

Health Economics –Methods for a New Field

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Health Economics –Methods for a New Field

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Health economics is a newcomer to the economics discipline and economics pedagogy.

Microeconomics, macroeconomics, and econometrics have served as foundations of economics curricula for more than fifty years, and public finance, international economics, or industrial organization date back even further. Many university economics departments have only recently instituted health economics courses, and in many institutions health economics courses reside *outside* of economics departments, in schools of public health, business, or nursing.

Present day interest in health economics comes from the importance of health and health care to the population, as well as the novel idea that economic analysis can address issues for which many health care professionals, until at least recently, denied its relevance. Methods of health economics apply to health policy, but also to health prevention and health treatment. Cost-effectiveness and cost-benefit analyses take on new importance in examining impacts of activities that often do not face market tests, including organ transplantation, immunization programs, or prevention initiatives. As recently as the 1980s, many physicians, health services professionals, and those serving the health sectors, including regulators and attorneys, argued that providers, rather than consumers make the important decisions, or that health is a necessity, inimical to economic analysis. The burgeoning interest since then has challenged those who seek to teach health economics, and those who wish to learn it.

There are increasing numbers of health economists, but course instructors also come from applied microeconomics fields like industrial organization, labor, or urban/regional economics. While some adapt their research interests to health economics, many are generalists who wish to

cover a new course. This chapter seeks to identify key features of teaching health economics. It starts with goals and objectives in teaching and follows by discussing some underlying principles in structuring health economics courses. It finishes with effective methods in health economics teaching.

Goals and objectives

It is important to ‘keep the economics’ in health economics. Students and practitioners may dwell on what the Medicare or Medicaid programs cover, how DRGs (diagnosis related groups) work, what limitations programs or insurers put on reimbursements, or how HMO, PPO, and POS managed care plans differ as organizations. Instructors who ignore field-specific references can render any course irrelevant, but economists have a comparative advantage over others in applying the concepts of opportunity cost, supply and demand, and the importance of technology, which promote an understanding of the health care system, and which form the firm foundations for teaching it.

Secondly, instructors must recognize that the health economy changes constantly, and that students, scholars, and the public can observe these changes, largely due to the Internet, in ways unimaginable even fifteen years ago. In the mid-1990s, as in previous decades, discussing health insurance meant discussing Blue Cross – Blue Shield. Not any more. Students read daily about new insurance plans, new drug treatments, or the increased incidence and costs of obesity. In the health economy, last year’s data are ‘old data.’ Information on health care systems around the world, or the HIV/AIDS pandemic, for example, is constantly updated by researchers and journalists. Health databases are abundant and available for downloading, often at no charge.

Philosophy

Most economists recognize that economic knowledge comes from researchers and their research. In developing *The Economics of Health and Health Care* (first published in 1993), Folland, Stano and I have sought to convince students that economic behavior is measured by researchers, that there are ongoing debates on how it is measured, and that it is important to show why these debates occur and how they might be resolved. The devotion to research findings represented a foundation of the book and has continued through its most current (sixth) edition.

Examples of important empirical work include the path breaking Rand Health Insurance study (Newhouse et al., 1993) which finds that health care demand is somewhat responsive to health insurance coinsurance rates, with an elasticity of -0.2. Other researchers (Jensen and Morissey, 1986) find that hospital care processes are provided with varying degrees of substitution of physicians, nurses and office staff, rather than the fixed input ratios (originating back to Lee and Jones, 1933) that were used to characterize health care production, and motivate health labor force planning.

However, both the Newhouse and the Jensen-Morissey studies refer to a health economy of thirty years ago. At the time of the Rand study, 'fee for service care' ruled. Now, where managed care dominates, and where employer-provided health insurance is waning, is the elasticity still -0.2? Jensen and Morissey's study predates widespread managed care and the Medicare prospective payment system that has turned hospital management upside down. In 1980, for example, nearly 70 percent of mothers experiencing regular deliveries had hospital stays of three days or more (Gillum, Graves and Woods, 1998, Table R). Contrast that to the concern about 'drive-through deliveries' of the past fifteen years. Can one assume that hospital practices and substitution patterns have remained unchanged?

