

**BIOGRAPHICAL SKETCH OF
SIMONETTI SAMUELS**

Ms. Samuels, a well-known expert in health care economics, is assistant professor of law at Loyola University's Institute for Health Law. Previously, she directed the American Hospital Association's Division of Economic Analysis; concurrently she served as senior economist for the AHA and as an assistant director of the Hospital Research and Educational Trust. At the AHA, Professor Samuels supervised, designed, and executed theoretical and empirical research to analyze economic, policy, and legal issues facing the Association.

Professor Samuels received a law degree and a master's degree in economics from the University of Wisconsin - Madison and is completing a Ph.D. in economics. She is a member of the Illinois state bar. Professor Samuels' expertise is sought frequently by hospitals and leading law firms. She uses the experience gained through her consulting and legal experience in health care and other regulated industries to help shape policy decisions for the hospital industry.

The University of Chicago
Center for Health Administration Studies

Hospital Regulation and the Provision of Charity Care

Simonetti Samuels, J.D.
Assistant Professor of Law
Institute for Health Law
Loyola University

Ph.D. Candidate in Economics
University of Wisconsin at Madison

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HOSPITAL REGULATION AND PRICING OF HOSPITAL SERVICES:

IMPLICATIONS OF

"THE THEORY OF ECONOMIC REGULATION"

SIMONETTI SAMUELS
INSTITUTE FOR HEALTH LAW
LOYOLA UNIVERSITY CHICAGO

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Overview

An analysis of price responses for the hospital industry have led industry researchers to conclude that hospitals do not engage in profit-maximizing behavior. In particular, empirical studies have shown that hospitals engage in "cost-shifting" which is inconsistent with the neoclassical profit-maximizing model. (In addition, studies of competition yield results contrary to the traditional antitrust paradigm--research shows that more concentrated markets exhibit lower prices than their less concentrated counterparts--suggesting that monopoly position does not yield monopoly profits in the hospital industry.) This anomalous results has been problematic for policymakers in search of a model which will permit accurate predictions of the impact of potential policy changes on the hospital provider.

Prior studies have ignored the effect of political transfers on the pricing behavior of the hospital industry. As described in the studies by Stigler and Peltzman, a regulator will redistribute the profits of a regulated industry in a manner which maximizes the regulator's political support.

This paper provides a stylized model of hospital health care supply which considers the impact of the political effect on hospital

pricing decisions. An objective function for hospitals is defined which assumes that hospitals operate in regulated as well as subsidized markets. It is assumed that hospitals maximize profits subject to a regulatory tax/subsidy function which affects private pay profits--this represents the political wealth transfer from consumers/taxpayers to producers or vice versa.

Cost shifting and the neoclassical model of profit maximization

Cost-shifting in the hospital industry is generally used to refer to the practice of increasing prices to private pay patients in response to a decrease in reimbursement by government payors such as Medicare and Medicaid. As Dranove has argued, cost shifting should not be confused with price discrimination and the resulting "cross-subsidization" which may occur. (Dranove, p.48) Cross-subsidization is a static concept, it refers to persistent price/cost differences across consumer groups. Cost-shifting, on the other hand, refers to the response of a firm to a single sector profit shock. (Dranove, p. 51). Possible single sector profit shocks include a reduction in the government reimbursement rate, a reduction in costs for one category of patients (not an overall cost increase/or decrease), and single sector demand shifts or elasticity changes.

Cost-shifting is inconsistent with the predictions of the neoclassical model of the price discriminating profit maximizer.

Assuming the hospital is free to set the profit maximizing price in the private pay market, and the government lowers the reimbursement rate in the government pay market, the profit increasing response would be to reduce rather than increase prices in the private sector.

Several researchers have used empirical evidence of cost shifting to support the conclusion that hospitals do not profit maximize, without specifying an alternative objective function. (See for example, Hadley and Feder). Other studies have modified the standard neoclassical model to reflect special features of the hospital market. (See for example Hay, Foster). While these models would predict cross-subsidization across patient markets, they yield the same prediction as the traditional neoclassical model with respect to single sector profit shocks--the price discriminating monopolist will lower, not raise prices, in response to a decrease in the government reimbursement level.

