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The Effects of Baby Boomers on Nonprofit Hospitals and Medicare

Mason Whitcomb
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Senior thesis submitted in partial fulfillment
of the requirements for a
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I. Introduction

One of the overarching differences between the cost structures of for-profit and nonprofit hospitals stem from charitable donations. Assuming similar costs to for-profit hospitals, nonprofits produce a greater quantity output in the long run because the average revenue consists of the donations per quantity output (D/q) plus the price, covering a part of the costs or providing excess revenues. Given the aging population of baby boomers and their likely high quantity demand for medical care, Medicare will be a much larger player in the medical insurance industry than the private health insurance companies to which most working families subscribe. When the baby boomers retire, they will become eligible for Medicare coverage in greater numbers than previous generations. Rather than paying for what a hospital charges for each treatment, Medicare pays a set amount to the hospital. As the Medicare fund becomes increasingly strained with more participants, the Medicare payment plan will become lean with respect to the amount the organization compensates hospitals for care.

Assuming a fixed level of funding for the Medicare system, there will be proportionally smaller per capita funding available for reimbursements than in the past. Medicare spending in 2005 equaled 2.7 percent of the GDP, and at an annual growth rate of 0.5 percent for Medicare funding this will be 4.5 percent of the total GDP by 2030 (White, 2008). Baby boomers will have to pay more money out of pocket for medical expenses, particularly with expenses related to hospital visits. When costs increase for

the baby boomers, however, nonprofit hospitals' cost structures will be affected, most notably the average revenue curve. According to the average giving curve outlined by Russell James and Deanna Sharpe (2007), households earning less than \$10,000 give at a higher rate than any other income level, equaling an average rate of 4.5 percent of post-tax income. One explanation for the higher percentage of donations at the lower income range is due to the number of retirees in this income bracket. In fact, 48 percent of retired households earning less than \$30,000 donate compared to 15 percent of non-retirees earning \$80,000 or more who donate. Given that retired households earn income from pensions and other fixed-income sources, the increased price of Medicare will decrease their disposable income and wealth, including dollars to donate to nonprofit hospitals.

In the future, a strain on Medicare funding will lead to reduced reimbursements to hospitals for treatments relative to prior years. As a result, the recipients of the care will be required to pay more, either via a co-payment system or, in some cases, completely out of pocket. Increased individual care payments will reduce disposable income and decrease the retired household's ability to donate money to the nonprofit hospitals and other nonprofit organizations. In response, nonprofit hospitals will be forced to lower quantity output in order to operate on lower levels of donations and Medicare reimbursements. While there are some treatments for which Medicare will require individuals to make partial payments, there are many treatments for which

Medicare will simply reduce reimbursement without an additional payment from the recipient. A decrease in the quantity output for the nonprofits will cause the nonprofits to introduce measures to increase quantity output back to a higher level to help as many individuals as possible.

According to the idea of managerial sorting, nonprofit managers have an incentive to produce the greatest amount of output possible and be as efficient as possible in order to help more individuals than comparably structured proprietary firms (Hansmann, 1980). Managers of nonprofit hospitals must gain some form of additional utility from their jobs outside of monetary compensation, which will also result in the choice to produce at the highest level of output (Hansmann, 1980). Increasing output will be accomplished by decreasing costs. Lower costs will be achieved by increasing the quality of care provided. As the costs decrease, the nonprofits will increase the quantity supply of healthcare, which will benefit all healthcare demanders, not just those participating in Medicare. This will also allow the nonprofits to reduce prices, which will force the for-profit hospitals to engage in similar cost-saving measures.

II. Problem Statement

The baby boomer generation will soon become eligible for Medicare in large numbers. On average, older people require more medical care than younger people.

When more people use Medicare as their primary insurance provider, the amount Medicare reimburses per person will decrease assuming no additional allocation of funding beyond the historical levels. Current Medicare funding comes from the Federal Insurance Corporation Act (FICA) tax taken from workers' paychecks. In 2007 Medicare provided coverage for 44.1 million people. According to the US Census Bureau, the baby boomer generation totals 78.1 million people, a number far greater than those currently covered under the program.

With the current number of workers roughly 75 percent larger than the number of Medicare recipients providing a subsequent \$30 billion operating surplus in 2007, Medicare can sustainably operate the fund. This relationship will soon be reversed, as the baby boomers will retire and no longer pay into Medicare. However, the number of American workers that will remain will be the roughly 41 million individuals of Generation X, leaving a substantial disparity between those contributing to and those drawing from Medicare. The Millennials, those born to the baby boomers between the years 1977 and 1994, account for 70 million people, and the oldest of this generation have just begun entering the workforce (*Generation*, 2006). Assuming the age and experience of those near retirement command higher wages than those of the young Millennials, relatively less income will be generated by FICA for Medicare. However, according to the *2008 Medicare Annual Report*, Medicare expenditures will need to increase from 3.2 percent today to 10.8 percent of GDP by 2082. While this projection is

far in the future and will affect more than just the baby boomers' retirements, either an increase in the FICA tax or a new source of income will be necessary to meet these growing expenditures. The FICA tax would need to increase from 3.1 percent to 11.4 percent over this same time period. As has been the trend in recent years, Americans elect politicians that fight to lower taxes, and an 8 percent increase in the FICA tax will be met with strong opposition. While the issue of funding will directly affect baby boomers, this will also greatly affect both nonprofit and for-profit hospitals.

Nonprofit hospitals can afford to operate at a higher cost per unit of output than for-profit hospitals for a number of reasons. First, the idea of trust may make people willing to pay more for services from a nonprofit hospital than from a for-profit hospital. Simply having incomplete information about the good or service provided makes the element of trust much more important for a nonprofit relative to a for-profit organization. The profit-maximizing nature of for-profits draws into question the motives of the firms, particularly in a healthcare setting in which the consumer may have relatively little information about the service provided. As discussed briefly above, nonprofit managers move through a sorting process in which their motives are tested. Weisbrod (1988) describes the preferences between managers choosing between the for-profit and nonprofit sectors based on motives and personality traits. Rawls, Ullrich, and Nelson (1975) conducted a study comparing the motives of individuals choosing the nonprofit and for-profit sectors. The results of the study showed those

preferring the nonprofit sector placed a high level of importance on being cheerful, forgiving, and most importantly helpful. Conversely, those preferring the proprietary sector placed a higher level of importance on financial prosperity, ambition, neatness, obedience, and dependability.

