

## THE WELFARE ECONOMICS OF HEALTH INSURANCE

Most textbooks in health economics, along with some texts in general microeconomic theory, present to students graphical displays according to which health insurance is inherently inefficient and, as such, entails a welfare loss. Yet all over the world modern societies have tried to introduce universal health-insurance coverage.

What is going on here?

In these notes, we shall examine this issue more closely. I hope you will agree that the economist's case, as presented in the texts, is much too simplistic and thus highly misleading.

Specifically, the analysis abstracts from the following issues:

1. The individual's demand function for health care may not be a good guide to the marginal social benefit yielded by that individual's consumption of health care, if the rest of society derives utility from knowing that this particular individual receives adequate health care. (We would call it a positive externality in consumption or "altruism.")
2. The individual's demand function for health care is stochastic, which means that the position of the demand curve we draw shifts up or down with the individual's health status, so that each particular position is associated with its own probability of the associated health-status' occurrence.

My advice to you is always to be very careful in buying propositions from economists because, like snake-oil sales people, we can be a bunch of very slippery folks with our "welfare analysis."

### I. THE TEXTBOOK CASE ON THE WELFARE LOSS INHERENT IN HEALTH INSURANCE

#### A. The Individual's Position

Figure 1 on the next page depicts the *demand curve* implicit in an individual's *demand function*. You will recall that a *demand curve* and a *demand function* are not the same.

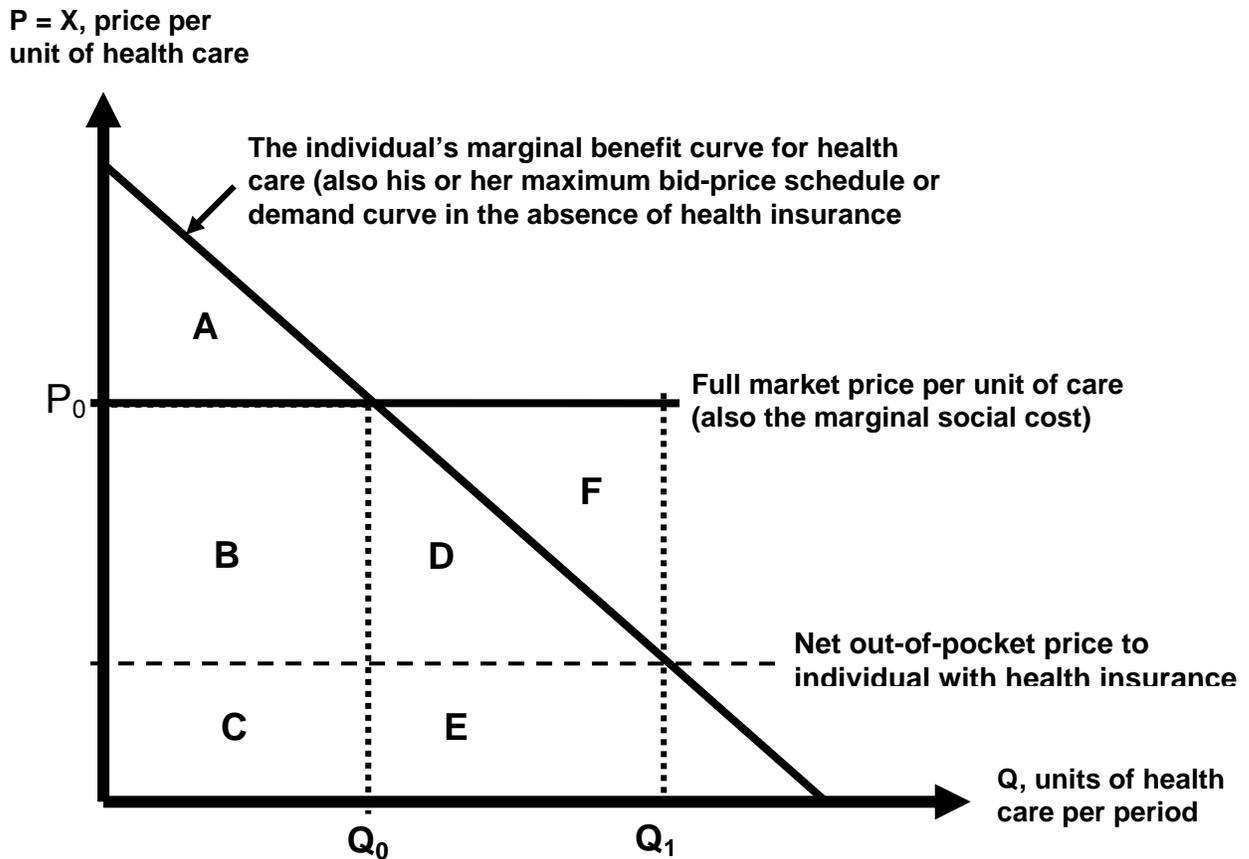
The *demand curve* depicts the maximum prices (P) thing being bought (Q), with all other things affecting those bid prices (including health status in the case of health care) being held constant. That curve shifts up or down when one or more of these other factors change. We can think of that curve as representing the monetary equivalent of the marginal benefit the person derives from the first unit bought, then of the marginal benefit from buying the second unit, given the first had already been bought, and so on.

