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Relative Price Differentials in Various Market Structures for Healthcare

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Abstract.

Recent proposed changes in federal healthcare laws by leading U.S. political parties will lead to higher prices for consumers and heftier profits for retailers especially in monopolistic markets. This is due to the way that the surcharges are proposed to be levied which is as a percentage of the base price of the healthcare service. This paper explains how prices are formed by a profit maximizing firm under the assumption of a production function that is homogeneous of degree one. This paper also demonstrates the relationship between markups and the price elasticity of demand. An analysis of how the newly proposed healthcare rules would impact relative prices in markets of varying levels of competition is then performed.

Keywords: Elasticity; Healthcare Surcharges; Price Differentials.

Introduction

Recent changes in healthcare laws have led to the distinct possibility of higher prices for consumers and heftier profits for retailers especially in markets that are less competitive. Several politicians are proposing types of surcharges that could be levied as a percentage of base prices. This, of course, is not just relevant in an election year, but at any time when healthcare laws and regulations are being changed.

The rising cost of health care in the United States has been a major economic issue for years. The U.S. continues to spend more per capita on health care than any other developed nation. Often the consumer may equate a higher cost with better service and better outcomes. However, there is a surplus of data that does not support this belief. In fact, comparing the numbers of adults with health risk factors such as heart disease, asthma, diabetes, hypertension, kidney disease, chronic obstructive pulmonary disease, and depression demonstrates increases in all categories. Prior to the Covid-19 pandemic, hospital occupancy and average length of stay were decreasing; yet, the average cost of inpatient care continued to rise. According to the Kaiser Family Foundation, in 2018, $3.6 trillion dollars was spent on healthcare with one third of that being paid out to hospitals and 20 percent going to physicians and clinics. This is in addition to the continued rising cost of pharmaceuticals. Although prevention of illness has been identified in the medical and nursing communities as being as an integral piece of improving and maintaining overall health, there has been limited federal healthcare dollars and public education dedicated to preventative services. In the past decade, there has been increased focus on moving more healthcare

services to less costly outpatient options; however, this remains focused on early recognition and treatment versus prevention. Americans are not buying better healthcare services leading to improved outcomes but instead, they are buying services that continue to become more expensive. Both political parties focus on access to healthcare but has this really improved? Will overall health improve under current or proposed healthcare laws or leave the American people with limited monopolistic options and rising healthcare insurance costs that can bankrupt their life savings?

Retailer Markups under Profit Maximization

It is assumed that all retailers in the healthcare market are interested in maximizing their profits and face constant returns to scale production function. The general case is assumed where total revenue (TR) is equal to the product of the quantity of services or output (Q) produced or provided and subsequently sold and also the price (P) of the product/service. Total cost (TC) is assumed to be a function of the quantity of output produced or service provided. Profit (π) is always the difference between TR and TC. In mathematical terms the profit function can be shown as:

$$(1) \quad \pi = TR - TC = PQ - TC(Q)$$

In order to find the profit maximizing quantity of output/service we need to differentiate (1) with respect to Q. This generates equation (2) below.

$d\pi/dQ = (dP/dQ)Q + P - (dTC/dQ)$ {where dTC/dQ) is the marginal cost (MC)}

$$(2) \quad P = MC - (dP/dQ)Q$$

We can consider the term $-(dP/dQ)Q$ a retailer markup (m) which would be positive assuming the customary assumption about (dP/dQ) being negative.

$$(3) \quad P = MC + m$$

Taking into consideration the assumption of constant returns to scale equation (3) can be written as (4).

$$(4) \quad P = AC + m$$

The price elasticity of demand measures how sensitive quantity demanded is to a change in price and is shown in equation (5) as a non-negative value.

$$(5) \quad E = -(dQ/dP)(P/Q) \geq 0$$

This can then be presented in terms of P and inserted into the term for retailer markup ($-(dP/dQ)Q$) to arrive with equation (6).

$$(6) \quad m = P/E$$

The major significance of (6) is that it shows an inverse relationship between m and E. The more elastic the demand for the good/service the lower the potential markup by the retailer. The more inelastic the demand the higher the potential markup.

Price Elasticity and Market Structure

The price elasticity of demand is a function of four variables: the number of available substitutes, the time one has to make demand decisions, the durability of a product and the proportion of total expenditures the good absorbs. The more substitutes that are available the more elastic the demand becomes. The more time one has to make a demand decision the more elastic the demand. The more durable a product the more elastic the demand. (The purchase of a durable product can be postponed for a period of time or the good can be repaired thus delaying the purchase of a replacement item.) The greater the percentage of the budget that the good takes up the more elastic the good will be.

