Guest Editorial

The Welfare Implications of the Extension of Life[1]

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Our physicians and biologists tell us that the possibility of significant extension of life can no longer be thought of as mere science fiction. It is important, then, to begin to consider the implications of this conceivable scientific development. With hard thought and a bit of reflection, we can make some sobering predictions about the structure of a society and economy in which lives are significantly extended.

The Structure of Society and the Economy

Extending life-spans by, say, 30 years would radically alter society and the economy. The social science explosion of the last few decades hasn't told us nearly as much as we need to know about the ways changes in certain parameters affect the total structure of society. But we have learned one unequivocal fact: economic and social institutions are much more complex and interdependent than we have imagined. This discovery implies that a significant change in one parameter, say, expected life-span, will reverberate through a vast array of social institutions. What is perhaps more sobering, these reverberations will be difficult to predict.

The danger, of course, is that a change that is desirable in and of itself may turn out to be undesirable, indeed even disastrous, once all of its ramifications are taken into account. Consider an example from the field of economics. The post-World-War-II U.S. agricultural revolution and the government policies that promoted it have been signal successes when measured in their own terms: promoting farm output and productivity. Taking a broader view, they have had significantly adverse consequences. In the process of boosting the productivity of the agricultural sector, marginal farmers and their families were driven off the land and into the cities. Significant credit for the United States urban crisis of the 1960s and 1970s must be given to the policies and institutions that promoted our agricultural revolution.[3] This example and many others should make us pause and reflect before undertaking what at first glance appear to be clearly desirable changes.

The Transition Period

Even if we argue that success with life extension would produce a more attractive society once our citizens and institutions accommodated themselves to this drastic alteration in circumstances, we cannot assume that such "success" should be welcomed. The transition period to an extended-life society that has reached equilibrium may be both difficult and lengthy. From a policy standpoint, we will confront the traditional paradigm of transition cost versus ultimate benefits. Its lesson goes as follows: we may see a change that will yield significant benefits once it is made part of a system, but if at the same time we foresee a difficult period of implementation, we may wisely oppose the change.

Without much additional evidence, it would hardly seem prudent to grant that the society that would ultimately result if lives were significantly extended would be an improvement over the present situation. It is clear, however, that getting to an extended-life society would be quite a struggle. During the period of transition, population would boom. Growth would be particularly rapid in the unproductive elderly years. Thus we might expect that during this transitional phase, the welfare of all groups might be in decline.

This will also be the period during which the formerly balanced patterns of society and its institutions will be furthest out of kilter. Large numbers of our elderly may be two generations removed from active employment. New family structures may be required, and these can hardly be created overnight. Unless our expanded elderly segment is to be thoroughly demeaned, it will be essential that we develop institutions of respect and esteem that are independent of income-earning capability.

The simple mathematics of life expectancy do not suggest that any significant extension of life can come about as part of a gradual process. Conquering diseases and improving health care and

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1. J. Kaplan, P. Memishian, T. Schelling, and the referees for this journal gave me helpful comments. The author's research on the elderly is sponsored by a grant DHEW to Elder Systems, a non-profit research organization.

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3. See, for example, U.S. Senate Committee on Government Operations, "The Rural to Urban Population Shift —A National Problem" [at the National Manpower Conference, Oklahoma, State Univ., May 1968]. Washington: USGPO, 1968.

the environment will just not add that much to longevity, particularly since those who might be rescued thereby are probably weaker than those who now survive and are likely to suffer higher than cohort-average death rates once they are saved.

So the change will have to come as part of some significant medical or biological breakthrough. Professor Bernice Neugarten describes this approach as

> altering the intrinsic biological processes which are presumed to underlie aging and which seem to proceed independently from disease processes—that is to discover the genetic and biochemical secrets of aging, to discover the factors that underlie the rate of aging, then to alter the biological clock that is presumably programmed into the human species. This second approach is directed at rate control, rather than disease control.[4]

All of this implies that the change may be rapid and the costs of transition extreme.

By way of analogy, think of the problems General Motors would encounter in adopting the (reputedly) superior Wankel engine for its cars. Even assuming that a world in equilibrium with extended lives is superior to what we have at present, how will our society perform in the much more difficult task of introducing and coping with extended-life individuals? Our society, after all, does not have the equivalent of design and production engineers. A more controlled society, say the People's Republic of China, could perhaps deal with a rapid increase in human longevity better than the United States.

A radical breakthrough in longevity potential need not, however, result in rapid movement to an extended-life society. Adoption of the techniques may be piecemeal and slow, and altered institutions may evolve apace. It has taken a long time for the automobile to reach its present level of total societal significance. Even if the scientific breakthrough is immediately adopted, its impact may come slowly. Quite possibly, it will turn out that the way to extend life is to participate in some processes over the course of one's younger years. If age 30 is too late to start, it will be at least 35 years from the development of the breakthrough until the first extended-life 65er's come on the scene.