A *demand function* expresses these maximum bid prices (P) as a function not only of volume bought (Q), but all other factors influencing that bid price – including health status if the "thing" is health care.

Now in Figure 1 we assume that the individual can procure units of health care at a constant price  $P_0$  in the local market for physician services. Think of this price as the full price of care in the absence of health insurance.

If, however, the person had health insurance that paid, say a fraction  $X$  of the medical bill (with  $0 <$

$X < 1$ ), then the net out-of-pocket price per unit of health care to the consumer would be only  $P_1 = P_0(1-X)$ , indicated by the dashed line in the graph.



**FIGURE 2 – THE MARKET FOR HEALTH CARE, NO HEALTH INSURANCE**

In the absence of health insurance, this individual would buy  $Q_0$  units of care at the full price  $P_0$ , deriving from that volume a total benefit equal to the areas  $A+B+C$  and a consumer surplus of  $A$ . With health insurance, the individual would use  $Q_1$  units of care, deriving from it a total benefit equal to areas  $A+B+C+D+E$  and a total consumer surplus equal to  $A+B+D$ . But the folks who finance the insurance risk-pool that provides the insurance would have to pay  $B+D+F$  (a deficit to them) for that individual's care, with the individual paying only  $C+E$ .

If you net this all out you arrive at the conclusion that, abstracting from who wins and who loses, society as a whole suffers a "welfare loss" of  $F$ .

Another way to look at this is that the extra volume  $Q_0-Q_1$  bestows added benefits of  $D+E$  on the individual but costs that individual and the insurance pool combined  $D+E+F$ , for a net welfare loss of  $F$ .

Now this story holds together only for the health status assumed to underlie the individual's marginal benefit curve. Perhaps that individual is reasonably healthy and we are talking about mainly highly elective care. If the person were critically ill, the demand curve would sit much higher.