Other questions abound. Is healthcare a luxury with an income elasticity greater than +1, seen by looking across countries, or is it a necessity (income elasticity much less than +1), as measured at the individual level? Does an increase in the supply of physicians or hospitals promote increased service demand (so-called supplier-induced demand), or is the causality reversed? Do hospitals experience scale economies, and if so, at what levels are they exhausted? Students deserve nuanced discussion as to the issues, how studies are conducted, where researchers agree ... and where they disagree.

Principles in structuring courses

Possibly the most important underlying principle in structuring an undergraduate health economics course is that incentives matter – to the consumers, providers, hospitals, bureaucrats, and regulators. Economists tend to focus on individuals, physicians, and hospitals, and courses taught in economics departments tend to follow this focus. However, many health economics courses are taught in public health settings. This may lead to a different set of topics related to what agencies do, how programs are set up, who they serve, and whether they provide services equitably. Even if instructors focus on individuals' responses to incentives, introducing the 'public' component early provides important context throughout.

Most undergraduate health economics courses require at least one course in economics principles and sometimes a course in intermediate microeconomics. Despite these requirements, and because the course is often taught outside of economics departments, classroom review of key microeconomic tools sets the stage for their application. Undergraduate health economics texts (typically containing twenty or more chapters) contain too much material for a single semester. The approach here emphasizes topics that students are not likely to see in other

economics courses. These include insurance, health capital, equity and need, and the US system in international perspective.

Insurance defines all health care economies. In the United States, third parties pay for well over eight of every ten dollars spent, with no other private good coming close; in other countries the percentages are higher. Insurance is probably the most difficult topic to teach and it receives special attention in a section below.

Grossman (1972) was the first to conceptualize *health capital*, to explain patterns relating to age or income in health care utilization and expenditures. Over time health capital applications have grown. Apart from looking at single period and time profiles of health expenditures, health capital topics have expanded to include obesity, ingestion of addictive substances, and decisions by the elderly and their families about ‘when to pull the plug.’

With the exception of some public finance courses, most economists avoid teaching about *equity* and few look at “need”. They (we) appeal to Pareto optimality and avoid interpersonal comparisons of utility. Many health economics students, particularly those with a public health bent, are interested in these issues. Yet, Pareto analyses provide little insight into issues of healthcare for those who do not participate actively in markets, such as children, the elderly, or the infirm. Health economics instructors who ignore inequality and problems of health care access risk rendering a health economics course irrelevant.

Many undergraduates expect to discuss health care policy at the local and at the national level. They are often unaware that close to fifty million Americans lack health insurance, and they know little about the US national health care system, especially in comparison to other systems around the world (with much media coverage either simplistic or incorrect). Many very good databases (for example OECD 2010) allow teachers and students to examine these issues

directly, discovering for example that we spend a lot (a greater percentage of GDP than anyone else), and that our output or quality (as measured by infant deaths, or population longevity for example) are arguably inferior to other countries that spend (often considerably) less.

Insurance – The most difficult topic

The primacy of insurance relates to several important questions: (1) Why do we buy insurance (demand); (2) How do we sell insurance (supply); (3) What determines the price; (4) What is moral hazard; and (5) Who pays for insurance? The economic analysis involves consumers' maximization of expected utility in a risky environment, assuming that insurance buyers are risk averse. Maximization of expectations will be new to many undergraduates, and most will not have learned about risk aversion. The demand and supply questions are more challenging because many courses do not require calculus methods that would simplify the analyses.