There are four different market structures that are normally identified in economics: perfect competition (or the slightly different pure competition), monopolistic competition, oligopoly and monopoly. Perfect competition is characterized by having many sellers, homogeneous products/services, easy entry into the market (no barriers to entry) and perfect information. Each firm is a price taker under perfect competition. Monopoly is the polar opposite of perfect competition. Only one seller exists in this market. There is assumed to be no close substitutes for the good/service being sold or provided by the monopolist and there are prohibitive legal and/or economic barriers to entry that prevent any competition. Oligopolies and industries categorized as monopolistically competitive are a hybrid of perfect competition and monopoly. For purposes of this paper these two market structures will be identified collectively as imperfect competition. Prices become higher and

output becomes lower as we advance from perfect competition to imperfect competition and then finally to monopolies where prices will be the highest and output the lowest of any type of market structure.

Relative Price Differentials

As a market becomes more competitive three results take place. First, the more competitive a market is the more substitutes that will be available for consumers to choose from. Secondly, a higher level of competition furnishes consumers with more time to make choices, since they will not be as worried about the supply of the good running out as quickly as it might if only one firm was producing the item. Finally, competition can foster the availability of firms that repair durable goods, thus extending the life of a durable good. These three results imply the price elasticity of demand will tend to be much more elastic under perfect competition than under imperfect competition or monopoly. The ranking of price elasticity in markets from relatively more elastic to relatively more inelastic would be perfect competition – imperfect competition – monopoly. The markups have the following relationship:

$$Mm > Mo > Mc$$

Where Mm is the markup for a monopolist, Mo the markup under imperfect competition and Mc the markup for a perfectly competitive firm. This follows from equation (6).

If we assume that each firm faces an identical cost function we generate the following base price (BP) equations.

(1) $BPm = AC + Mm$

(2) $BP0 = AC + Mo$

(3) $BPc = AC + Mc$

Given the information on the relative markups under each type of firm/market we have the following:

$$BPm > BPo > BPc$$

Consumers would pay higher prices when markets are less competitive. This is due to the higher markups afforded by the varying demand elasticities.

The recently proposed changes in laws governing healthcare will make this difference between competitive prices and monopolistic prices even greater. This is due to the way the healthcare surcharges are applied. Each firm applies the surcharges as a percentage of the base prices. For each base price the actual price paid by consumers (P) will be $BP (1 + i)$ where "i" is the percentage surcharge applied to the base price.

(4) $Pm = BPm(1 + i)$

(5) $Po = BPo(1 + i)$

(6) $Pc = BPc(1 + i)$

Since the percentage surcharge is assumed to be the same regardless of market structure the nominal differences in the consumer prices will be no larger than the nominal differences in base prices. For example, $Pm – Pc > BPm – BPc$.

Conclusion

This paper demonstrates that recently proposed changes in laws regarding healthcare surcharges will increase prices in retail markets and alter relative prices among different market structures as well. The increases in prices were shown to vary depending on the level of competition within the market. In markets where less competition exist consumers will be burdened more than in more competitive markets. Consumers living in rural areas, for example, tend to be faced with less competitive markets thus they will be impacted more adversely by the recent legal changes.

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Authors' information

For over 20 years, Dr. Annette Mattea has made significant educational contributions to the University of St. Francis as the Associate Dean and Associate Professor at the University of St. Francis, Leach College of Nursing. She received her Baccalaureate degree in Nursing (BSN) at Rush University; Master's degree in Nursing (MSN) from Loyola University Chicago, and her Doctorate degree in Nursing (DNP) from the University of St. Francis. She holds a Certificate in Nursing Education and received the Illinois Board of Higher Education Nursing Scholarship Award. She was awarded tenure from the University in 2015. She has shown her dedication to USF by serving as chairperson for numerous committees and participating in various community events. Annette has extensive knowledge and over 30 years of experience in critical care nursing. She holds two professional licenses: Registered Nurse and Advanced Practice Nurse/ Clinical Nurse Specialist. Her specialties include cardiac and transplantation. She has contributed to several research studies and grants pertaining to quality of life in cardiac assist device patients. Most recently, Annette was awarded the Arnold P. Gold Foundation Champion of Humanistic Care for her outstanding volunteer service in the community providing Covid vaccinations to hundreds of people. She finds volunteer work most rewarding and wishes to continue in community service.

Dr. David Gordon is professor and chair of the School of Business in the College of Business and Health Administration at the University of Saint Francis (USF), Joliet, Illinois. He teaches both graduate and undergraduate classes in finance and economics. Prior to joining USF he held faculty positions at Illinois Valley Community College, the University of Illinois-Chicago and Governors State University. David was awarded numerous teaching awards during his academic career. Prior to earning his Doctorate in Business Administration he received a MA degree in economics and a BA degree in Finance from the University of South Florida in Tampa. He is currently a member of the American Economic Association, the International Financial Management Association, the National Association of Forensic Economics, the History of Economics Society, the Southern Economics Association and the Southern Finance Association. His research interest includes public finance, financial economics and forensic economics. He has published articles in various business and economics journals.