There is a government failure to meet the needs of all those that require healthcare. Programs including Medicare and Medicaid were introduced to help offset the number of individuals that are uninsured and unable to pay for medical expenses out of pocket. With an unmet demand requiring medical care, nonprofit hospitals provide care at either a minimum or no cost to these demanders. Donations and excess revenues in other submarkets counterbalance lost revenue from such cases, allowing nonprofits to produce a higher quantity output than their for-profit counterparts who would pay the owners with the excess profits. However, when donations decrease because retirees will have to spend more of their incomes on personal medical care due to relatively less Medicare reimbursements, the average revenue will decrease and the nonprofit hospital may not be able to absorb the price difference described above. Therefore, the nonprofit will either need to reduce quantity output or find a way to lower costs. By nature of nonprofits seeking to provide a good or service to meet an unmet demand, the answer will not be reduced output. Rather, the nonprofit will look to find ways to lower costs. While this paper focuses primarily on affects of baby boomers on nonprofit hospitals, there are also implications for the proprietary hospitals.

Profit-maximizing organizations are not subject to the non-distribution constraint, and therefore have an incentive in the short-run to reduce costs and subsequently increase profit. Assuming the same story with Medicare providing less reimbursement for treatments relative to previous years, for-profit organizations will also find ways to reduce costs to maximize profits.

III. Review of the Literature

As I move towards discussing the implications of the problems with Medicare demand and funding, there is a body of research that helps frame the context for the resulting story. Issues ranging from managerial sorting to the quality of care all contribute to the overall structure and philosophy of the nonprofit hospitals. With the understanding of these key concepts we can work towards an effective resolution to the Medicare problem.

Henry Hansmann (1980) addresses a number of ideas relevant to the nonprofit sector. First, he argues that managers will take relatively lower wages than their counterparts in the for-profit sector. This is the result of a screening process in which the "greedy" individuals move to the proprietary sector in order to reap financial rewards for their work. Conversely, the "craftsmanlike" managers get utility from working for nonprofits that are of high quality and have a charitable mission. The nonprofit managers gain satisfaction from helping as many individuals as possible in

accordance with the organization's mission. Whereas the nonprofit sector is subject to the non-distribution constraint, proprietary firms have managers that attempt to maximize profit, generally irrespective of the quantity output. Second, Hansmann discusses the way nonprofits disburse excess revenue via cross-subsidization. A nonprofit may be able to take excess revenue from one area of the organization and cross-subsidize other products or services operating at a loss.

Burton Weisbrod (1991) discusses some of the issues surrounding pricing and payment strategies of the healthcare industry and how these affect the care a patient receives. For many years the availability of insurance, both private and government-sponsored, created a moral hazard situation. Doctors and patients had the ability to utilize more healthcare services simply because such options would be covered by the insurance provider and were not necessarily beneficial to the treatment of the individual. Such disregard for costs led to increased insurance claims, and in the case of Medicare, this depleted the fund at a greater rate than if doctors used only the necessary treatments. As a result of this moral hazard, private insurance and Medicare set average levels at which healthcare providers were reimbursed for each treatment. This created another problem; as reimbursement for treatments decreased there was less funding for research funded by these treatments. Medical research is highly important to discovering new cures, better treatment methods, and lower-cost ways to conduct such treatments. Therefore, limiting reimbursements as a cost-saving measure

for insurance providers limits the ability of the market to find cheaper treatment methods for the future.

Jennifer Lubell (2007²) describes problems of rising costs and sicker patients that have plagued the healthcare sector. Rising costs make it less affordable for individuals to go to the doctor, which means individuals wait longer to go to the doctor.

Consequently, treatments that would be affordable (albeit not cheap) will be relatively less compared to the costs associated with treating an ailment in the later stages of development. Individuals may continually put off going to the doctor because of the cost, and in so doing the treatment will become more and more expensive, with the individuals growing more ill all the while. Robert Gill, the chief financial officer of a St. Paul, MN hospital, described the Medicare shortfalls every year that lead to the increase in costs for the hospital for which they must account, increasing the costs for all healthcare demanders, not just those requiring Medicare reimbursement.

Jennifer Lubell (2007¹) discusses the limits that Medicare has proposed on its new reimbursement plan. The plan for fiscal 2008, as it stands, recommends a 2.4 percent decrease in reimbursement to hospitals for treatment. The current payment system, which uses coding of treatments, will be affected by this decrease. According to the Lubell, hospitals enter the codes for the treatment that is provided to a patient and Medicare reimburses the hospital accordingly. However, Marc Miller, the executive director of the Medicare Payment Advisory Commission, states that patients appear to

be sicker when they are treated at hospitals, yet this has not been factored into the rate of coding increases. While there are inefficiencies in treatments that drive up costs, the root of the problem is the relatively sicker patients that require more care than comparable patients in an earlier stage of a condition. When patients take better care of themselves and go to the doctor at first sign of a condition the cost of treatment will be relatively less and require less Medicare reimbursement than the sicker patient. Therefore, there is room for Medicare to cut back on reimbursements while still paying for the treatment of patients.

Lawrence Flannagan (2008) describes a situation in which nonprofit hospitals have been forced to keep up with for-profit hospitals, which has resulted in increased costs. One of the points he cites is that Americans have demanded private hospital rooms, which were first delivered by the for-profits. In order to maintain competition, the nonprofits built hospitals with private rooms instead of the more traditional wings, which had allowed nurses to keep track of many patients at the same time. Another reason for the increase in costs for nonprofits has to do with the amount of care provided to those unable to pay. For a time, nonprofits could file claims with Medicare to recover the costs of treating these individuals, which drove-up the costs that Medicare had to reimburse. Similarly, regulations have changed, which require compensation to employees in positions where volunteers once worked.