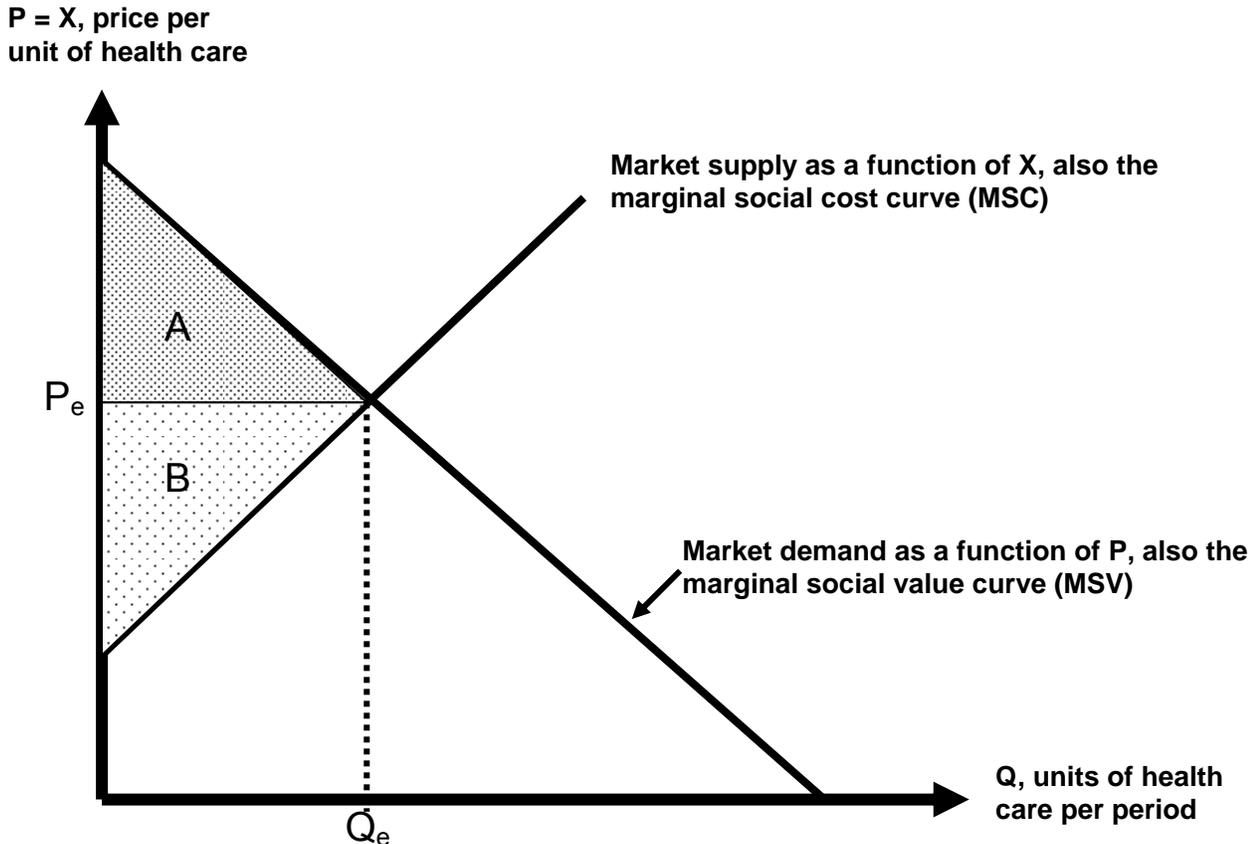
Health insurance priced at an actuarially fair premium is designed to cope with this uncertainty. For

risk averse persons, insurance provides increased utility relative to remaining uninsured. That benefits must be juxtaposed to the welfare loss shown in Figure 1.

Furthermore, if this person were very poor, perhaps society at large would derive benefits from seeing this individual consumer more health care than he or she would with only their own resources. In other words, health care tends to be subject to positive externalities in consumption. In that case, this simple graphical exercise is highly misleading. There would be a much smaller social welfare loss and possibly a social welfare gain from providing the poor person insurance. Modeling this situation with a graph could be done, but it would be much more complicated.

## B. The Entire Market for Health Care

Some textbooks do not show the individual's case, but only the situation for an entire market. Figure 2 illustrates this case.



**FIGURE 2 – THE MARKET FOR HEALTH CARE, NO HEALTH INSURANCE**

In Figure 2 we assume that there exists a perfectly competitive market for some standard health service illustrated in Figure 2. Initially no buyer in this market has health insurance.