Dranove, on the other hand, specifies an objective function which would predict a cost shifting response to a single sector profit shock. In his model for hospital behavior, which he refers to as the 'voluntary' objective function, Dranove assumes that a hospital's objective function may contain several factors, not only a profit motive. In addition the hospital may desire to increase output, for the purpose of providing charity care, improving access or simply increase the demand health care for its medical staff.

Comparative statics of this 'voluntary' objective function reveals that cost-shifting is predicted if the hospital is not solely a profit maximizer, and faces a demand curve of finite elasticity. (Dranove, p. 50).

The key feature of Dranove's model which is important here is that cost shifting behavior is attributable to the objectives of the hospital, and not necessarily the result of regulatory pressures.

"The theory of economic regulation" as applied to the hospital industry

The model specified below is motivated in spirit by the model of the demand and supply of government regulation in the political market as developed by Stigler and Peltzman. According to this model of regulation, the political market is concerned with maximizing votes which can be obtained through the transfer of wealth to various producer and consumer constituencies who bid to tax the remaining groups. Several factors will limit the success of the potential bidders. In particular group size will affect the costs of using the political process. As Stigler concludes, a smaller compact group is more likely to be successful than a large group with diffuse interests. In addition, the costs of organizing opposition to the transfer will also influence the probability of obtaining a wealth transfer. Therefore, a small homogeneous group

of producers are more likely to be successful bidders than the diffuse consumer groups that they serve.

This model of regulation predicts that price adjustments to cost and demand changes in a regulated industry will contain both political and economic components. If the political component is empirically important, then the observed prices will differ from profit maximizing prices which one would expect from a monopoly or cartel. In particular, the political effect will result in an attenuation of overall price increases when demand increases, and an amplification in price increases when costs increase. The Stigler/Peltzman model also has relevant conclusions with respect to price discrimination across consumer groups in a regulated industry. The political effect will result in the taxation of profits, and thereby attenuate the firm's ability to price discriminate.

Of particular importance here, the political effect will influence the market response to single sector profit shock. For example, a demand shift in one consumer sector will encourage the regulator to permit price, and thereby profit, increases in that sector, as would be observed in the classic profit maximizing model. In addition, however, the increased political "wealth" now available can be used to reduce price (or increase subsidies) to other consumer groups, and attenuate price increases in the sector affected by the profit shock. If the political effect

predominates, then one would observe price increases for the consumer group affected by the single sector profit shock to be accompanied by price decreases for other politically favored consumer groups. In other words, one would observe cost-shifting.

While the results with respect to cost-shifting behavior implied by the Dranove and Stigler/Peltzman models are strikingly similar, their policy implications are different. In particular, modelling industry behavior using the Dranove model could result in erroneous conclusions over time if the regulator's objective function changed. In the short run, changes in the parameters which could affect the regulator's behavior, but not the hospital would also lead to incorrect predictions.

The hospital industry is subject to a wide variety of regulations. It is not unreasonable to assume that overall these regulations serve to distribute profits and subsidies between hospital providers and consumer groups.

A simple model of regulatory "taxation" on hospitals

Peltzman formalized the objective function of the regulator who is regulating prices for a good sold to two separable buyer groups in the following manner:

$$\text{Max } L = M(p_1, p_2, r) + k(r - f(p_1, p_2, c))$$

where:

M is the majority the regulator wants to maximize
p1,p2 are average prices for two consumer groups
r profit level of the producer
c is the cost of production for group 1 (it is
assumed that it costs nothing to produce for group
2)

$$f1, f2 \geq 0$$

$$f11, f22 < 0$$

$$fc < 0$$

cross group effects are ruled out, so that

$$M12 = M1r = M2r = f12 = 0.$$

Comparative statics are then performed to analyze the impact on prices and profits of a shift in the demand (y) for group 1. Peltzman decomposes $dp1/dy$ into three components: the "taste" shift, the "substitution" term and the "political wealth" effect. The impact of the demand shift will have an ambiguous impact on how responsive group 1 is to a decrease in price (taste shift $>$ or $<$ 0). The substitution effect reduces the cost of collecting wealth in the form of transfers from the higher demand group (substitution effect $<$ 0). Finally, the wealth effect uses the increased wealth generated by the shift in demand to price increases. For group

two, dp_2/dy also consists of the three components. The taste effect is ambiguous here. The substitution effect will result in a reduction in prices for group 2, given that regulator can gain more from taxing group 1. Group 2 will also be benefitted by the wealth effect. The increase in wealth due to the increased demand is distributed to consumers in the form of reduced prices, and to producers in increased profits.

