Rising Health Care Costs and the Two Price Market

The Impact of Third-Party Payers

Except where reference is made to the work of others, the work described in this thesis is my own or was done in collaboration with my advisory committee. This thesis does not include proprietary or classified information.

_____
Joshua J. Robinson

Certificate of Approval:

_____
Michael Stern
Assistant Professor
Economics

_____
Richard O. Beil, Chair
Associate Professor
Economics

_____
T. Randoph Beard
Professor
Economics

_____
George T. Flowers
Interim Dean
Graduate School

RISING HEALTH CARE COSTS AND THE TWO PRICE MARKET

THE IMPACT OF THIRD-PARTY PAYERS

Joshua J. Robinson

A Thesis

Submitted to

the Graduate Faculty of

Auburn University

in Partial Fulfillment of the

Requirements for the

Degree of

Master of Science

Auburn, Alabama
December 17, 2007

RISING HEALTH CARE COSTS AND THE TWO PRICE MARKET

THE IMPACT OF THIRD-PARTY PAYERS

Joshua J. Robinson

_____

Signature of Author

_____

Date of Graduation

Vita

Joshua J. Robinson, son of James C. and Valerie Robinson, was born April 3, 1984 in Fairfield, AL. He married his wife, Rachelle, on August 9, 2003. He graduated Summa Cum Laude from Huntingdon College on May 6, 2006 with a double major in Mathematics and Business Administration with a concentration in Economics and Finance. In August of 2006, Josh entered the graduate school at Auburn University. He has been accepted to pursue his PhD in Economics at Emory University in Atlanta, GA.

Thesis Abstract

Rising Health Care Costs and the Two Price Market

The Impact of Third-Party Payers

Joshua J. Robinson

Master of Science, December 17, 2007
(B.A. Huntingdon College—Montgomery, 2006)

34 Typed Pages

Directed by Richard O. Beil

Martin Feldstein wrote several important papers in the 1970s concerning the reciprocal growth of health care inflation and insurance levels. This paper attempts to develop a new theoretical model based on a two-price market that will explain the reciprocal nature discovered by Feldstein, but is not dependent purely on moral hazard to explain increased costs. A general two price model is developed, and then applied to the health care industry.

Style manual or journal used <u>Journal of Approximation Theory (together with the style</u> <u>known as "aums"). Bibliograpy follows the American Economic Review style.</u>

Computer software used <u>The document preparation package T_EX (specifically L^AT_EX)</u> <u>together with the departmental style-file `aums.sty`. Graphics preparation done using</u> <u>Grapher and Seashore.</u>

TABLE OF CONTENTS

LIST OF FIGURES

Rising costs in the health care industry have been a contentious economic and political topic for number of years. In 2004, nearly 1.9 billion dollars, was spent on health care in the United States, an increase of nearly 8 percent from the previous year. Per capita expenditures on health care have increased from 148 dollars in 1960 to over 6000 dollars in 2004. Moreover the health sector is absorbing an ever increasing percentage of GDP. In 1960 health care expenditures accounted for only 5 percent of GDP; current figure is about 16 percent (National Center Health Statistics 2006) .

Although we can track health care inflation quite well, there is little consensus as to why these costs continue to accelerate. It is often the case that policy analysts and political scientists blame greedy hospital administrators and physicians (Brewster and Stowers 2004). While this may be the case in some instances, it is unlikely to be a major factor. Martin Feldstein (1971, 1973) did research on hospital cost inflation—which remains the largest component of health care expenditures (BCBS 2007). He restricted his studies to not-for-profit hospitals, which rules out greed a determinate, yet there were still massive cost increases. Technological advances and the development of new drugs are also cited as sources of cost increases (Brewster and Stowers 2004). However as both Feldstein (1971) and Newhouse (1996) point out, factors like greed and technological advancement only explain how costs increases. They do not explain why costs were able to increase or why the trend of inflation continues. If we can understand the why, we may be able to check this inflation in time. So what is the why?

Feldstein published a series of papers in the 1970s examining health care inflation. He first showed that a permanent excess demand for physician services allows doctors a great deal of control over the quantity of care provided and the price charged. Consequently, as the patient's ability to pay increased, physicians' fees increased (Feldstein 1970). In another paper, he examined price increases in the not-for-profit hospital industry. He found that increases in the demand for hospital care allowed hospitals to increase prices, which, due to their non-profit nature, translated into increases in the quality and sophistication of the care provided (Feldstein 1971). These factors were Feldstein's "how", but why were patients becoming increasingly able to pay physicians? And why was the demand for hospital care increasing? Feldstein's answer was third-party payers.

Feldstein (1973) discovered a statistical relationship between the percentage of health care expenditures paid for by third-party payers and the price of care. It is an endogenous relationship. An increase in insurance increases utilization of care, which, in turn, increases price (assuming a fixed supply). On the other hand, Feldstein also found empirical evidence to suggest that an increase in price increases the demand for insurance[1]. Additionally, he found that Americans were over-insured by a significant degree, and there was room for large welfare gains by reducing the level of insurance[2].