We assume, as welfare economists do, that the market demand curve represents the **marginal social value (MSV) curve**. This is easiest to understand if we assume that every individual buys only one unit of health care per period in this market, so that a point on the market demand curve represents a

particular individual's maximum bid price for that unit of health care. It is the marginal value that individual assigns to that unit of health care. If we array individuals from left to right along the curve in decreasing magnitude of their marginal bid prices, we get the market demand curve. For the market as a whole it then makes sense to call it the **marginal social value (MSV) curve**.

Similar reasoning makes us view the upward-sloping supply curve as the **marginal social cost (MSC) curve**. Here we think that providers of care in this market are arrayed along the supply curve in terms of increasing minimum ask prices for units of care. These ask prices increase as we move along the supply curve to the right, because the marginal cost of producing services experienced by these providers increases. On the left segment of the curve are low-cost providers. On the right are high cost providers.

In equilibrium, this market will clear at a price  $P_e$ , which is paid by the buyers of care and received by the providers. All but the marginal buyer at the intersection of demand and supply would have been willing to pay more than  $P_e$ . They reap a so-called consumer surplus, defined as their maximum bid price minus  $P_e$ . If we add that across all buyers, we get the **total consumers' surplus** in this market, equal to area A in Figure 3.

Similarly, at  $P_e$ , only the marginal seller at the intersection of the demand and supply curve just breaks even. All suppliers to the left get paid more ( $P_e$ ) than their marginal cost of producing care. Their marginal profit per unit is thus  $P_e$  minus their marginal costs. If we add this up across all suppliers actually selling in the market, the **total producers' surplus** is area B.

Finally, the **total social surplus** in this market, in equilibrium, is the sum of areas A and B. Maximizing the total social surplus to be had from a market is what economists call "**maximizing the social welfare**" yielded by this market. It is the overarching normative goal of what is called "welfare economics."

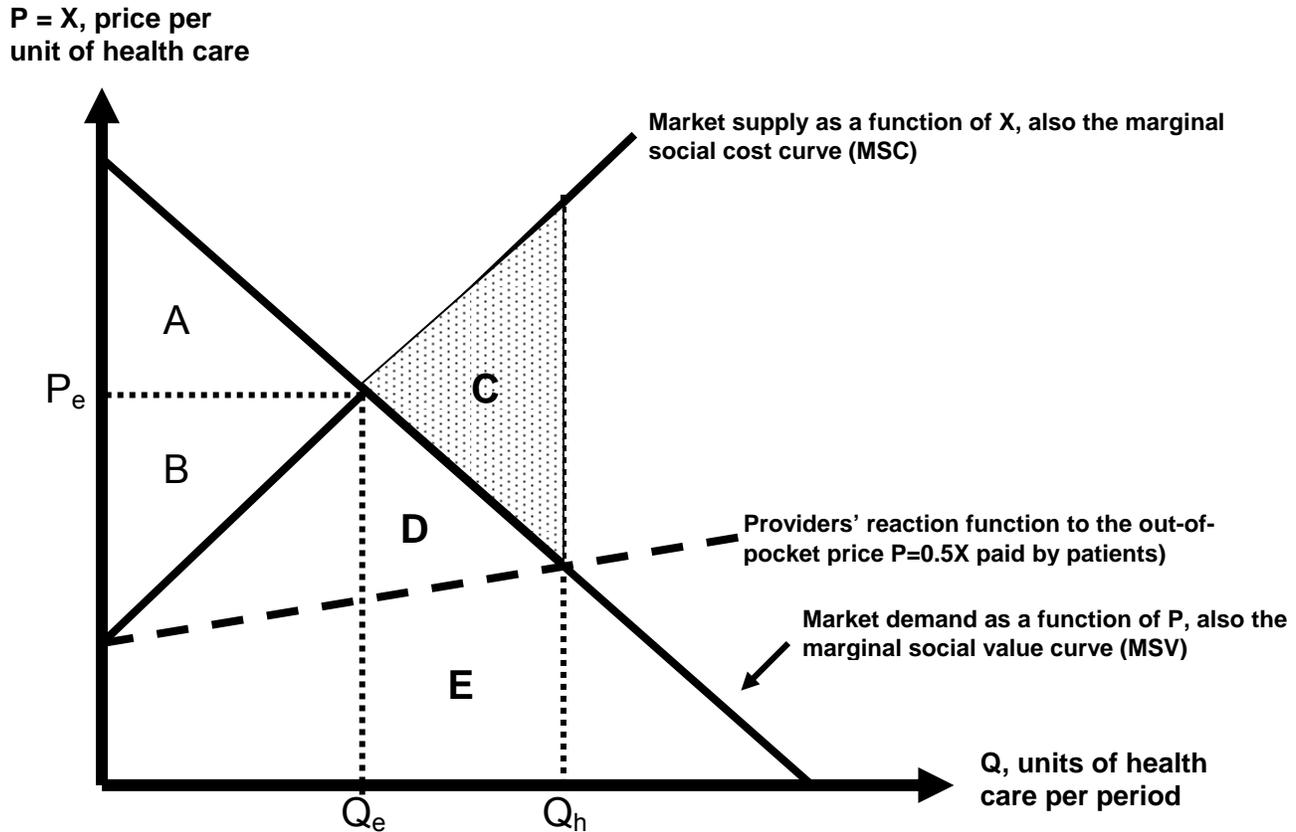
With this set up as the baseline, let us now assume that the government introduces into this market a tax-financed, public health insurance program under which it pays 60% of the cost of health care for some patients (e.g., the poor or the elderly). Assume the providers of care collect 40% of their bills from patients and are paid the other 60% by the government program.