To fully incorporate the impact of the regulator's actions on the hospital, it would be necessary to model the regulators objective function and incorporate this constraint into the hospital's objective function. Given that these changes undoubtedly occur over time, ideally one would model the hospital's behavior as a reaction function to the regulator's actions.

Instead, a simplified model which attempts to incorporate the regulatory pressure faced by the hospital is presented. It is assumed that the regulatory taxes or subsidizes profits in the private pay sector, and sets price and quantity in the Medicare/Medicaid market. (While the model is presented as a two-sector model here, it would be more interesting to consider a third sector--uncompensated/unsponsored care). The major feature of this model is that it incorporates the regulator's ability to tax or subsidize different market segments faced by the hospital. In this way the regulator can affect the price in each market and profits received by the provider. It is assumed that this tax/subsidy, z ,

is a function of the private pay price, p_1 , and the Medicare/Medicaid reimbursement rate, R_2 . To simplify the mathematics, it is assumed that costs are separable, but the model could be adjusted to reflect different cost assumptions. Further, it is assumed that the hospital maximizes profits subject to this tax/subsidy.

The hospital's objective function can be summarized as:

$$\text{Max}_{p_1} r \quad z(p_1, p_2) (p_1 q_1(p_1) - c(q_1)) + (R_2 q_2 - c(q_2))$$

The first order conditions for a maximum yield:

$$dr/dp_1 = dz/dp_1 (p_1 q_1(p_1) - c(q_1)) + z (MR_1) = 0$$

where $MR_1 = p_1 dq_1/dp_1 + q_1 =$ marginal revenue for group 1

Totally differentiating the first order condition, and permitting p_1 and R_2 to vary:

$$dp_1/dR_2 = -(d^2z/dp_1dR_2 (p_1 q_1(p_1) - c(q_1)) + dz/dR_2 MR_1) / (SOC)$$

where SOC = second order condition for a maximum, and therefore < 0

While it is impossible to sign this derivative without knowing the underlying taxation function, using Peltzman's model as a guide it is probably ^{negative} positive. First, he assumes that there are no intergroup effects, implying that the first term is zero. Secondly, a higher price on R2 means there are more wealth to distribute in the form of lower prices to group 1 (p_1 goes down) and producer profits are permitted to go up, implying dp_1/dR_2 is negative. This model would predict cost-shifting behavior.

Conclusion

There has been much debate about whether hospitals are able to "cost-shift" reductions in public pay payments to the private health care sector. Classic neoclassical models of a profit maximizing, price discriminating monopolist would predict just the opposite effect. A recent model of hospital behavior develops a 'voluntary' objective function which assumes that hospitals maximize both profits and output. (Dranove) This model predicts that in the face of a single sector shock Medicare and private pay prices will in some circumstances move in opposite directions.

Stigler/Peltzman's model of regulated industries, as applied to the hospital industry, would also yield a prediction of cost shifting behavior under certain assumptions. The motivational factors

behind the two models differ dramatically, however, and the policy application of the wrong model could lead to incorrect predictions over time.

In a model which assumes profit maximizing behavior on the part of hospitals, but incorporates a tax/subsidy constraint on profits to reflect the regulators goals of redistributing wealth across producer and consumer groups to maximize his/her majority of political support. It captures the spirit of the regulatory models in an oversimplified manner, but also suggests that cost-shifting would occur.

Further research is necessary to ascertain whether the political effect in fact influences pricing behavior in the hospital industry in order to assess the impact of future policy changes. In particular, the specification of the regulator's objective function could be important in predicting the effect on privately subsidized uncompensated care when government pay subsidies are reduced. This author intends to extend the results here to a three-sector model to permit analysis of the charity care market.

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