---

[1]There are two factors at play here. First, the increase in price increases net health care expenditures, which increases the demand for insurance. However, the increase in price lowers the quantity of medical care demanded, which would reduce the demand for insurance. Feldstein found that the former effect dominated the latter. In a later study (Feldstein 1977), he discovered that the quality change resulting from the price increase causes and outward shift in the demand for medical care. This exacerbates the direct relationship between price and insurance.

[2]This study was repeated by Feldman and Dowd (1991). They found price-elasticities that were lower than Feldstein's estimates, and used an estimate of absolute risk-aversion that was much higher than the one used in Feldstein's model. They found that Americans were not as over-insured as Feldstein estimated; thus the welfare loss of excess insurance was smaller, but still significant.

In a more recent study, the growth of per capita medical spending in the US from 1960 to 1993 was examined empirically (Peden and Freeland 1998). They included explanatory variables such as the coinsurance rate[3], income, and technology. They found that coinsurance levels were responsible for almost half of growth in per capita medical spending in the 34 year period. Moreover, from 1983 to 1993 the low coinsurance level accounted for 60 to 65 percent of the spending growth.

The question now becomes what is it about introducing a third-party payer into the medical care market that causes such massive inflation? Many economists try to explain this phenomenon with the notion of *moral hazard*. Because insurance effectively lowers the price of medical care to almost zero at the time of utilization, insured individuals will likely increase utilization of health services until their marginal utility of medical care is near zero as well[4](Feldstein 1971, Newhouse 1996). Additionally there is an *incentive compatibility problem* (See Section 4.2) between the doctor and the insurance company. The insurer hires a physician as its agent to provide health care to its customers, the patients, for as little cost as possible. However, because his own profit is also part of the doctor's utility function, there is incentive to over-provide care. Schneider and Mathios (2006) showed both theoretically and empirically that this was the case with traditional fee-for-service insurance—even when monitoring efforts are employed. Feldstein (1970) found empirical evidence that physicians actually raise fees when insurance levels increase. The over-utilization by both patient and

---

[3]Here defined as the percent of per capita spending not paid for by third-party payers (government or private insurance) nor subsidized through tax breaks.

[4]That is, the additional utility gained by obtaining one more unit of health times the additional health resulting from consuming one more unit of medical care. This is based on the derived demand for medical care (see Santerre and Neun 2006). The consumer utilizes an optimal level of medical care when the marginal utility of medical care divided by the price of medical care is equal to the marginal utility of all other goods divided by their respective prices. Thus, assuming marginal utility is downward sloping, a lower price would mean it would be optimal to lower the marginal utility by increasing consumption of the good.

doctor is often collectively referred to as moral hazard. Newhouse (1996) cites there is strong evidence of moral hazard in the American health care system. In a randomized experiment he conducted, patients with full coverage insurance spent about 40 percent more than those with a high deductible.

Can this really be the whole story, though? Schneider and Mathios (2006) showed that moral hazard could be effectively held in check by using capitation, an agreement between insurers and physicians in which physicians engage in supply-side cost sharing. However, despite health maintenance organizations (HMO) and preferred provider organizations (PPO), which engage in a form of capitation, becoming the dominant trends in insurance throughout the 1990s (Brewster and Stowers 2004), medical costs have continued to rise and continue to swallow a larger and larger percent of GDP in the US.

In this paper, I will posit a new theoretical model for health care inflation. Like Feldstein's models (1970, 1971, 1973, 1977), the model presented here will center around the reciprocating relationship between increasing insurance levels and price of care. However, unlike Feldstein, my model is based on a bifurcated price market.

There is no such thing as a uniform price in the medical care industry. According to a Pricewaterhouse Copper (PWC) (2005) report, large private and government insurers negotiate with medical care providers to pay only a fraction of the list price of the procedure, while uninsured individuals often pay list price. In fact, until 2004 hospitals could not offer discounts to the uninsured without it affecting their Medicare reimbursement. The gap between the list price and the negotiated fee can be extremely large; recent data gathered about prices for appendectomy procedures (PWC 2005) showed that managed care providers and government insurance programs typically pay less than a third of the hospital list price

on average. I will argue that the existence of a two price market is itself a source of perpetual medical cost inflation.

The rest of this paper is organized as follows: in Chapter 2, I will posit the general theoretical model for a two-price market. In Chapter 3, I will apply this model to the medical care market. In Chapter 4, I will discuss the implications of the model developed. And in Chapter 5, I will provide some concluding thoughts.

The Theory of a First Mover Monopsonist

In this chapter the theoretical framework of a two-price market is developed[1]. In this market there are two buying blocks: a large firm with significant monopsony power and a competitive fringe of small buyers. In this model the mere existence of the large buyer creates a market with two prices. In later sections, this model will be applied to the health care industry, and I will argue that the two price market is a major source of health care inflation.

Assume there exists a firm with significant monopsony power, and assume there is a small fringe of buyers that behave as perfect competitors. Additionally, we will assume that part of the dominant buyer's monopsony power includes the ability to act as a first mover. That is, all buying decisions made by the monopsonist occur before the buying decisions of the fringe. The large buyer produces a good, X, using a variable input, q, and a fixed input, f, according to the production function

$$X = X(q, f) \tag{2.1}$$

Since the firm has monopsony power, it is not a price taker with respect to the variable input. Thus the purchasing price, p_d, for q is a function of the amount of the variable input used.

$$p_d = p_d(q) \tag{2.2}$$

---

[1]Blair and Harrison (1993) is used as a reference for the theory presented in this section

The function $p_d(q)$ comes from the supply curve for q. Thus we can assume a positive slope or $\frac{\delta p_d(q)}{\delta q} \geq 0$.