Jeffrey Krasner (2007) describes six Massachusetts hospitals that have been commended for their quality work and subsequent cost efficiency. There are certain methods of treatment, such as the use of a catheter to inject medication, that have been the source of infections for many patients due to improper installation of the device. When faulty treatments result in complications requiring more treatments, costs for that patient rise. However, if the nurses take enough care to properly set the catheter, as in this example, the patient benefits in his or her health and the treatment costs will be limited to those the original condition. Being exposed to new conditions once in the hospital is an indicator of low quality care, and avoiding hospital negligence as described above will lead to more efficient use of resources (labor and capital) resulting in relatively lower costs. Rewarding nonprofits for being more efficient and providing better quality care the first time is a winning solution to all parties involved. Such efforts serve to decrease the cost curves for the nonprofits, which result in a higher level of output for the nonprofit.

Chapin White's (2008) article talks about how the rate of growth in Medicare spending has decreased dramatically over the years. One of the first reasons for the slowdown is that Congress has pulled back on the amount that Medicare pays out per individual due to the increasing number of participants. Early on, the goal was to get many people to buy into the Medicare system. Medicare encouraged participation by paying for most or all of an individual's expenses. Another reason for the slowdown

can be attributed to a similar declining rate of growth in the private-insurance sector.

This trend will continue as even more participants enter into the program, which helps to show the need for nonprofits to reduce costs in order to accept lower reimbursement from Medicare.

James and Sharpe (2007) explain a “u-shaped” giving curve relative to income due to the nature of charitable contributions across the income spectrum. Highlighting the need for charitable contributions, Brooks’ 2004 study found that 20 percent of the income of all nonprofit organizations comes from donations. In general terms, this statistic exhibits bias, as the healthcare industry accounts for much of the total income of nonprofits and primarily collects on fees for goods and services. James and Sharpe’s study separates income into \$10,000 increments up to \$100,000, \$100,000 - \$149,999, and \$150,000+. According to these figures, the group earning less than \$10,000 had the highest level of after-tax charitable giving, donating 4.55 percent of the household income based on the sample. As the income level rises up to the \$100,000 we see a decreasing trend in charitable giving, dropping to as low as 1.34 percent of after-tax income. One source that the authors cite as a reason we see the higher percentage of giving at lower incomes is that pensioners (retirees) earn very little income (presumably only income from a pension or other fixed-payment sources), yet these households have significant estate values and give at a higher rate due to their ability to donate and still maintain a comfortable lifestyle.

James Andreoni (1990) discusses the idea of altruism with respect to different types of donors. First, he introduces the utility function of an individual $U_i = U_i(x_i, G, g_i) \forall i$ where x_i is consumption of the private good, g_i is their gift to the public good, and G is the total amount of the public good. For an individual whose utility function does not include G , $U_i = U_i(x_i, g_i) \forall i$, then this person is motivated to give purely by warm-glow, which is simply the gain in utility from the gift of giving to another in need. If an individual's utility function is $U_i = U_i(x_i, G) \forall i$, then this person is purely altruistic, gaining utility from own consumption and the total public good. An impurely altruistic individual's utility function has g_i as a function of G . Therefore, the utility function for this individual is $U_i = U_i(x_i, G, g_i[G]) \forall i$. With the different motivations for making charitable contributions there will be different levels of giving according to the market conditions. For example, an impure altruist will be less likely to give when G is relatively high.

With these concepts in mind the solution to the problems become increasingly clear. Although problems have arisen with respect to Medicare spending there are proven methods to reducing costs and subsequently alleviating the strain on the Medicare fund. With a few important measures, both nonprofit and for-profit hospitals will combat this problem. The byproduct will be better care and decreased per capita spending, which will benefit both healthcare demanders and the hospitals.

IV. Economic Theory

As the baby boomers reach retirement there will be an increase in the demand for Medicare. Workers primarily receive healthcare coverage via private insurance through their employers. When the workers retire, they will lose this private healthcare coverage. The baby boomers will have three options: they can get private health insurance, not have insurance, or subscribe to Medicare. The increase in the demand leads to an increase in the price of Medicare. However, as was noted in the *2008 Medicare Annual Report*, the amount of funding necessary to cover the baby boomers and future generations under Medicare will be roughly 10.8 percent of the GDP compared to the current 3.2 percent. For the average worker, this translates to a FICA tax increase from 3.1 percent to 11.4 percent by 2082. Based on the Medicare projections, the per capita level of coverage in Medicare will likely decrease during this period of high rate of retirement, assuming no alternative source of revenue.

The argument for individuals using Medicare as opposed to using private health insurance providers or paying completely out of pocket considers an overlapping-generations model. Just as with social security, each individual lives in two time periods; one time period is when the individual is young, earning an income and consuming C_1 ; the second time period is when the individual is old (retirement-aged) and no longer works for an income, yet still consumes C_2 , which is left over from when the individual was young. I assume that income is perfectly storable; therefore, $C_1 + C_2$

= 1. The basic utility function for this individual is $U(C_1, C_2) = C_1 C_2$. Using a constrained optimization technique, the Lagrangian for this case is $L(C_1, C_2, \lambda) = C_1 C_2 + \lambda [1 - C_1 - C_2]$.