Further, most health economics students know little about health insurance. Younger undergraduates generally are healthy, and most have been carried on parents' policies. Asking them about their coverage often brings blank stares, and many do not know whether they are covered by fee-for-service or by some kind of managed care. Older students, and those students with children and/or families, are more likely to have some personal insights, although they may have limited knowledge of their own plans. Many elderly who receive Medicare benefits think that Medicare pays for everything (it does not). To complicate matters, health economics requires learning a new language including terms such as *premiums*, *copayments*, and *deductibles*.

A simple example eschews most of the jargon. Consider a club (motorcycle clubs usually get students' attention) with 100 members –all about the same age, and with similar same

lifestyles. About once per year one of the members gets sick and incurs health care costs of \$5,000. The illness incidence seems random with respect to gender or age. Club members donate \$50 per year to a fund that will earn some interest and pay for the member's treatment if necessary. Without premiums, copayments, deductibles, or moral hazard, students have learned the concept of insurance. By paying \$50 with certainty, the member has insured against the uncertainty (or risk) of having to spend \$5,000. Issues such as surplus (because no one gets sick), deficit (more than one person gets sick), or adverse selection (the same member gets sick each year) follow naturally.

While not all people wish to avoid risk (they are not risk-averse), those who do must determine how much insurance to buy. Begin with the observation that a small amount of insurance may bring utility if the buyer falls ill, and costs utility if the buyer stays healthy. Without specifying the price per unit of insurance, Figure 1 shows that for \$500 of insurance, the marginal utility (if ill) at point A exceeds the foregone marginal utility (if well) at A' . Additional increments of \$500 are subject to diminishing marginal benefits in terms of payments (or reimbursements) if ill, and increasing marginal costs (in terms of foregone utility), leading to a policy of size q^* that is purchased. This is the demand side.

Insert Figure 1 here

There are few good alternatives to algebra for the supply side, which compares revenue to costs, using the equation:

$$\text{Profits} = \text{Revenue} - \text{Costs},$$

$$\text{Profits} = aq - (pq + t)$$

where a is the premium in fractional terms of payout q , p is the probability of payout, and t is a per policy processing cost. Assuming perfect competition, profits approach 0, and the competitive premium a (with zero profits) is:

$$a = p + t/q.$$

Premium a is directly related to probability p , and if t is small relative to q , then the premium a , in fractional terms is roughly equal to probability p .

Ignoring t , one can solve for the optimal coverage q^* . Buyers will add coverage to the point that the wealth will be the same whether they are well or ill. Letting \bar{W} signify initial wealth leads to:

$$\bar{W} - aq^* = \text{Wealth if well} = \text{Wealth if ill} = \bar{W} - \text{loss} - q^* - aq^*, \text{ or when simplified:}$$

$$q^* = \text{loss}.$$

In the absence of processing costs t , a consumer insures fully, thus solving for the equilibrium value of q^* in Figure 1. With positive and possibly substantial processing (or loading) costs t , the price of insurance rises, so the best choice is to buy less of it, insuring for less than the full loss.

The previous analysis assumes that health care demand is totally price inelastic, like insulin for brittle diabetics. However, students realize that low insurance copayments may lead them to purchase other items (contact lenses or prescription shampoo, for example) that they might not otherwise have purchased. This leads to a discussion of *moral hazard*, the impact of insurance (more generally, any contractual arrangement) on economic behavior. Full insurance or fractional coinsurance induces ‘over-consumption’ of goods that (unlike insulin) are responsive to lower prices, beyond the point at which marginal benefits equal marginal costs, a textbook example of moral hazard. Buying prescription shampoo rather than the store brand or

Head and Shoulders[®] would seem like a social waste, but what about heart surgery procedures that a patient could not afford without insurance, or other treatments that may not increase length of life, but definitely increase quality of life?

Nyman (1999) has developed important analyses that recognize such income effects of insurance. Noting that the income transfers from the health insurance go only to those who are ill, he considers a woman who receives an insurance settlement that allows her to purchase a mastectomy, breast reconstruction surgery, and an extra two days in the hospital to recover. The conventional insurance literature (dating from Pauly, 1968) treats the entire expenditure as welfare decreasing if paid for by health insurance. Nyman shows that the part of the expenditure for the mastectomy and to correct the disfigurement, coming from an income transfer, is welfare increasing. The additional hospital days purchased due to low copayments are still inefficient and welfare decreasing.