The firm's goal is to purchase inputs in such a way as to maximize profit, given by the function

$$\pi = \varrho \cdot X(q, f) - [p_d(q) \cdot q + \mu \cdot \overline{f}] \tag{2.3}$$

where ϱ is the output price[2], μ is the fixed input price, and $\overline{f}$ is the amount of fixed input. Since f is invariant in the short-run, the firm will maximize profit by adjusting the variable inputs. The first order conditions are

$$\frac{\delta \pi}{\delta q} = p \cdot \frac{\delta X}{\delta q} - \left[p_d(q) + q \cdot \frac{\delta p_d(q)}{\delta q} \right] = 0 \tag{2.4}$$

Since $\frac{\delta X}{\delta q}$ is the *marginal product* of the variable input, $\left(p \cdot \frac{\delta X}{\delta q} \right)$ is the *marginal revenue product*—that is, the additional revenue generated by a one unit increase in q. Since the dominant firm is buying all of its inputs at the same time, the purchase of an additional unit of q will increase cost by $p_d(q)$ as well as by the additional amount that must be paid for all other units of q as a result of $\frac{\delta p_d(q)}{\delta q}$ being positive. The sum of these two effects is know as the *marginal factor cost*.

$$MFC_q = p_q(q) + q \cdot \frac{\delta p_d(q)}{\delta q} \tag{2.5}$$

---

[2]Notice that if the firm has monopoly power as well as monopsony power that this value will not be exogenous. Rather it will be a function of the quantity of X sold. This will be explored further in Section 3

The first order conditions of the firm show in order to maximize profit the quantity of variable inputs must be chosen such that *marginal revenue product* equals the *marginal factor cost.*

So far this is standard monopsony theory. Now we must consider the competitive fringe. Since the dominant firm is allowed to make its buying decisions first, the competitive fringe faces a new vertical (price) axis set at the quantity, q_d, the dominant firm has chosen. That is, the price the competitive fringe will pay is determined by an altered inverse demand function.

$$p_f = p(q + q_d) \qquad (2.6)$$

Where p_f is the price the fringe will pay, q is the quantity the fringe will buy, and q_d is the quantity the dominant firm has chosen to purchase. Since the price of q is an increasing function of the amount of the input purchased, this will result in the competitive fringe paying more of each unit of q than the dominant firm. These results are displayed graphically in Figure 2.1.

The green marginal revenue product (MRP) curve is the monopsonist's derived demand for the input good; it represents the additional revenue gained from employing each addition input. The red marginal factor cost (MFC) curve is the incurred cost of employing each additional input. The monopsonist chooses a quantity of the input good such that its profit is maximized. As suggested by the first order conditions, this occurs when the MRP curve intersects the MFC curve at $Q_{Dom.}$. The suppliers are willing to sell a quantity of $Q_{Dom.}$ at a price of $P_{Dom.}$, which is the price the monopsonist pays. Once the monopsonist has made its purchasing decisions, the competitive fringe enters the market—their demand is represented by the blue curve labeled D. The monopsonist's ability to act as a first mover
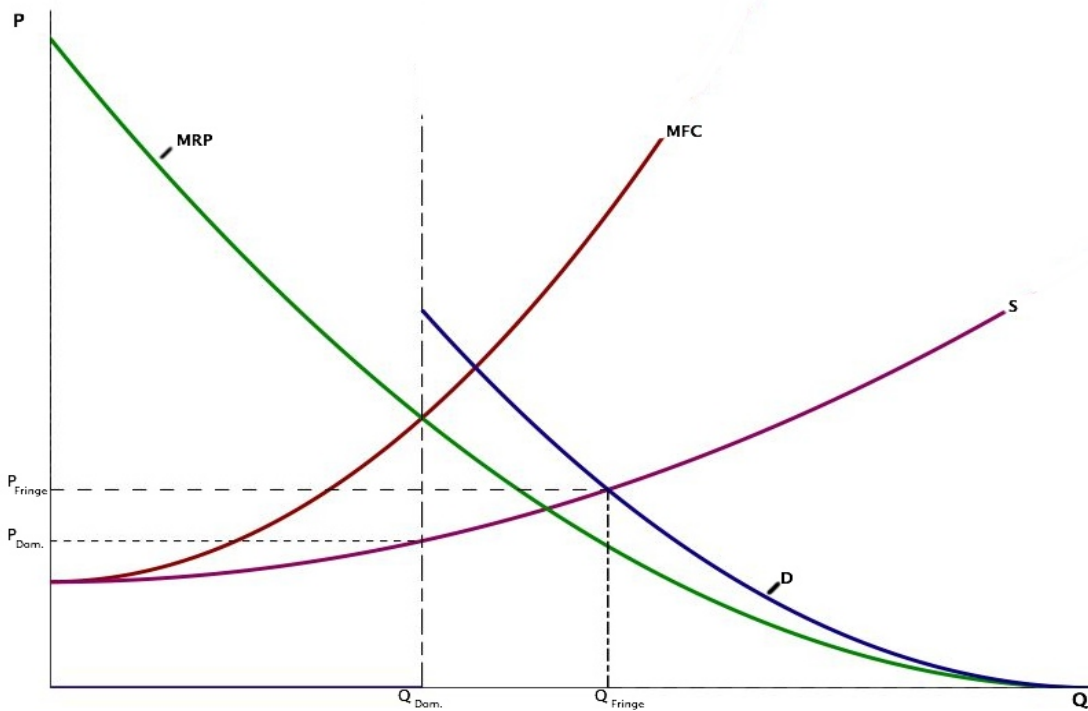
Figure 2.1: First Mover Monopsonist with a Competitive Fringe