The first-order conditions state the following:

$$\begin{aligned} L_1 = \frac{\partial L}{\partial C_1} = 0 &\Rightarrow C_2 - \lambda^* = 0 \\ L_2 = \frac{\partial L}{\partial C_2} = 0 &\Rightarrow C_1 - \lambda^* = 0, \\ L_\lambda = \frac{\partial L}{\partial \lambda} = 0 &\Rightarrow 1 - C_1 - C_2 = 0 \end{aligned}$$

such that $\lambda^* = C_1 \Rightarrow C_1 = C_2$. Substitute and solve for C_1 :
 $\lambda^* = C_2$

$$\begin{aligned} 1 - C_1 - C_1 = 0 \\ 1 - 2C_1 = 0 \end{aligned} \Rightarrow C_1^* = \frac{1}{2} = C_2^*.$$

Under the original utility function, the maximum utility subject to the constraint is

$$U^*(C_1^*, C_2^*) = C_1^* C_2^* = \left(\frac{1}{2}\right)\left(\frac{1}{2}\right) = \left(\frac{1}{4}\right).$$

Under the Medicare program, however, the individual can lend $(1 - C_1)$ to the government when young and receive $1 + n(1 - C_1)$ when old, where $n = \frac{(N_y - N_o)}{N_o}$, N_y is the number of young individuals, N_o is the number of old individuals, and $0 < n < 1$. In practical terms, this model assumes positive population growth, which equates to a positive rate of growth in the workforce. Accordingly, the new constraint with Medicare is $C_1 + C_2 = 1 + n(1 - C_1)$. The new Lagrangian is

$$L(C_1, C_2, \lambda) = C_1 C_2 + \lambda [C_1 + C_2 - 1 - n(1 - C_1)].$$

The first order conditions state the following:

$$L_1 = \frac{\partial \mathcal{L}}{\partial C_1} = 0 \Rightarrow C_2 + \lambda^*(n+1) = 0$$

$$L_2 = \frac{\partial \mathcal{L}}{\partial C_2} = 0 \Rightarrow C_1 + \lambda^* = 0$$

$$L_\lambda = \frac{\partial \mathcal{L}}{\partial \lambda} = 0 \Rightarrow C_1 + C_2 - 1 - n(1 - C_1) = 0$$

such that $\lambda^* = -C_1$
 $\lambda^* = \frac{-C_2}{n+1} \Rightarrow C_1 = \frac{C_2}{n+1}$. Substitute and solve for C_2 :

$$\frac{C_2}{n+1} + C_2 - 1 - n\left(\frac{C_2}{n+1}\right) = 0 \quad \Rightarrow \quad C_1 + \left[\frac{n+1}{2}\right] - 1 - n(1 - C_1) = 0$$

$$C_2^{**} = \frac{n+1}{2} \quad C_1^{**} = \frac{1}{2}$$

Under the new conditions, the maximum utility subject to these constraints is

$$U^{**}(C_1^{**}, C_2^{**}) = \left(\frac{1}{2}\right)\left(\frac{n+1}{2}\right) = \frac{n+1}{4}.$$

Since $U^{**} > U^*$, individuals gain more utility from having a Medicare system than not having such a system in place. Therefore, there is an incentive to keep Medicare properly funded in order to meet at least part of each individual's healthcare needs.

As demonstrated by the utility maximization comparison, the individual only gains more utility with Medicare under the assumption that the exogenous rate of population growth, and therefore growth in the workforce, is positive. However, the number of people in old age (baby boomers) will reduce n , which will decrease the ability of the Medicare fund to insure individuals at the same per capita level as prior years. If Medicare receives income of $(1 - C_1)$ and has expenses of $1 + n(1 - C_1)$, the result

must be greater than or equal to zero assuming no additional source of revenue. Net revenue is

$$(1 - C_1) - [1 + n(1 - C_1)] \geq 0$$

$$\left(1 - \frac{1}{2}\right) - \left[1 + n\left(1 - \frac{1}{2}\right)\right] \geq 0$$

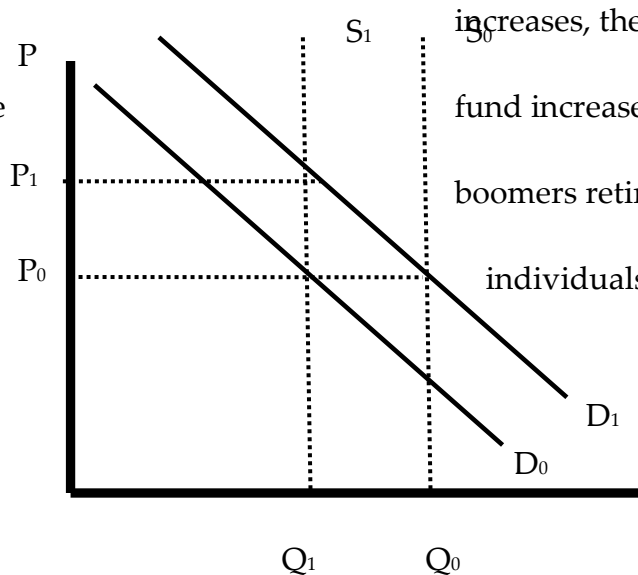
$$\frac{n}{2} - \frac{1}{2} \geq 0$$

As n decreases and eventually becomes negative as projected by the end of the century, the restrictions on n adjust to $-1 < n < 1$, this relationship decreases the ability of Medicare to operate and the fund will eventually fail. Thus, Medicare will need to find additional funding from a source other than the FICA tax to combat this decrease over time. Although additional funding is required to fund Medicare under these conditions, Medicare can still operate but at a lower per capita level of coverage.

Unlike a traditional market, Medicare has a certain level of funding each year from the FICA tax. The total income of the fund changes annually based on employment statistics, particularly the number of individuals employed and per capita income, which directly affect the FICA tax. When the economy moves toward full employment

and per capita income increases, the amount of money going into the Medicare fund increases. However, the case when the baby boomers retire will be such that the number of individuals contributing to

Figure 1



the Medicare fund through the FICA tax will decrease, which reduces the supply of the Medicare fund from S_0 to S_1 . As the supply of the Medicare fund decreases, the quantity output, in this case the number of individuals that Medicare covers, will decrease at price P_0 from Q_0 to Q_1 . Similarly, the number of individuals strictly using private insurance will decrease as individuals begin subscribing to Medicare, which increases the demand for Medicare from D_0 to D_1 .

Therefore, as demanders bid up the price of Medicare they do so at their own expense.

