blue Shield market share in the efficiency of the equilibria in health care markets.

2. Enabling legislation in many states required Blue Shield plans to use community rating. Various forms of community rating still exist in many Blue Shield plans. In those areas the commercials may find niches in markets where Blue Shield has regulatory advantages by offering plans that experience rate the enrollees.

3. Vogel (1977) took into account tax differentials enjoyed by certain Blue Shield plans but did not consider provider control.

4. In the absence of insurance, DD is generated from a standard one period utility maximization problem:

   \[
   \max U = f(X, H) \\
   \text{subject to } Y = pX + p_H H
   \]

   where \( U \) represents utility; \( X \) is a vector of all goods except health; \( H \) represents units of health; \( Y \) is total income, \( p \) is a vector of prices of \( X \), and \( p_H \) is the price of health care.

5. Freck (1981) defines "idealized" insurance as insurance that has no adverse incentives, such as, moral hazard, or subsidy effects.

6. Freck and Ginsberg (1974) found \( \alpha \) to be significantly greater for Blues' plans than for commercial insurers. However, their empirical model did not relate that difference to regulatory advantages or plan control.

7. An exception to this may occur if rents are captured by consumers in the form of greater insurance coverage and \( MC_o \) is increasing.

8. Sloan and Feldman (1981) and Arnould and Eisenstadt (1982) show that point of sale price discrimination is no longer a widespread strategy in the physician service market.

9. Empirical evidence of the former result (higher prices) was found by Arnould and Eisenstadt (1981), Sloan (1980a), and Kass and Pautler (1979). However, the significant relationship between Blue Shields' market shares and regulatory advantages found by Freck (1979) and Greenspan and Vogel (1979) suggest that the rents are captured in both higher provider prices and greater output.

10. Cost-of-living deflators were derived by calculating a weighted average of the urban and regional cost of living values. If the plan area contained no city for which BLS cost-of-living are published, the nearest BLS city was used.
11. The coefficients of the region dummies in equation (3') are 1.63 for Northeast, 3.41 for North-central, and -1.65 for the South; all are measured with very poor precision.
REFERENCES