creates a new vertical "axis" for the competitive fringe; graphically shifting the demand

curve outward[3]. Since the fringe is perfectly competitive, it has no negotiating power.

Thus the price paid by the fringe is determined by its demand curve's intersection with the

supply curve, which occurs at P_{Fringe}. The result is the monopsonist paying one price, and

the competitive fringe paying another, higher price.

In the next chapter, this general model will be adapted to the health care market.

Large third-party payers, like the government and large insurance corporations, will be the

---

[3]Although graphically the demand curve is shifting outward, the monopsonist has no direct effect on the demand of the competitive fringe. Effectively what is occurring is the supply available to the fringe is being reduced by the monopsonist's purchases.

monopsonist. Those individuals not represented by third-party payers will be the competitive fringe. It will be shown that the unique dependent relationship between these two buying blocks creates much more dramatic results than those of the general model presented above.

CHAPTER 3

Insurance as the First Mover Monopsonist

Now let us consider how the model presented in the previous chapter applies to the health care industry. For consumers, health care is a variable input that they use to produce personal health. However, in the United States only 13 percent of health care expenditures came directly out of pocket from the consumer. Most consumers contract the purchase of health care out to third-party payers in the form of purchasing health insurance. According to a 2005 US Census Bureau estimate, 68 percent of all Americans were covered by some form of private insurance. Many consumers' health care expenditures are covered by the federal and state governments in the form of public health insurance, like Medicare or Medicaid. The US Census Bureau's estimates say that a little more than 27 percent of Americans are covered by some form of publicly funded insurance. According to the Blue Cross Blue Shield (BCBS)*Medical Cost Reference Guide* (2007), private insurance pays for about 35 percent of national health care expenditures, and publicly funded insurance pays for about 46 percent of the health care bill.

By anyone's standard the federal government, who accounts for nearly half of all expenditures in the medical care industry, has significant monosony power. Blue cross Blue Shield, a private corporation, insures one third of Americans—the Alabama branch of BCBS covers over three quarters of the state's residence. Additionally, the prevailing trend in private insurance is to use HMO and PPO style reimbursement. These aggressive cost management efforts allow private insurer to pay reimbursements similar to those of Medicare and

Medicaid (PWC 2005). Hence it is realistic to assume that third-party payers in the health care industry have significant monopsony power.

Here we will assume a representative medical insurer is our monopsonist, and the some 20 percent of medical care paid for with private funds is our competitive fringe.

3.1 Insurance: Production and Profit

The insurance company produces medical care coverage. That is, it allows consumers to pre-pay a fixed amount, called a premium, for certain expected medical expenses during a specific amount of time. The insurer takes on the risk of the actual amount of medical expenditures its client will have, which are financed by collection of premiums based on expected medical expenses. The consumer bases his expected medical expenses on the fee he would pay the doctor per unit of care in the event of illness, $\mathcal{F}$, the units of medical care he expects to consume, and the probability of contracting the ailment that would make consuming this care necessary. Additionally, the consumer is *risk averse* with respect to income, which means his utility function is strictly increasing with respect to income ($\frac{\delta U}{\delta I} \geq 0$), but increases at a decreasing rate ($\frac{\delta^2 U}{\delta I^2} \leq 0$). Thus, the consumer does not pay the "fair" amount for insurance[1] . Since the insurance company will charge the maximum amount possible, it will charge the consumer a loading factor, $\mathcal{L}$, equal to the consumers *risk premium*, which is the ratio between the maximum premium the consumer is willing to pay and the fair premium[2]. Thus, the insurer collects revenues according to the following

---

[1]The actuarially fair price for insurance equals the total expenditure on care times the probability that care will be necessary. Thus if p is the price of a unit of care, q is the quantity of care necessary for the ailment, and ϕ is the probability of that ailment occurring, then $p \cdot q \cdot \phi$ is the fair actuarial price for insurance.

[2]It is important to remember here that the consumer is aware of the loading factor, and, because he is risk averse, would still rather buy the insurance than do without it. The more risk averse an individual is the higher the loading factor he is willing to accept.

equation

$$\mathcal{R} = \mathcal{L} \cdot \phi \cdot \mathcal{F}(x) \cdot x \tag{3.1}$$

Where ϕ is the probability of incurring an ailment, and x is the expected units of medical care needed. The expected fee, $\mathcal{F}$, is a decreasing function of x—that is, $\frac{\delta\mathcal{F}(x)}{\delta x} < 0$. This is because the pricing schedule for the insurance premiums is inherited from the consumers' demand for medical care. The value $\mathcal{F}$ reflects the price the consumer would pay for medical care without insurance.

