

Health Economics, Exam June 4, 2009

Hints for solution

Problem 1. The basic externality problem comes from the fact that the satisfaction of consumption in general depends on other people's consumption. The unregulated market cannot adapt to this, so that prices give wrong signals to consumers in the market.

1.1. The purpose of an intervention is to set the information signals right, which in this case means that the smokers (and future unhealthy) individuals should see the cost to society of their consumption choices. Setting up artificial markets would amount to having restricted areas for smoking, eating burgers etc. with entry fee, which would clearly be difficult to sustain. The taxation solution seems therefore to be the superior.

1.2. Medical savings accounts were introduced mainly to cope with ex post moral hazard, since the individual pays for her treatment with her own money. They can hardly be expected to have any impact on lifestyle, since the basic problem here is rather the individual assessments of future consequences.

1.3. The scheme has the advantage that it pays out immediately the gains from improved lifestyle and therefore acts as an incentive for lifestyle changes. On the other hand, the payments have to be financed, so that the scheme can be neutral at most in the long run. Moreover, the idea of having to pay back when the illness progresses would probably be rejected by the population at large.

Problem 2. This is the QALY model discussed for example in Miyamoto et al. (1998). It is assumed that preferences over lotteries over health profiles (Q, T) are governed by the expectation of $U(Q, T) = V(Q)T$.

2.1. A health state Q is a variable that describes the health of a person. Note that Q is not necessarily a real number, and the set of all possible health states can be any arbitrary set. The duration T is a non-negative real number. A health profile (Q, T) can be interpreted as T years in health state Q . Thus, health states are chronic. Usually, the quality-adjustment factor $V(Q)$ is normalized such that $V(\text{"perfect health"}) = 1$. We can therefore

interpret $U(Q, T) = V(T)Q$ as the number of life years in perfect health that is just as good as T years at health state Q .

There are (at least) four different methods for assessing $V(Q)$ in practise. The rating-scale method (not meaningful in relation to the model); the standard gamble method (meaningful in relations to the model); the time trade-off method (meaningful in relation to the model) and the person trade-off method (not meaningful in relation to the model). An advantage of the time trade-off method is that it is relatively easy to understand, and does not refer to choices involving lotteries. An advantage of the standard-gamble method is that it works also for the generalized QALY model $U(Q, T) = V(Q)W(T)$ and therefore does not require that utility is linear in life years.

2.2. Maximizing the total sum of QALYs of all individuals in a given population is being refereed to as QALY-utilitarianism. Sceptics of such QALY-utilitarianism argue that it violates certain interpretations of “equal value of life”, it fails to take into account aversion against inequality in the distribution of QALY over the population, and use the “double jeopardy” argument to criticize that it discriminates against the disabled. Defenders of QALY-utilitarianism argue that it is in the interest of any expected utility maximizer behind a “veil of ignorance” (as discussed by Harsanyi and others), and that it implies (and, in fact, under certain assumption is implied by) the basic principle of justice that a gain in life years for one person is socially equally good as a similar gain (in terms of the absolute number of life years) for another person at the same health state.

2.3. Examples of other health-related social welfare functions: The Cobb-Douglas social welfare function (that can be justified in terms of a basic principle of justice saying that social welfare is unaffected by a permutation of life years among the individuals for a fixed distribution of health states), and the Bergson family of social welfare functions (that can be justified by somewhat weaker basic justice principles).

Problem 3. The situation sketched is one of adverse selection in the insurance market, covered in the lecture notes (ch.11). However, it differs in two respects, namely (1) the presence of administration cost and (2) the fact that individuals differ only in their attitude towards risk, and consequently their willingness to pay for insurance.

3.1. The basic figure (Figure 3 p.16) illustrating the workings of the market can be used in an adapted version, where individuals are ranked according to their willingness to pay for insurance. Now each individual has the same

average loss, but due to increasing marginal administration cost, there may be a lower segment of willingness to pay which is below the cost of insuring these and all the more willing costumers, leaving them without insurance.

3.2. The classical remedy for adverse selection is the introduction of contracts which specify premium *and* deductible, and the standard analysis of the case of different types (Figure 4 p.17) may be carried over to the present case of different attitude towards risk with changes only in the interpretation.

3.3. With mandatory insurance there will be a large number of individuals, possibly a majority, for which the cost of insurance will exceed the willingness to pay. It may be expected that in this case the insurance scheme will be changed, possible in the direction of lowering the reimbursement.