There are significant consequences if life extension turns out to be a delayed-action process. This might mean that few individuals who could provide the resources to make the process available could expect to benefit from its use. The resources may still be provided, for they are provided in equivalent situations with schools, orthodontia, and other productive inputs we provide to the young. Unless the technology is readily transparent, the first cohort of "beneficiaries" will have little idea of exactly the ways their lives will be affected. This may add a bit of natural caution. Finally, if the process is in any way painful or expensive, the youthful future beneficies may be reluctant to pay the price for distant future benefits. The reluctance may run deeper than does our natural tendency to weight the future less than the present. These youngsters may just express a selfish insufficient concern for their future selves. John Smith at age 65 is a very different person than he is at 21, and his younger self may realize that. (This is one argument for "paternalism" with regard to prohibition or discouragement of activities such as smoking and drugs.) If any of these forces slow adoption of life-extending technologies, the transition to the extended life may be eased.

The Dynamic Evaluation Process

The emphasis thus far has been on a snapshot look: how will things look on a cross-sectional basis? The time dimension must be considered as well. Surely some individuals would lower their consumption levels in each of their allotted three score and ten years if they could perhaps secure an extra dozen. The mere mention of this problem gets into questions like: what is the appropriate structure for a dynamic utility function for an uncertain lifetime? Such questions are troubling to decision theorists, much less to mere laymen who may be choosing whether or not to extend their lives.

As a rough approximation, it is easy to suggest the types of factors that might play a role. First, what will it cost to extend one's life? The full tally includes not only the consumption sacrifices that one will make in saving for one's extended years, but the pain and expense of any medical treatments, or foregoing a preferred life style.

Second, what share of these costs will be borne by the total society? Most price theorists would suggest that we should provide each individual a lump sum transfer (possibly negative) that he can allocate in any actuarially fair manner he likes. But it seems obvious that people who live longer will receive more total transfers from the society, even if their longevity is partly produced by a conscious choice of their own. The individual's incentives then may stand as follows: if you wish to take the expensive action of life extension, society will gladly bear part of the costs, but this is a bonus transfer that you can only receive if you make that choice.

Even if future support levels are equalized across income groups, this restricted transfer plan will work to the disadvantage of our poorest citizens.[5] They are the ones who, given the choice, would

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4. B. L. Neugarten, Social Implications of a Prolonged Life-Span, **Gerontologist**, 1972, **12**, 323, 438-440.

5. Present social security schemes have the size of annual payment independent of life expectancy. This is a built-in regressive element, because the poor do not live as long. Some pension plans, such as TIAA-CREF, avoid uneven expected payments to recipients by giving shorter-lived males greater payments than females in like circumstances. In theory, of course, there is no reason why past income, like sex, could not be employed as an actuarial indicator of expected longevity when computing equitable pension payments.

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most likely choose not to extend their lives, but to receive the actuarial savings as increased income during their ordinary lifetimes.

If the longevity treatments themselves are expensive, it seems probable that they will fall in the class of merit goods, goods our society at present believes it important to make available to all of its citizens at modest charge. Such treatments will likely achieve the sanctified, subsidized role recently accorded to renal dialysis. If you need it, the federal government will pay for it. Thus, with life extension, our expected unwillingness to let the market ration a good that becomes heavily entwined with sacred values will lead society to make inefficient transfers to some of its constituents. Given free choice, these individuals would prefer to spend the funds then allocated to extending their lives in other directions.

Third, what sort of provisions will be available if life extension does not work out so well? It seems inevitable that any significant program of life extension will raise to the forefront of public debate questions of euthanasia. Any significant tampering with natural life-span may create additional unfortunate situations of life that are inferior to death. Choosing between the two is not an action our society readily sanctions.

To show the possibilities, consider the concept of preparatory euthanasia. An individual in good health, knowing that at some time he might fall into a subzero condition, contracts for his death should such an event occur. The contract, to be most effective, should be between the man and a mechanical device, not another human being. A very ingenious example suggested by Thomas Schelling would allow the individual to emplace a sensor device within his skull. If the sensor ever determines that a stroke has left the individual in a vegetative state, it goes off, producing further damage and inducing death. Assuming that the device is implanted in advance of the stroke (and many such devices will never play any role), all the individual has done is shift his future probability distribution. Death has been increased in probability; vegetating has gone done. And we readily accept actions that increase the probabilities of individuals' deaths. What is even better in this instance, we may not know whether the stroke itself was fatal, or whether instead it required the assistance of the preparatory-euthanasia device.