The insurance company has a pricing advantage over the consumer. Because of its monopsony power, the insurer is able to negotiate lower fees for service. Additionally, the actual quantity of medical care purchased on behalf of the consumer is most likely different than the expected quantity, x. The bifurcated pricing is represented in the profit function.

$$\pi = \mathcal{L} \cdot \phi \cdot \mathcal{F}(x) \cdot x - \mathcal{N}(q(x)) \cdot q(x) \tag{3.2}$$

Where $q(x)$, the actual quantity of medical care purchased by the insurer on behalf of its customer, is an increasing function of the amount of expected care, x, purchased by the consumer. $\mathcal{N}$ is the negotiated price paid by the insurer to the doctor; it is an increasing function of the actual quantity of care purchased.

Because contract terms for medical care are made before the customer uses his insurance, the insurance company has no direct effect on the actual quantity of care it purchases. It can only influence $q(x)$ by varying the amount of expected care it will insure. Thus the insurer will maximize its profit function with respect to x[3]. The first order conditions are

---

[3]Some may be unsure about why I am using expected quantities instead of actual utilization. Besides having the benefit of simplifying the problem, there are several rational reasons to do this. As has been

given below.

$$\frac{\delta \pi}{\delta x} = \mathcal{L} \cdot \phi \cdot \left[\mathcal{F}(x) + \frac{\delta \mathcal{F}}{\delta x} \cdot x \right] - \frac{\delta q}{\delta x} \left[\frac{\delta \mathcal{N}}{\delta q} \cdot q(x) + \mathcal{N}(q(x)) \right] = 0 \qquad (3.3)$$

In the first part of this expression, $\mathcal{F}(x)$ is the additional revenue gain by selling an addi-
tional unit of expected medical coverage. Since the function, $\mathcal{F}$, comes from the consumer

demand, $\frac{\delta \mathcal{F}}{\delta x}$ is negative. Thus $\left(\frac{\delta \mathcal{F}}{\delta x} \cdot x \right)$ is the revenue loss on the other units from selling

the additional unit of coverage. The sum of these values multiplied by the probability of

medical incident and the loading factor is the insurer's *marginal revenue.* In contrast to

the generic bifurcated price model, the insurance company's marginal product is assumed

to be constant[4]. Thus in order to insure a downward sloping "demand" function for the

insurance company we must assume $\left(2 \cdot \frac{\delta \mathcal{F}}{\delta x} \right) > \left(\frac{\delta^2 \mathcal{F}}{\delta x^2} \cdot x \right)$[5].

Likewise, in the second part of the equation, $\mathcal{N}(q(x))$ represents the addition cost from

purchasing an additional unit of medical care, and $\left(\frac{\delta \mathcal{N}}{\delta q} \cdot q(x) \right)$ is the increased cost of all

other units resulting from the additional purchase. The sum of these values multiplied by

the change in q as a result of selling one more unit of x gives the insurer's *marginal cost.* The

optimality condition requires the insurers marginal revenues to equal its marginal costs.

---

mentioned several times in this paper, the majority of insurers have switched or are switching to a managed
care platform. Under this format, insurers contract with medical service providers prior to utilization and
negotiate a fee schedule. Since this is done before services are rendered, the quantity consideration in
the price negotiations must be estimated based on the number of insured—that is, an expected quantity.
Additionally this also justifies the insurer's first-mover status.

[4]This decision was made to simplify the problem. In reality, the insurer most likely has production
restraints in its ability to process large numbers of claims as well as inheriting production constraints from
the medical providers. However, this complicates the model severely, and a downward sloping demand curve
is easily attained by assuming the consumer has a downward sloping demand for medical care.

[5]If the marginal revenue product curve is to be downward sloping, then we need $\frac{\delta \mathcal{MRP}}{\delta x} = \mathcal{L} \cdot \phi \left[2 \frac{\delta \mathcal{F}}{\delta x} + \frac{\delta^2 \mathcal{F}}{\delta x^2} x \right] < 0$. Since $\frac{\delta \mathcal{F}}{\delta x} < 0$ we must assume $2 \frac{\delta \mathcal{F}}{\delta x} > \frac{\delta^2 \mathcal{F}}{\delta x^2} x$ if we are to avoid making any as-
sumption about the second derivative of $\mathcal{F}$ that may limit its functional form and the generality of the
model.

3.2   The Competitive Fringe

In this version of the model, the competitive fringe represents all medical care purchases not made by way of insurance. This category of buyers defines a competitive fringe extremely well. There is a large number of small buyers who are price takers, and the group as a whole makes up less than 20 percent of all medical care purchases. The only additional assumption that will be made about this group for the medical market model besides the assumptions necessary to make them perfect competitors is that there medical consumption plans are realized. That is, because the fringe of buyers is not purchasing medical care in advance of actual usage, the model assumes the expected medical care purchases of the fringe equal the actual medical purchases $(x = q)$. The fringes inverse demand equation is as follows

$$\mathcal{F}(x) = \mathcal{F}(x + x_d) \tag{3.4}$$

Where $\mathcal{F}$ is the price the fringe pays, x is the quantity of medical care purchased, and x_d is the expected quantity of medical care purchased by the third-party payer. As in the general model, the existence of the monopsonist shifts the demand curve of the fringe outward, increasing the price they pay.