Let

$X$  = the total price (40% paid by patients, 60% paid by the government) received by the providers of health care per unit of care and ,

$P$  =  $(0.4)X$  the out-of-pocket price patients pay per unit of care.

The impact of this policy on this market is shown in Figure 3. In that graph, the vertical axis shows both, the total price  $X$  producers are paid (half by patients, half by the government), and the price patients pay producers, equal to  $P = 0.4X$ . The market demand curve depicts how many units of care patients demand at alternative out-of-pocket prices they pay. That curve is still the consumers' **marginal social value (MSV) curve**.



**FIGURE 3 – THE MARKET FOR HEALTH CARE, WITH HEALTH INSURANCE**

The solid, upward-sloping supply curve depicts the number of units of care that providers supply at different total prices  $X$  they are paid (40% by patients, 60% by government). That curve is still the producers' **marginal social cost (MSC) curve**.

Finally, the dashed upward sloping supply curve shows the number of units of care providers supply to patients at the out-of-pocket price  $P$  patients pay. It is important to recognize that this curve does **not** represent the **marginal social cost curve**. It is simply a reaction curve – the suppliers' reaction to the out-of-pocket price  $P = 0.4X$  patients pay. The providers know, of course, that when patients pay them  $P$ , they will actually receive  $X = P/(0.40)$  in toto per unit of care.

We see in Figure 3 that, after the introduction of this health insurance scheme, the out-of-pocket price  $P$  patients pay has fallen below the original equilibrium price  $P_e$ , while the total price  $X$  providers receive (40% from patients, 60% from government) has increased above the original  $P_e$ . The total quantity of health care used has increased markedly by  $\Delta Q = Q_h - Q_e$ .

Textbooks in health economics invariably use a graph such as Figure 3 to point out that health insurance entails a welfare loss, shown in Figure 3 by the shaded triangle C. The argument might proceed as follows:

1. The total value (measured by willingness to pay) that patients assign to the added units of health care  $\Delta Q = Q_h - Q_e$  consumed by patients as a result of the "moral hazard" of health insurance is the sum of areas D and E.

2. The total additional social cost of producing these extra units of care is the sum of areas C, D and E.
3. Therefore, the total incremental social costs associated by the introduction of health insurance exceed the incremental social value associated with that policy by area C, which is a so-called “deadweight loss” or decline in “social welfare.”
4. Health insurance is “inefficient” in this sense.