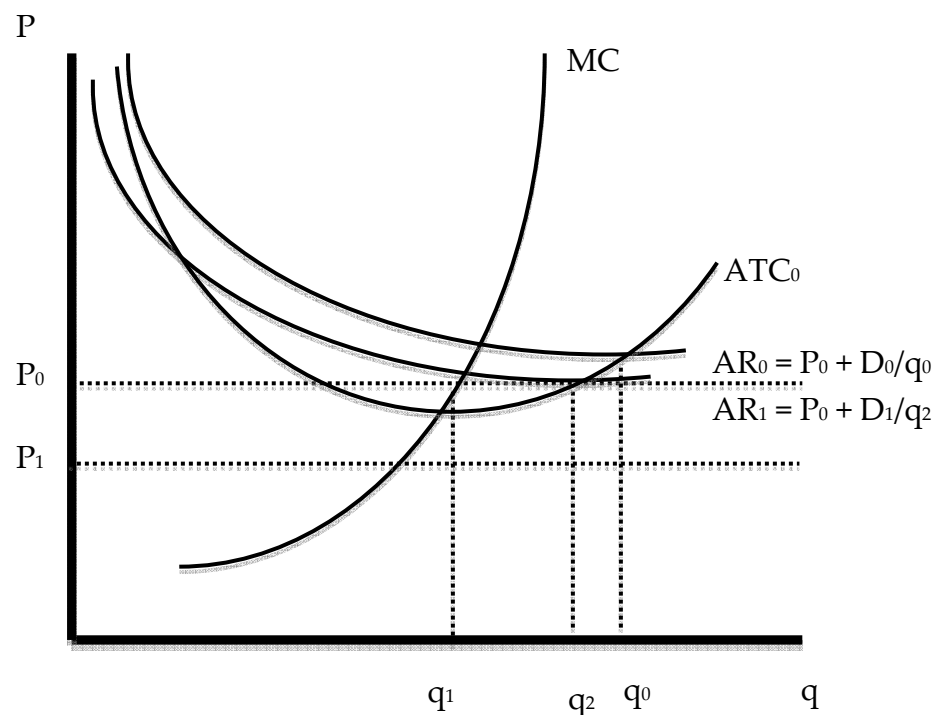
The likeliest solution to this change in demand will require demanders to engage in a co-payment system to cover the additional costs of Medicare, amounting to the difference between P_0 and P_1 . According to this model, however, there will be individuals who will be neither able nor willing to pay the additional costs of Medicare as the price is bid up. Assuming total nonprofit donations include a substantial portion

of donations for the healthcare industry, these cost increases will also affect donations, which decreases the ability of nonprofits to provide medical services to some individuals. Instead of donating to the nonprofits, individuals covered by Medicare will use their income and wealth to cover parts of their medical costs subject to the co-payment systems that will result from this shortage of funding.

The standard nonprofit model is very similar to that of the traditional for-profit firm. The average revenue is the price of a treatment plus the amount of donations per quantity output. A greater demand for Medicare bids up the cost per individual, which translates to higher co-payments per subscriber. Understanding the relationship between the donations to nonprofits and retirees, higher premiums and co-payments will reduce these individuals' abilities to donate. Wealth and after-tax income will be reallocated, dollar for dollar, to personal medical expenses away from donations.

According to Salamon, donations to the healthcare sector in 1996 accounted for roughly 10 percent of total charitable donations to nonprofits. Although the donations at the lower end of the giving curve will decrease, there are no indications that the higher income levels will increase donations. Therefore, there will be a reduced level of total donations.

Figure 2



Average revenue will decrease reflecting lower donations and a higher quantity of medical services produced. Assuming no changes in the price of hospital treatments, as the cost increase of Medicare rests solely on the demanders through higher co-pays, the quantity produced will decrease from q_0 to q_2 where AR_1 intersects ATC_0 reflecting the changes in the donations.

While most of the baby boomers receive the care they need at price P_0 , Figure 1 above shows there will be a shortage of Medicare funding at P_0 that causes demanders to pay out of pocket the difference between P_0 and P_1 . As a result, many individuals

will be unable to afford or will be unwilling to pay the additional costs of medical treatment beyond the P₀ level of Medicare reimbursement. Medical care is a basic necessity and individuals that forgo the expense of regular checkups and doctor visits in the early stages of an illness will face greater complications if they wait to see a doctor. To help alleviate this problem, nonprofits must use their excess revenue to provide care for these individuals at a reduced price to the demander, thus producing a higher level of output.

In both nonprofit and for-profit hospitals, there are certain treatments that provide profits or excess revenues. For example, individuals file insurance reimbursement claims for trips to the emergency room or other natural illnesses that require medical care. Furthermore, emergency room care can be especially costly for both nonprofit and for-profit hospitals due to the laws that require these hospitals to provide care for all individuals that walk through the door. While most people that enter hospitals are insured or can otherwise pay for their treatments, there is a group of uninsured individuals that receive treatment and cannot pay. These cases provide financial hardships for the hospitals, as the great cost that goes into these emergency room visits comes straight out of the hospitals' profits or reserves. Keeping in mind that Medicare reimburses the hospitals for what Medicare deems to be the total amount that a treatment should cost, emergency room visits do not provide large profits or excess revenues. However, insurance providers, particularly Medicare, do not

reimburse subscribers for cosmetic surgeries, such as a face-lift or liposuction.