The next chapter will summarize the major results of the bifurcated price model applied to the medical industry. Using these results, this paper will explain both how and why third-party payers cause inflation in the medical care market.

CHAPTER 4

RESULTS AND APPLICATIONS

4.1 Third Party Payers and Cost

The major distinguishing feature of the bifurcated price model applied to the medical
insurance industry is that the price paid by the competitive fringe is a component of the
demand of the monopsonist. This small difference has a significant impact on the results of
the model. Remember that in the general two price model the monopsonist can affect the
price paid by the fringe (by increasing or decreasing its own demand), but the fringe has no
impact on the price paid by the monopsonist. The fact that the fringe price is an argument
in the monopsonist's demand equation means not only the demand of the competitive fringe
influences the demand of the monopsonist, but also that the model is potentially unstable.
That is, if the demand for either the monopsonist or the competitive fringe increases for any
reason, cost and demand could increase indefinitely. For example, if people become more
risk averse and purchase more insurance, the insurer's demand for expected medical care
will shift out. This will cause the quantity of expected medical care the insurance company
demands to increase. Because the quantity demanded by the insurer is the "axis" for the
competitive fringe, the demand of the fringe will also shift out. The result is that the price
paid by both insurer and fringe competitor increases. Additionally, because an increase
in the fringe price will increase the demand for insurance, and thus, the monopsonist's
demand for medical care, the insurer's demand curve will shift out further causing the
fringe's demand curve to shift outward as well. It is possible that there may not be a new
equilibrium; this process of repeated feedback could continue indefinitely. Thus, as far as
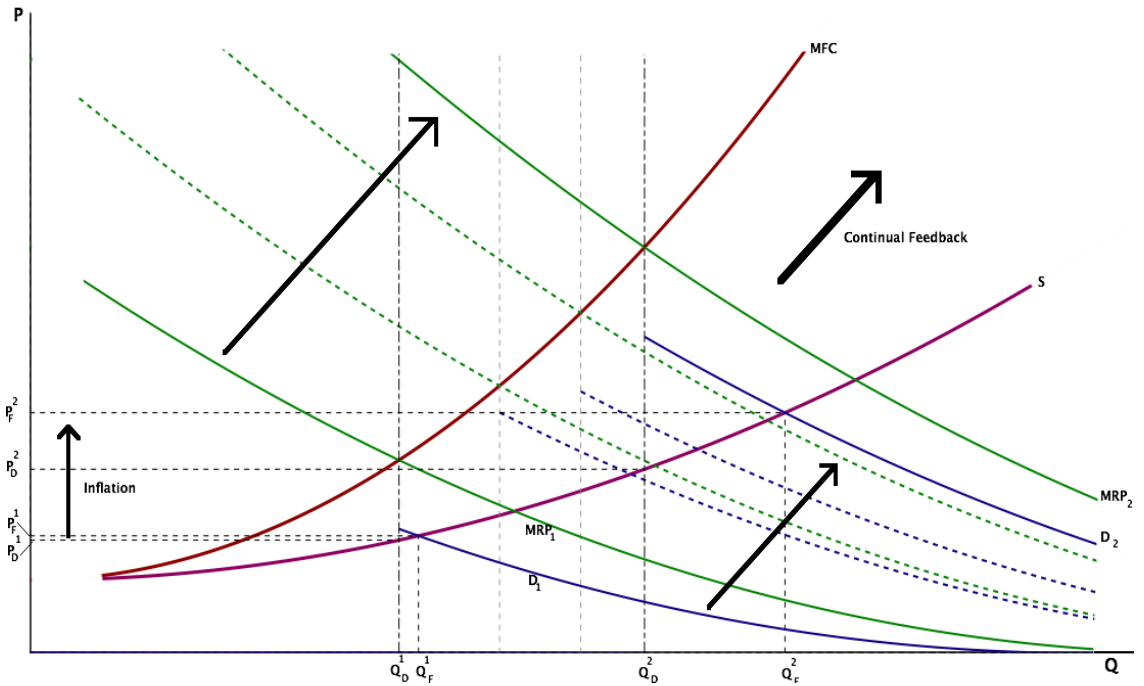
Figure 4.1: Continual Feedback Resulting from Third-Party Payer

the this model is concerned, any increase in demand from either the monopsonist or the competitive fringe may cause perpetual price increases. The results are shown graphically in Figure 4.1.

The green MRP curves represent the third-party payer's derived demand for medical care. The blue D curves represent the demand of the competitive fringe. Since the supply of medical providers is assumed to be fixed, neither the S curve nor the MFC curve shift. As the insurer's demand for care increases the vertical "axis" for the competitive fringe shifts outward, which shift the demand curve of the fringe outward. This shift causes the price paid by the competitive fringe to increase, which, in turn, increases the demand for insurance, and thus further increases the insurer's demand for medical care. A shift from MRP_1 to MRP_2 and from D_1 to D_2 causes the prices paid by both monopsonist and

17

competitive fringe to increase. Additionally, in this graph the difference between the prices has increased; this has further implications discussed in Sections **??** and 4.2. Notice that no new equilibrium is made.