The question now is what *normative* significance a policy maker should attach to these conclusion. It is true that society as a whole will incur additional money costs equal to areas C+D+E to bestow on some members of society added health care for which these recipients would have paid at most a money amount equal to areas D+E. But what does that suggest about the merits of the proposed policy?

Note that the statement about *money* tells us nothing about *utilities*, that is, the net change in *human happiness* (well being) brought about by that policy. For all we know, those who paid for the added care lose less happiness collectively than the happiness gained collectively by the recipients of the added care. Simply to assume that amounts of money measures this change in happiness accurately is dubious on its face, especially when those who are made to pay money for the extra care are in a different income class than those who get the extra care. To assume that the deadweight loss C expressed in money terms also reflects a net social loss in human happiness (utilities) tacitly assumes that utility can be measured in money terms and, moreover, that the marginal utility of money wealth is constant across income classes.

The preceding analysis speaks about net costs and gains. A somewhat richer welfare analysis identifies specific groups within society that are affected by the income redistribution inherent in the introduction of health insurance. We use Figure 4 and the standard welfare accounting system in the table below to perform that analysis, using three groups in society: (1) patients who receive the extra care, (2) the providers of health care who produce the extra care and are paid for it, and (3) taxpayers who have to pay 60% of the total cost of health care used by patients in this market.

### WELFARE ANALYSIS OF HEALTH INSURANCE

INTEREST GROUP	BEFORE POLICY	AFTER POLICY	CHANGE
Buyers (Patients)	F + A	F+A+B+D	+B + D
Providers of Care	H + B	H + B + A + G	+A + G
Government (Taxpayers)	0	-A - G - C - B - D	-A - G - C - B - D
<b>TOTAL (SOCIETY)</b>	F + A + H + B	F + A + H + B - C	<b>- C</b>