Such a device might even be employed if the vegetative state were considered superior to death. First, the prospect of vegetating may cause greater anxiety than the prospect of death. Eliminating vegetating as a possibility may raise utility in all pre-stroke years. It may provide an additional benefit of this type if it obviates any need to save for possible years of complete helplessness.

The welfare implications of life extension need not be all mechanical as has just been described. No doubt significant changes would be wrought in values and tastes. Clichés can be trotted out to support both sides of the argument. But it seems clear that there would be many forces of conservatism that might lead us to prefer what we have to what we would get with extended life. This might be the case despite the fact that, once we got extended life and learned to live with it, we might never want to make the reverse transformation.

A more mundane biological example might be suggestive. Nature, in her wisdom, made our arms a particular length. It perhaps had something to do with balancing gains from length, requirements for balance, and the difficulties of maintaining appropriate supply lines and information channels. Say we could work around the constraints. Would we want our arms to be longer or shorter? It would seem hard to argue that arms are just the right length, but that might be our conclusion. (We would of course accept the glacial pace of any evolutionary changes.) First, society has already adjusted to our present arm length, whether it be in clothing styles, tastes in apperance, size of tennis rackets, or structure of machines. Second, we place very different weights on errors of omission versus errors of commission, and changing arm lengths might elicit the latter. Third, we are significantly risk-averse, and we believe we are doing just fine with what we have. The same arguments seem to apply to life extension.

Whether a particular individual would choose to extend his life would depend on a lot of things: for example, in what ways life was extended, who else was extending, and what he expected would be his lot after he gained more years. As the speculative tone of this paper suggests, we cannot provide him many hard facts on the last issue.

Conclusion—The Effects of Knowledge

But what if we carried out the research and discovered that it would be undesirable in a welfare sense to have individuals' lives extended significantly? How would this affect what happens? Unfortunately, I would argue, not very much. The key to prediction in this area is the knowledge of who controls the choices and what are the benefits and costs returning to them.

It is worthwhile to note that we have long had the scientific capability to significantly extend life: the required technique would be selective breeding. We did not make this choice because the controllers—the people who would have to abstain from having children, or the long-lived who would have to produce many—thought the gain not worth the sacrifice of traditional procreative practices.

Now we are told we are at the threshold of some new possibilities. One group of controllers for this new opportunity will be the biomedical investigators, the people who might produce research breakthroughs. To a scientist, knowledge is an end in itself. Unless its eventual applications are

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clearly undesirable (and the public debate on this issue shows that not to be the case here), we must expect scientists to push their research forward.

How about the people, those whose lives might be extended, or perhaps those (like parents) who will be choosing an extended life for others? A few no doubt will choose no change. But many will choose greater longevity despite the fact that it might work out poorly for all. This may represent but another situation where a social outcome is inefficient in terms of individual preferences. This point is perhaps best understood with the aid of a homey metaphor. I recently attended a Bruins hockey game where the crowd was on its feet each time the play got "hot." With everyone standing, it was harder for everyone to see. The resolution of the problem seemed impossible, for anyone who sat down helped not his own vision, but that of others.

The extrapolation of this example to life extension seems rather grim. We may all recognize that life will be less pleasant once we all choose to extend our lives. But if the technology is made available to each one of us individually, we may choose longevity in the same way that the Bruins fans chose to stand up. Through our uncoordinated personal actions, we may grasp voluntarily for an inferior outcome.

What this all means is that the people, to the extent that we are the controllers, may not be in control. And that is an ominous observation.

The "New Professional" (Continued from page 94)

I am a New Professional gerontologist. A few years of experience in the field separate me from my student colleagues and at the other end separate me from true peerage with experienced, established gerontologists. Yet almost like some Newtonian law it seems that the very years that separate me from them concurrently link me to them. This is not merely a perceptual game; both elements are coincidentally present at each stage in the professional and organizational development of a Gerontological Society gerontologist. I cite this apparent paradox in an attempt at ending this essay with a sense for what I think is the most appropriate role for the New Professional vis-à-vis the Society. If given a little help by the Students through their communications and programs, and if given a little help by the Society leadership through increased involvement in committee and Sectional activities, the New Professionals can offer their input to both groups while also facilitating a meaningful two-way interactional continuum between Students and the greater Gerontological Society. When and if this happens, truly qualitative involvement of New Professionals will have taken place. It is my deep conviction that this is both a desirable and a possible role for New Professionals to play, and look to our colleagues at either end of the experience spectrum to give us the supports we need to move toward this goal.

These are my personal observations and I welcome comments from my New Professional peers as well as from all others who identify with their Gerontological Society membership.

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