If this model were to ever be used in an empirical application, a dynamic model would be more appropriate and informative. Depending on the functional form of the demand curves, supply curves, and marginal factor cost curve, the model may find a new equilibrium or it may be explosive. Either scenario would provide significant insight into the future of health care. Feldstein (1977) explored the dynamics of his inflation model using data from 1958 to 1973. He found that the reciprocating increases of insurance and price were dynamically explosive for nearly half of the time period explored (1958-1965). He explained the stabilization to be the result of quality increasing to a point where consumers were less sensitive to a quality change. It would be interesting to see an empirical test with a two price model to gauge the impact of recognizing a different market structure.

4.2   Agency and Insurance

Principle-agent theory models economics situations in which there is asymmetrical information. The principle, who is not fully informed, hires and agent, who is fully informed, to perform a service. Because the agent's knowledge gives him a comparative advantage in performing the task for which he is hired, the exchange should be *pareto optimal*. However, the principles lack of knowledge creates an *incentive compatibility problem*. Since the agent is trying to maximize his own independent utility function, his incentive is to induce demand for the service he provides. This is a conundrum for the principle, who must try and design a reward system that aligns the agent's incentives with his own and keep the exchange

attractive to the agent. The difficulty of this task greatly depends size of the disparity of information between the principle and the agent.

Traditionally economists have modeled the relationship between an consumer and his insurance company as one where the consumer is the agent. It is believed that after an individual purchases insurance, they will engage in riskier activities. This increases the individual's probability of incurring a loss, which shifts the demand for medical care outward and makes it more difficult for the insurance company to accurately manage risk. Additionally, insurance effectively reduces the price of medical care to zero (or a small co-payment). Because of this, individuals will now go see a doctor to treat illnesses that they may have dealt with with home remedies (i.e colds, allergies, minor sprains, etc.). This problem is referred to as *moral hazard.* It is, therefore, up to the insurance company to realign incentives by way of co-payments or not fully insuring the individual.

Considering the results of the model used in this paper, we will consider the problem from a different angle. Consider that the consumer is largely unaware of the negotiated fee paid by his insurer, and bases his purchasing decisions on the fee he would be charged without insurance. This is an informational disparity between the consumer and his insurance company. In this instance, however, the consumer is the principle and the insurer is the agent.

Using the ability to negotiate for lower fees from physicians and hospitals, the insurance company indirectly induces demand from the consumer. The consumer purchases insurance based on expenditures (price times quantity) he would likely make on health care during the coverage period. However, because the consumer is calculating this figure using a price

which is higher than the one the insurer is paying, he will spend too much on his insurance—even if he predicts the same quantity of usage. Some may argue here that this is not induced demand because the consumer could not have negotiated this price on his own. While it may be true that individual consumers cannot negotiate price, the mere existence of a third-party payer artificially inflates the "market" price the consumer observes. Additionally, as PWCs Health Research Institute (2005) reports the incentive for hospitals and physicians is to charge an extremely high list price to make up for losses from powerful managed care payers, like government programs and large insurers. Moreover, standard monopsony theory tells us that any savings gained by the monopsonist are not passed on in output price, and if the monopsonist also has monopoly power, output price will actually increase as a result of the firm negotiating efforts—all savings will be retained as profits (Blair and Harrison 1993). In essence, the insurer creates its own demand by simply being a large buyer with the ability to negotiate before other buyers.

Usually when a principle-agent problem exists, the research generally focuses around designing a contract to realign the incentives of the principle and agent. However in this case, this may be impossible. Recall that the loading factor is the observed profit of the insurer that the consumer allows because of his risk aversion. A smaller loading factor means that the degree of risk aversion necessary to make insurance attractive goes down. Notice that from the consumer perspective

$$\lim_{q(x) \to x} \frac{\mathcal{L} \cdot \phi \cdot \mathcal{F}(x) \cdot x}{\mathcal{F}(q(x)) \cdot q(x)} = \mathcal{L} \tag{4.1}$$

but from the insurer's perspective

$$\lim_{q(x) \to x} \frac{\mathcal{L} \cdot \phi \cdot \mathcal{F}(x) \cdot x}{\mathcal{N}(q(x)) \cdot q(x)} = \mathcal{L} \cdot \frac{\mathcal{F}(x)}{\mathcal{N}(x)} > \mathcal{L} \tag{4.2}$$

That is, the consumer observes a much lower loading factor than actually is being charged; so bifurcated pricing actually makes insurance seem like a "better deal" to the consumer. Thus the consumer is completely unaware that he is purchasing too much insurance; he simply believes he can not do without it. Feldstein (1973) made a similar analysis referring to the "price of insurance". In his paper the price was equal to the ratio of premium cost to expected benefits. Notice that if we consider expected benefits equal to the actuarially fair price for insurance, the this ratio is exactly what I refer to as the loading factor, $\mathcal{L}$. Feldstein sites that the lower the cost benefit ratio ($\mathcal{L}$), the higher the consumer's optimal level of insurance. Thus because the bifurcated-price market lowers the loading factor (cost-benefit ratio), people are induced to buy more complete insurance. This accelerates the reciprocating feedback between increases in insurance levels and price.