Finally, the question of ‘who pays’ is critical in discussing insurance. Many US residents (and US politicians) believe that employers ‘pay’ for the insurance. Careful analysis shows otherwise. Ask students to suppose that they earn \$20 per hour with no health insurance. Now, suppose that the employer offers a health insurance policy that is worth at least \$2 per hour to them, while costing the employer \$2 per hour to provide. While employees would prefer to get their \$20 per hour *plus* the health insurance, most students will agree that if workers value the insurance at more than \$2 per hour, they (the workers) would accept a wage of \$18 plus the \$2 per hour of insurance. Who pays? The workers do, whether the employer writes the check or they write the check.¹

Innovative teaching methods

Most professional economists come from the background of ‘chalk and talk,’ a term popularized by Becker and Watts (1996). Formal chalk and talk was supplanted by transparencies, and many instructors now use either publisher-created or instructor designed PowerPoint presentations. There can be bad PowerPoint presentations, but the ability for economics instructors to sequence in points and to draw clear, multi-color, and precise diagrams can enhance teaching. Three practices to engage students in health economics courses beyond chalk and talk are: ‘News of the Day,’ EXCEL exercises, and empirical papers.

Many University economics students complete their undergraduate careers without ever presenting material to others. News of the Day addresses this shortcoming. It starts with a news item broadly related to healthcare from the news media or (increasingly) from the Internet. I introduce students to the issue, providing background information before relating it to key economic analysis, typically in the form of a supply-demand or similar diagram, and summarize it in no more than six to seven PowerPoint slides. For example, media reports of labor negotiations that change the health care package will be accompanied by a simple market supply and demand for labor diagram that addresses ‘who pays.’

After two to three weeks, the students begin presentations, with each presentation evaluated as approximately five percent of the total grade, on the basis of topic, analysis, and style. Students pick presentation slots at random. They may exchange, buy, or sell the slots, with the goal simply that everyone presents by a certain date. In larger classes, each student presents once per term – in smaller classes, students may present as many as three times.

These presentations enhance communication skills as well as economic knowledge. Students’ presentation quality improves over the course of the term, with better graphics and analyses. The PowerPoint presentations are then added to the class web site, and students are

told that content contained in any presentation may appear on mid-term and final exams – and it does. This added layer of assessment enhances both the presentations themselves, and the student discussion that accompanies it.

EXCEL (or comparable spreadsheet) programs serve as valuable teaching aides in several ways. On occasion one is looking at small data sets like national income or health expenditures. Graphing, and looking at means, medians, and distributions are easy with EXCEL.

For example, the Organization for Economic Development and Cooperation (OECD 2010) has created a database that is available to most students through library web sites. The data are collected at the country level for over thirty developed countries, including the United States, Canada, Mexico, most of Europe, some Asian countries, and Australia. Starting from a 1960 baseline, there is a range of health utilization, expenditure, and outcome measures. A simple exercise examines the share of GDP going to health expenditures over time. Figure 2 shows, for Canada, France, Germany, the United Kingdom, and the United States, that expenditures have grown everywhere, but faster in the United States. Students cannot help but see that the US share is nearly twice that of the United Kingdom. For a larger sample of 34 countries (too crowded for a single graph), EXCEL's functions calculate that the mean (median) expenditure share for countries rose from 3.8% (3.8%) in 1960 to 8.9% (8.7%) in 2008.

Insert Figure 2 here

A second important EXCEL use involves equation solving. Economists customarily draw graphs and shift curves, showing price and/or quantity changes. Recalculating the equilibrium amounts with each shift in demand and/or supply quickly becomes a mechanical

exercise, subject to calculation errors, rather than one which builds intuition. Solving the equations on a spreadsheet requires the same analytical skills, and allows the students to change the parameters and to look at the impacts.