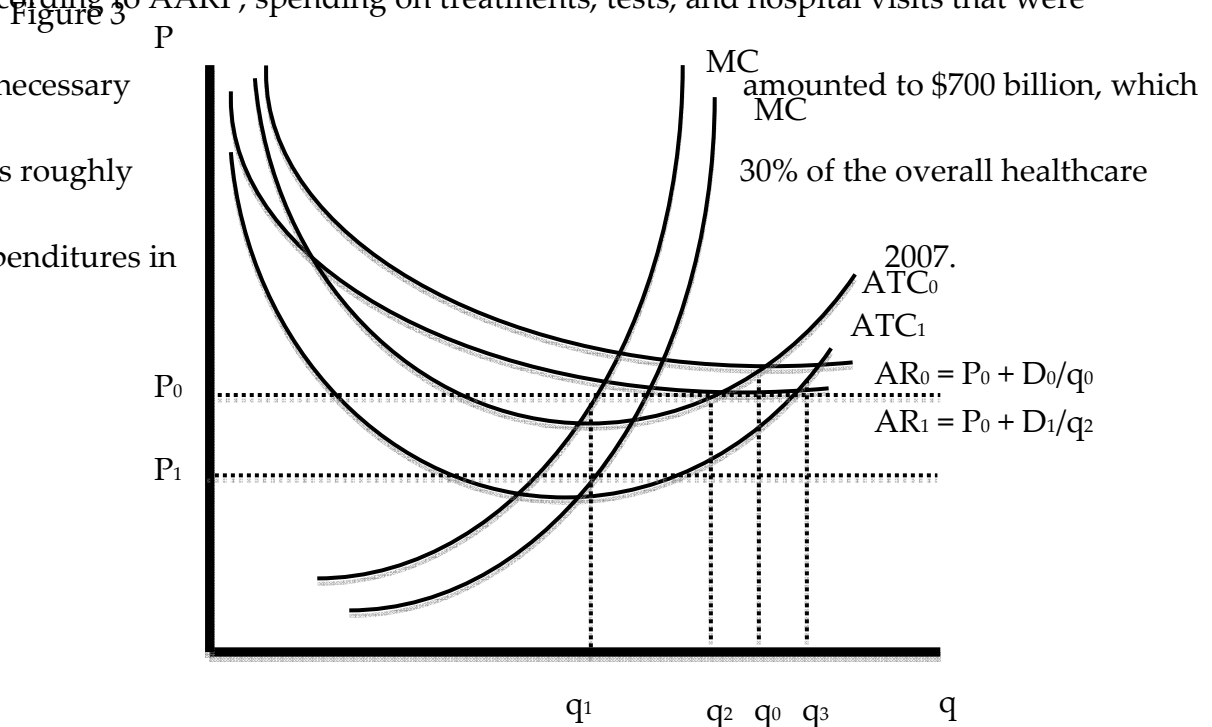
Therefore, the costs of these treatments are not limited in the way Medicare limits reimbursements and the hospitals can charge higher prices to the consumers of the treatment.

Applying the idea of cross-subsidization the nonprofit can use excess revenue from one submarket, such as cosmetic surgery, to fund research and lower costs in another submarket. As discussed by Weisbrod (1991), the excess revenues can be used to fund new research that will lower costs of treatments in the future. Similarly, excess revenue can be used to increase the quality of care patients receive in order to reduce costs. For example, better training and equipment can ensure that a patient's risk of infection is reduced and nurses can better monitor the effectiveness of the treatments. Although new equipment may be expensive, increasing the quality of care can finance the costs of new equipment.

According to AARP, spending on treatments, tests, and hospital visits that were

unnecessary amounted to \$700 billion, which was roughly 30% of the overall healthcare

expenditures in



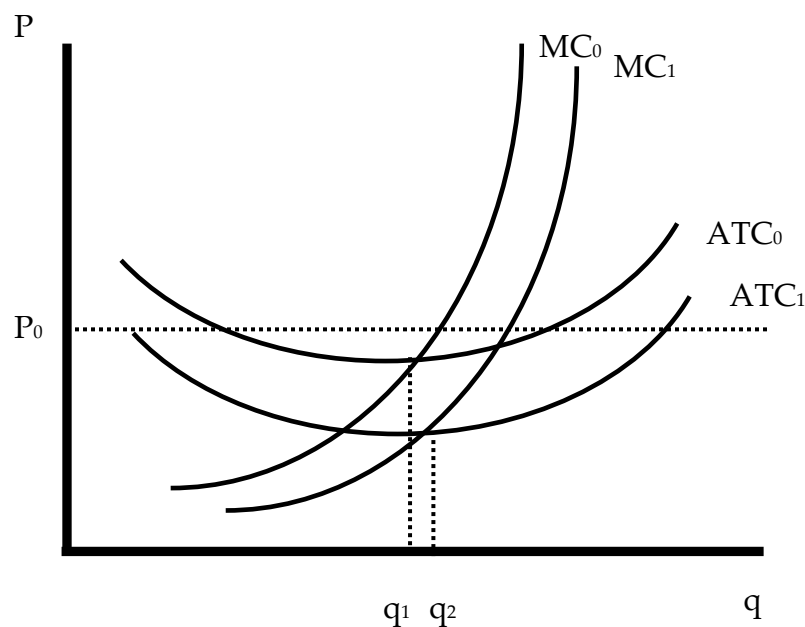
If this unnecessary spending were used to finance cost-saving equipment and research, clearly there would be a significant reduction in the total cost of healthcare. Therefore, this represents a decrease in the average total cost for the nonprofit from ATC_0 to ATC_1 . When costs decrease, this will provide greater excess revenue and allow for more research or other capital improvements in the short run, measures that will help further reduce costs. According to Figure 3 above, in the long run quantity output will increase to q_3 where ATC_1 and AR_1 intersect.

The for-profit hospitals will be affected by these changing market conditions with similar end results but with different implications. Given the motives of for-profit firms to generate profit for the owners, these firms will continue to charge the market price, which provides economic profits in the short run according to the model. When Medicare reduces reimbursements, the proprietary hospitals will collect the remaining fraction of the price from the individuals receiving the care assuming these individuals

can pay. Just as there are individuals that cannot afford to pay for treatments in nonprofit hospitals, the same problem exists in for-profit hospitals, forcing the hospitals to write-down the lost revenue. These firms do not have an incentive to change pricing and quality of treatment practices based on Medicare reimbursement changes alone. As the nonprofit hospitals respond to the decrease in donations by reducing the quantity output, the proprietary firm will try to increase output to meet the unmet demand.

One response that will produce additional output is to increase the price of the care, but the nonprofit firms will maintain their prices at the current market rate maximize profits. As the nonprofits increase treatment quality and thereby reduce costs, those individuals that seek medical care may have a greater incentive to go to a nonprofit hospital to benefit from the better quality care. In response, the proprietary firms must also increase their quality of care to reduce costs such that the marginal revenue and marginal cost intersect at a point beyond q_1 .