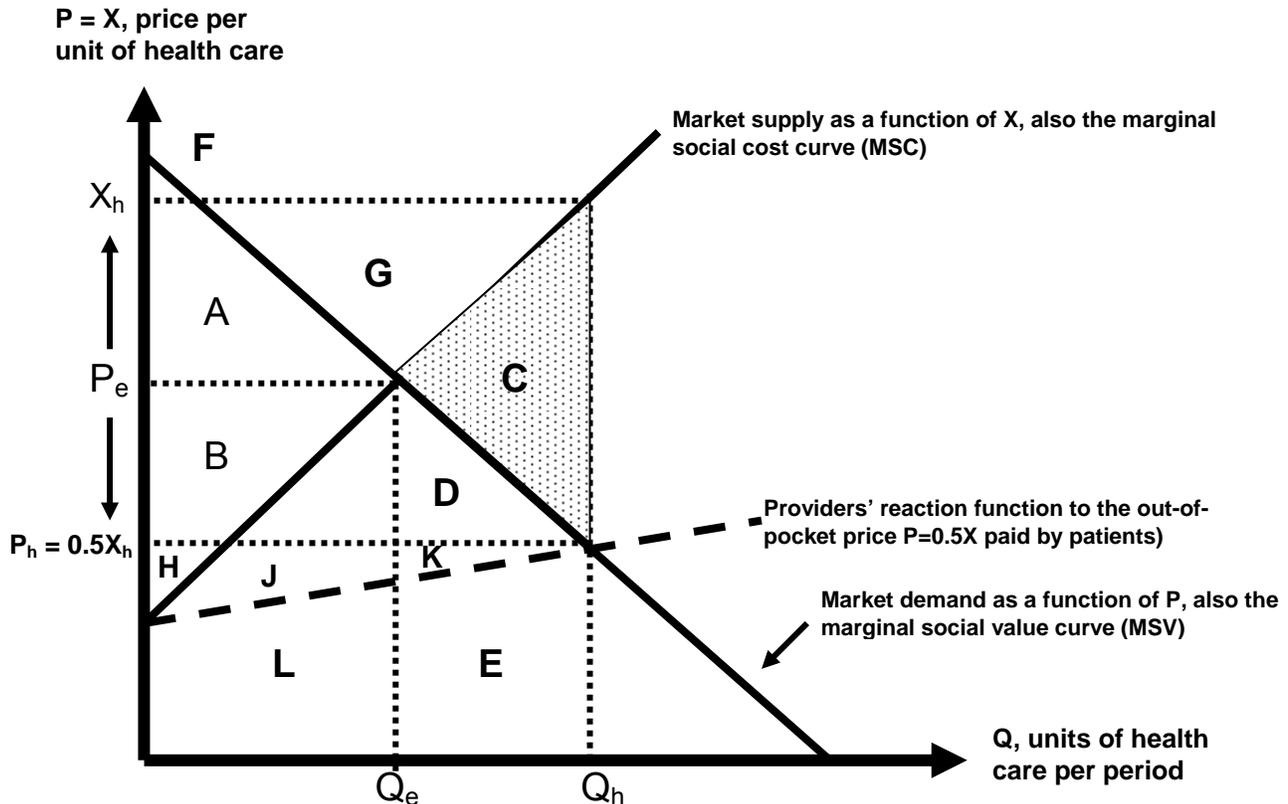


FIGURE 4 – THE MARKET FOR HEALTH CARE, WITH HEALTH INSURANCE

Figure 4 and the accounting table show that, relative to the original situation without health insurance, the introduction of the public program under which government picks up 60% of the cost of health care redistributes money-equivalent surplus from taxpayers to both patients and the providers of health care, as certainly Medicare did when it was introduced in 1965.

In our illustration, patients reap additional consumers' surplus equal to areas B and D. Providers reap additional producers' surplus equal to areas A + G. On the other hand, taxpayers, who previously had not paid anything toward health care, now pay actual money equal to areas A + G + C + B + D. Of this outflow of money, (A + G + B + D) flows as additional surplus to patients and providers.

The remainder, area C, the "deadweight loss" so dreaded by economists, goes up in smoke, so to speak. It accrues to no one in society. It is the "welfare loss" economist attribute to health insurance, which causes the production of additional health care at a cost of E + K + D + C for which patients would have been willing (and able) to pay collectively only E + K + D.

Once again, however, this redistribution of money equivalents tells us nothing about the associated redistribution in utility. To assume that it does, we must assume that utility is well measured by willingness to pay, which abstracts from ability to pay and assumes that the marginal utility of money wealth is constant across all income classes.

Finally, we note once again that health insurance yields utility gains from the reduction of uncertainty not captured in these graphs. A more comprehensive analysis must take that into account.

**Cash Transfer instead of Tax-Financed Health Insurance:** It may be argued, and economists routinely do argue, that all patients collectively could be made happier if they were simply given cash in the amount taxpayers now pay to subsidize health care. (You will recognize this as an implication of the Second Theorem of Optimality in economics).

The argument is that, instead of receiving additional consumer surplus of  $B + D$  through the health insurance program, if patients were given cash equal to  $A + G + B + D + C$  they could create far more happiness for themselves than is yielded them by the added consumer surplus  $B + D$ .

This is undoubtedly true, because patients could then still recreate precisely the same outcome that health insurance would, but they might prefer to spend some of the cash transfer on other pressing items – e.g., a better car.

This argument, however, has a major flaw. It is doubtful that voters would approve of so large a transfer of unrestricted cash. Can one really believe that voters would be indifferent between funding, ay, the current Medicaid program and simply giving the poor the same amount now spent on Medicaid in the form of unrestricted cash transfers, letting the poor spend that cash as they see fit? Where have economists been even to dream of such an outcome?

It is highly unlikely that the typical taxpayer wishes to see the poor maximize their own happiness for every dollar of taxes paid by taxpayers. Instead, taxpayers want the poor to behave in certain ways and not in others. Thus they want the poor to use tax-financed health care for themselves and their children, but taxpayers do not want the poor to enjoy tax-financed football games or alcohol. Why economists find that so hard to grasp has long been a mystery to me.