Consider Grossman's health capital model, which views consumer's time as an input to health production. In a simple model, leisure is either traded for wages, or used to produce health through visits to a provider. A decrease in the money price of visits (inputs into health production), relative to all other market goods, makes health more attractive, but it must also lead to a decrease in work (or, in a more complex model, both work and leisure used for other goods) because of the time components of visits. Changing parameters in this exercise shows the complex interaction between the labor-leisure choice and health demand, and improves discussion.

Writing original research papers is valuable for undergraduates. One of the best data sources for empirical papers is the OECD data archive mentioned above. Students may examine countries' health expenditures as a proportion of GDP, or examine economic determinants of health outcomes such as longevity or infant deaths. They may compare health outcomes in countries with centralized health insurance systems such as the United Kingdom, with decentralized systems such as Germany or the United States. They can look at these items over time for a single country or across many countries (or both, in a panel study). Students who have taken undergraduate econometrics classes can use packages such as EViews, SAS, SPSS, or STATA, but others can use EXCEL's regression package.

The assignment comprises at least two stages over seven to eight weeks, culminating in the finished paper. The first stage requires preliminary student work. In the world of economic consultants, a buyer requires the consultant to provide a 'deliverable' after a short period of time

to demonstrate progress on the work. Here, after three to four weeks, the student provides the instructor with an eight-to-ten slide PowerPoint presentation including: hypotheses (does the student expect increased income to affect expenditures positively or negatively; will the elasticity be small or large); a list of five journal sources; expected analyses, including diagrams or regressions; and expected findings. PowerPoint forces students to synthesize their thoughts, acting as an informal outline.

The second stage is the finished paper with full explanations of methods and results, and with the computer output as an appendix. Consistent with the premise that health economics is an empirical field, and that researchers develop, accept, and/or change theories based on empirical findings, this paper of ten to fifteen pages plus tables (and journal sources), serves as an important capstone experience for both undergraduate and graduate classes. Depending on the class size, as a third stage students may present findings (in PowerPoint) in fifteen to twenty minute blocks.

Conclusions

Health economics instructors increasingly rely on careful models of people, firms, hospitals, or governments that make decisions in circumstances where insurance is important, and health outcomes are both difficult to measure, and uncertain (treatments may not be effective). Health economics analyses apply to questions of policy, prevention, and treatment. Some of the tools used, including cost-effectiveness and cost-benefit analyses, have become mainstays of health effectiveness, pharmaceutical, and policy research.

Instructors new to the field might find international perspectives to be most instructive because while insurance and health technology are universal around the world, different

countries do things in different ways. How is it that other advanced countries spend much less than the US, and yet manage to insure all of their people? International students often provide enlightening home country perspectives to these discussions.

Whether beginning their teaching careers, or diversifying their teaching portfolios, health economics instructors should recognize that their venerable analytical tools will provide valuable insights into people's health and healthcare decisions. Because the field is so new, and so fluid, instructors can easily address topics from the news media as well as the textbook. The analyses of health economists, and the roles these analyses play in improving policies and practices, serve as foundations in the courses that we teach.