Figure 4



If more healthcare demanders, not just those covered by Medicare, prefer the higher quality of care that the nonprofits will provide, then the proprietary hospitals must respond by also increasing the quality. This will work by providing better training to the doctors and nurses to ensure that patient safety is the priority, making sure that the treatments are only what are necessary to effectively treat the patients. When these measures are taken, the proprietary firm will reduce costs, which will provide a greater quantity output and attract demanders who prefer a hospital with a reputation for good quality.

V. Results/Data

For this regression analysis, I look at a number of contributing factors to the total donations received annually by nonprofits from 1968 to 2006. The dependent variable is the total contributions per capita in thousands of 2006 dollars. The first independent variable is RGDP per capita in thousands of dollars. The second independent variable is real Medicare spending per capita in 2006 dollars. The third independent variable is the maximum annual income tax rate categorized into low (0 percent – 35 percent), medium

(36 percent – 50 percent), and high (51 percent – 91 percent). All dollar amounts are converted to 2006 dollars transformed by the CPI of each of those years.

Although my final model included only the statistically significant variables, I chose a larger group of independent variables for this regression analysis. Among the original independent variables I included the different levels of contributions broken down by source, which included corporations, individuals, and foundations. My main objective was to see how charitable giving is affected with respect to different economic factors and how this would lead to further behavioral changes in factors of giving. For example, I would expect individual giving to increase when the cost of giving decreases. However, these variables proved to be insignificant in providing strength to the model. Further, there may be some behavioral changes in giving, particularly with respect to altruism, when the amount of giving increases. A pure altruist who gets utility from knowing there is greater equity among all may be less inclined to give if more people already gave. The same can be said for the reverse, as a pure altruist may be more inclined to give when per capita giving is low. Further, I would expect donors to be somewhat mindful of the organization to which they contribute. If an organization has not gone through an effective managerial sorting process to find an efficient manager, the organization may operate inefficiently, perhaps causing hesitancy and less altruism on behalf of the donor.

I use the per capita individual donations in 2006 dollars to show the relative changes in donations in total dollars as opposed to percentage changes. One of the reasons for this is to show a greater variability in the data, whereas when giving is expressed in percentage terms the total variation in individual contributions is 0.4 percent. RGDP per capita helps show, on average, the amount individuals donate relative to their income. Next I included Medicare expenditures in real dollars per capita in order to frame this analysis in the context of hospitals. For the tax rate I broke the variable into three groups according to a clear trichotomy graphically displayed in a plot of the data in an effort to normalize the data. Originally when the model included the tax rate as a quantitative the variable, this coefficient was not statistically significant. Making this a categorical variable fixed the problem to make tax rate statistically significant. This is also the reason I chose to leave this as a categorical variable rather than change the different tax rate levels to dummy variables, as the latter technique led to a decrease in the robustness of the model and produced insignificant tax rate dummy coefficients.

These data were collected from three sources. First, the total annual charitable contributions and population statistics were all collected from the *Nonprofit Almanac 2008*. This annual publication from Urban Institute Press includes data relevant to various trends in the economy, including giving and volunteering. Second, the GDP and Medicare spending figures came from USGovernmentSpending.com, while the

highest tax percentage data were collected from the Citizens for Tax Justice website.

The GDP and Medicare spending figures were originally unadjusted for inflation and population, while the highest tax bracket percentages was originally a quantitative variable. Last, the CPI figures were obtained from the City of Seattle's website.

I hypothesize that total donations will increase when the price of giving decreases (meaning there is an increase in the tax rate), when RGDP per capita increases, and when Medicare spending per capita decreases. First, I believe total donations will increase when the tax rate increases because this tax increase will result in a lower opportunity cost to donate income. Reducing taxable income via donations allows an individual to change tax brackets, thus reducing overall taxes paid. Second, an increase in RGDP per capita equates to more income in the economy and in the pockets of individuals. A higher RGDP per capita increases personal disposable income. With respect to the finding of James and Sharpe of a u-shaped giving curve and the baby-boomer population heading towards retirement age, there will be a greater percentage of individuals in the less than \$10,000 taxable income group that gives a relatively high percentage of income. Retired individuals will have a higher level of wealth, on average, than the typical wage earners in this low-income bracket, which helps explain the high percentage of income giving. Last, I expect a negative relationship between Medicare spending and charitable contributions for the reasons of

crowding out discussed above. As the government spends a higher percentage of total federal outlays on Medicare the purely altruistic donors will be less likely to give.

Using the model described above, I found the relationship between total donations per capita, RGDP per capita, Medicare spending per capita, and tax rate to be consistent with my hypotheses. The coefficients for RGDP and tax rate were both positive, while the Medicare spending and intercept coefficients were both negative. For the reasons discussed above the signs of these coefficients are consistent with the predictions. The intercept coefficient can simply be explained via extrapolation, as we would not expect to see zero donation dollars. The resulting regression output is as follows:

$$Y = -0.8930 + 0.0507 X_1 - 0.0004 X_2 + 0.0791 X_3,$$

$$(-4.371) \quad (5.856) \quad (-2.398) \quad (4.752)^*$$

where Y = total donations per capita in thousands of 2006 dollars, X_1 = RGDP per capita in thousands of 2006 dollars, X_2 = Medicare spending per capita in 2006 dollars, and X_3 = the tax rate according to the 0 (low), 1 (moderate), 2 (high) scale. The R^2 of this model is 0.89, which suggests this is a highly robust model for time-series data. In conducting analyses of the data, I determined that autocorrelation was present and produced a second model that adjusted for autocorrelation. In this new model I included a trend variable and the AR(1) variable to help capture autocorrelation. However, the results of

* t-values. All independent variables are significant at the 5 percent significance level.

the new model left ambiguity about the presence of autocorrelation and reduced the explanatory power of the model. Given the adjustments of the model described above, I do not believe this results in a significant bias on the coefficients.