CHAPTER 5

CONCLUSION

Since the 1970s, there has been strong research to suggest that the proliferation of insurance is the source of medical cost inflation. Martin Feldstein's research provides strong empirical evidence to support this fact. However, much of the "how" part of this analysis is blamed on problems of moral hazard. In this paper, it has been shown that this simple assumption may not be adequate explanation of health-care inflation. To my knowledge, there has been no research concerning the impact that having two market prices can have on the market. However its role is significant.

Feldstein (1973, 1977) discovered a dynamic relationship between price and the level of insurance. Being insured increases the demand for medical care through various forms of moral hazard. The increase in demand results in higher prices. When prices increase, the consumer's expected expenditures increase, which further increases the demand for insurance. He found that this feedback could be explosive or stable (and showed that it had been both) depending on the consumer response to market conditions.

A similar relationship can be see from the model presented in this paper. Insurers ability to negotiate prices before the competitive fringe effectively shifts price axis of the fringe out to the quantity purchased by the insurer. This has the same effect of reducing supply for the fringe, which now faces and artificially high price. Those individuals who purchase insurance base their expenditure decisions on the price they would pay without insurance (their other alternative), which causes them to over purchase. This results in over-utilization, which increases the price the fringe will pay. The increase in the transparent

price will further increase the demand for insurance. This will shift the fringe "axis" out even further, and the fringe price will increase again. The process of continual feedback could potentially go on without end.

Additionally by considering this problem in a two-price market, the analysis of this paper reveals a new method of insurance inducement: the loading factor or cost-benefit ratio. The ability to negotiate fees allows insurers to present a much lower cost-benefit ratio to the consumer. This means that the level of risk aversion necessary to make additional insurance optimal also falls. That is the existence of a two price market induces more people to purchase insurance and induces insured people to purchase more complete coverage.

While there is little recognition of the two-price problem in the world of economics, it is recognized on a national level. Part of the Bush Administration's plan to fight health care inflation involves increased transparency about negotiated fees on the part of government funded and private insurers to allow everyone the same access to affordable care. Moreover PWC's Health Research Institute recognizes the cost shifting from large insurers to those without coverage resulting from a multiple-price market as a major roadblock in providing charitable insurance for the underprivileged. According to the Seattle Weekly, medical care providers are also responding. Groups like Qliance, a boutique medical practice in Seattle, WA, are providing primary care to working class and uninsured individuals at a fraction of the typical costs; and they are doing so by not accepting any form of insurance. They claim that the savings in employee hours and paperwork from not having to file insurance claims along with a carefully altered business plan makes this alternative form of medical service viable.

Further research in the area needs to focus on more empirical analysis of this model. Specifically a dynamic price adjustment model stemming from the two-price formulation may provide new insight as to the true nature of health cost inflation.

<div align="center">BIBLIOGRAPHY</div>

[1] Blair, Roger D. and Jeffery L. Harrison, *Monopsony: Antitrust Law and Economics*, Princeton 1993.

[2] Brewster, Lawrence G. and Genie N.L. Stowers, *The Public Agenda*, Ontario, 2004.

[3] Feldman, Roger and Bryan Dowd, "A New Estimate of the Welfare Loss os Excess Health Insurance", *AER*, Mar. 1991, 81, pp.297-301

[4] Feldstein, Martin S, "The Rising Price of Physician's Services", *The Review of Economics and Statistics*, May 1970, 52, pp. 121-133.

[5] .____ , "Hospital Cost Inflation: A Study in Nonprofit Price Dynamics", Dec. 1971, 61, pp. 853-872.

[6] .____ ,"The Welfare Loss of Excess Health Insurance", *The Journal of Political Economy*, Mar.-Apr. 1973, 81, pp.251-280.

[7] .____ , "Quality Change and the Demand for Hospital care", *Econometrica*, Oct. 1977, 45, pp. 1681-1702.

[8] Newhouse, Joseph P, "Health Reform in the United States", *The Economic Journal*, Nov. 1996, 106, pp. 1713-1724.

[9] Peden, Edgar A. and Mark S. Freeland, "Insurance Effects on US Medical Spending (1960-1993)", *Health Economics*, 1998, 7, pp. 671-687.

[10] Santerre, Rexford E. and Stephen P. Neun, *Health Economics: Theories, Insights, and Industry Studies*, 4th ed, Mason 2007.

[11] Schneider, Helen and Alan Mathios, "Principle Agent Theory and Health Care Utilization", *Economic Inquiry*, Jul. 2006, 44, pp. 229-241.

[12] BCBS Association, *2007 Medical Costs Reference Guide*, 2007.

[13] National Center for Health Statistics, *Health, United States, 2006 With Chartbook on Trends in the Health of Americans* , Hyattsville 2006.

[14] Pricewaterhouse Coppers' Health Research Institute, *Acts of Charity: Charity Care Strategies for Hospitals in a Changing Landscape*, 2005.