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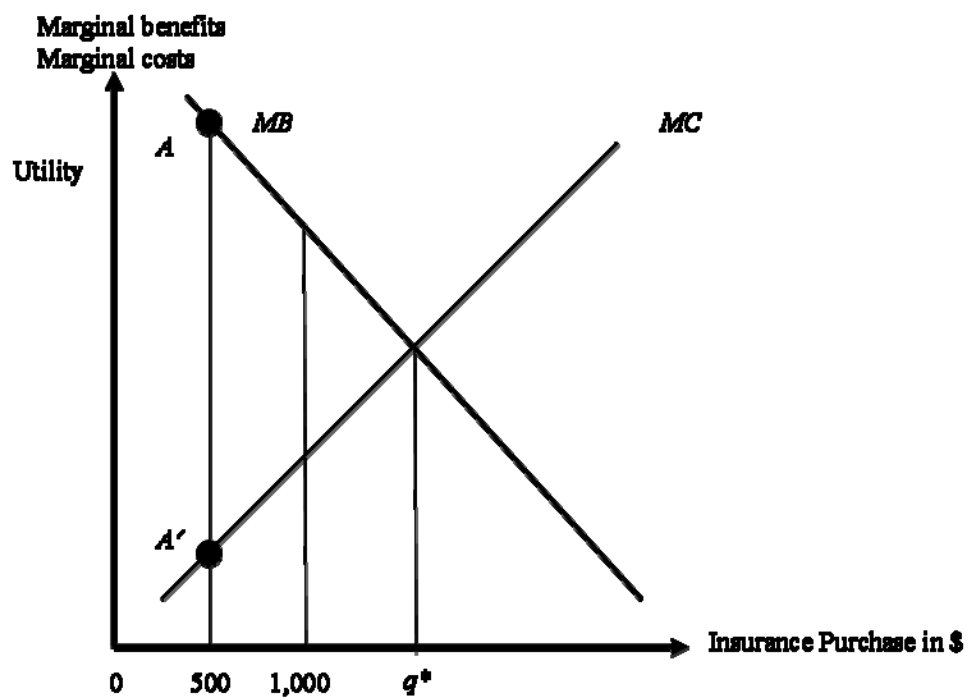
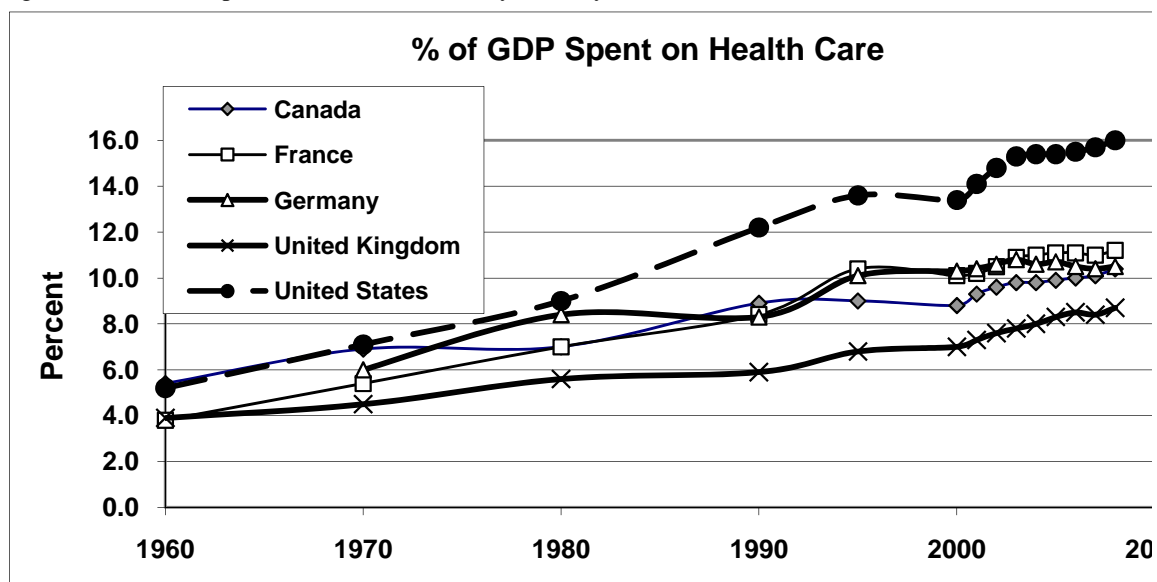


Figure 1 – Optimal purchase of insurance

Figure 2 – Health Expenditure Share of GDP by Country



¹ For a more complete graphical example, see Folland, Goodman, and Stano (2010), pp. 206 – 208.