Using these empirical results, there is a negative relationship between the amount of government spending on Medicare per capita and the amount of income donated to nonprofits. If Medicare expenditure per capita decreases by \$100, then I will expect a \$0.04 increase in the per capita amount of income donated to nonprofits on average based on these data holding the tax rate and government spending per capita constant. In real terms with a population of 300 million people, this translates to a \$12,000,000 increase in charitable giving. However, according to the *2008 Medicare Annual Report*, sustaining the Medicare fund will require an increase in funding to 10.8 percent of GDP by 2082 compared to 3.2 percent in 2007. As a result, based on the model holding the other variables constant, I will expect a decrease in the overall charitable donations to nonprofit organizations as the baby boomers retire and enroll in Medicare.

VI. Conclusion

In order for nonprofit hospitals to adequately respond to the baby boomers that will rely upon Medicare, both nonprofit and for-profit hospitals will be required to lower costs in the production of healthcare. The baby boomers will affect nonprofit

hospitals more than the for-profit hospitals due to the nonprofits' relationships with these donors who will increasingly also become patients. Households earning less than \$10,000 per year, a group primarily consisting of retirees, donate at an average rate of 4.5 percent. Consequently, these households will spend more of their incomes (and wealth) on medical related expenses, which will lower the left side of the "u-shaped" giving curve. Assuming no additional levels of donations at the other income levels, the giving curve will now appear in a more "j-like shape." Therefore, nonprofits will have a lower level of donations, with $D_1 < D_0$. Average revenue for nonprofit hospitals will decrease, $AR_1 < AR_0$, allowing the hospitals to produce a lower quantity output.

Since nonprofit managers have been screened to be more efficient and shown to seek a higher level of output, the firms will increase the quality of healthcare supplied in order to lower costs. Increasing the quality of the care provided will reduce per patient costs and may provide additional revenue for research to help further reduce costs. This will allow the nonprofit firms to produce a higher level of output than a similarly structured for-profit firm adjusting for the lower Medicare reimbursements and a lower AR curve.

When the nonprofit's costs decrease, the result will be a decrease in the price of healthcare and an increase in the quantity supply. Medicare subscribers, as well as all other healthcare demanders, will benefit from the decrease in price, advancing the mission of the nonprofit to provide additional quantity output for a target group.

By nature, for-profit firms look for ways to lower costs and increase economic profit. When the nonprofit hospitals increase the quality of care resulting in a greater quantity output and lower costs, the nonprofits will decrease the price. When the nonprofits decrease the price of healthcare, the for-profit firms will respond by attempting to follow a similar path. To attract healthcare demanders back from the nonprofits the for-profit firms will decrease the additional costs associated with poor quality care. As the doctors and nurses provide better care to the patients the costs will decrease. This is good news for the proprietary firm, as it will increase output and benefit from greater economic profits.

The further into the future we go the greater the problem will be with respect to Medicare if the nonprofit firms do not react. Although the baby boomer problem for Medicare may be resolved by deferring some of the costs back to the demanders, the depletion of the Medicare fund will present an even greater problem. As discussed in the *2008 Medicare Annual Report*, the amount of funding necessary to support the Medicare system will be roughly 10.8 percent of the GDP in 2082 compared to 3.2 percent today. Rather than taxing workers an additional 8 percent via the FICA tax to fund Medicare, the long-term solution will be for the healthcare industry to control costs by increasing the quality of care and decreasing superfluous treatments. The drivers of this mission are the nonprofit hospitals in their efforts to provide care for as many individuals as possible. For-profit hospitals will respond to the efforts of the

nonprofit firms, and as a result of these efforts healthcare demanders will benefit from higher quality care.

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VIII. Appendix

Table 1:

Year	Annual Donations Per Capita in Thousands of 2006 \$ ¹	Real GDP Per Capita in Thousands of 2006 \$ ²	Medicare Spending Per Capita in 2006 \$ ³	Tax Rate ⁴
1968	0.54762437	24.55082851	131.706441	2
1969	0.568838933	25.06007752	150.4502862	2
1970	0.537136356	25.09934793	154.062684	2
1971	0.561330969	25.60649055	157.0202615	2
1972	0.560864924	26.67341846	169.303655	2
1973	0.562369973	26.80420168	165.0561578	2
1974	0.535153405	26.14253246	175.0766834	2
1975	0.503961399	26.30484373	217.0018985	2
1976	0.521893769	27.56178029	251.3177248	2
1977	0.541866369	29.03759555	284.522254	2
1978	0.550180054	29.51648704	303.1264668	2
1979	0.555909103	28.90356021	306.2341856	2
1980	0.544021866	27.86120612	327.8930959	2
1981	0.548025487	28.50846767	365.3641931	2
1982	0.535224872	28.76891447	415.0706531	1
1983	0.5469261	29.17058732	445.8461494	1
1984	0.564948584	31.18045874	467.1953534	1
1985	0.565068407	32.07034017	509.702748	1
1986	0.626153873	33.36866537	530.6135069	1

¹ *Nonprofit Almanac 2008*, Table 3.4.

² USGovernmentSpending.com

³ Ibid.

⁴ Citizens for Tax Justice.

1987	0.603727644	33.48457685	541.2755078	1
1988	0.615610393	34.1704706	538.1340853	0
1989	0.650890559	34.69646779	545.8662511	0
1990	0.625468808	34.48655386	589.8803758	0
1991	0.609642421	34.31636171	604.1485937	0
1992	0.624894547	34.47774382	657.6514013	0
1993	0.624515946	34.97454552	694.3953869	1
1994	0.619477017	35.5926593	740.0816879	1
1995	0.612171756	36.02404324	786.0743443	1
1996	0.662401949	36.29539597	821.8720011	1
1997	0.744451833	37.55611433	872.1478567	1
1998	0.785773199	38.49869171	860.394155	1
1999	0.875927101	39.17857279	817.6653541	1
2000	0.955534946	39.74699356	806.8805889	1
2001	0.917349317	40.2932055	870.867496	1
2002	0.899417166	40.1129398	892.3499833	1
2003	0.885909386	40.58178032	936.5167746	1
2004	0.943586915	41.53255253	972.8091854	1
2005	0.992523375	42.11704353	1027.770258	1
2006	0.983989326	43.41394263	1100.293529	1