IMPLICATIONS OF POPULATION CHANGE ON SOCIAL INSURANCE SYSTEMS

PROVIDING OLD-AGE BENEFITS

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by

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General agreement, although not completely universal,
exists in North America that cost analysis of programs providing
old-age retirement benefits should be conducted over the long
range, and not merely over the next few years. The actuarial cost
estimates for what is now the U.S. Old-Age, Survivors, and
Disability Insurance program have always been made over a long
period of future years. Initially, for the 1935 Act, this period
was 44 years (up through 1980), but most subsequent valuations
of the program have used a 75-year period. The justification for
this length of time is that it covers essentially the entire life-
time of every person in covered employment on the valuation date.

It must be recognized that outside of North America --
but with the exception of the United Kingdom -- long-range social
insurance programs providing retirement benefits are not generally
considered over long future periods. The argument made in support
of this short-sighted approach is that it is impossible to
predict with any precision such long-range future operations.
Countering this is the point that an estimate prepared by well-

qualified persons is far better for policy planning and analysis than nothing at all.

ELEMENTS DETERMINING COSTS OF SOCIAL INSURANCE PROGRAMS

Basically, it may be said that all elements which determine the cost of a long-range social insurance program that provides old-age retirement income can be classified into two categories, demographic and economic. The main thrust of this paper will be to consider the implications of population change. However, the effect of economic elements cannot be ignored.

Considering the matter from another standpoint, it could be said that the two elements which determine the cost of any social insurance program are the benefit structure and the population covered. Quite obviously, for any particular covered population, the cost of the program depends on the benefit structure as to such items as normal retirement age and level of benefits.

Conversely, the cost of a particular social insurance program does not depend solely on the benefit structure. Two plans may have exactly the same benefit provisions and yet have greatly different costs over both the short range and the long range, because of the nature of the population covered. For example, one program might apply to a population which has a relatively young current age distribution and a high level of mortality, while another program might apply to a population which has a relatively high age distribution currently and low mortality. Quite obviously, the cost for retirement benefits under the latter plan will be far higher then under the former plan (although there may be some offset in that the cost for young-survivor benefits will be higher for the former plan).

INTERDEPENDENCE OF BENEFIT STRUCTURE AND NATURE OF POPULATION
COVERED

In actual practice, the benefit structure and the nature
of the population covered under a long-range social insurance system
providing retirement benefits are not completely independent vari-
ables. Thus. for example, in a population with relatively high--
mortality, it is very likely that the normal retirement age under
the program (the age at which full-rate benefits are first avail-
able) will be considerably lower than in a country with low mor-
tality.

When mortality rates decrease significantly, and the proba-
bility of attaining normal retirement age approaches unity, while
the life expectancy thereafter increases greatly, logic calls for
raising such age. In practice, this may be difficult to do, because
many people tend to remember the past when relatively few people
survived to the normal retirement age and then lived for many years
thereafter. However, it is possible and equitable to raise the
normal retirement age if this is done on a deferred, gradually
phased-in basis.

Digressing a moment, it is important to note that frequently
it is very difficult to specify precisely what is the normal retire-
ment age under certain plans. For example, consider the situation
under the U. S. Old-Age, Survivors, and Disability Insurance program
for persons currently attaining age 65. It is usually stated that
the normal retirement age is 65, with reduced benefits being avail-
able at age 62 (at 80% of the age-65 amount), with increments for

delaying retirement beyond age 65 (at the rate of 3% per year for
each year up to age 70), and with the benefits being paid auto-
matically (without regard to retirement) at age 70. One could
equally describe the retirement-age basis as being a normal retire-
ment age of 62, with increments for delayed retirement amounting
to 25% at age 65 and to 43.75% at age 70. Or, conversely, it could
be said that the normal retirement age is 70, with reductions of
30.43% for retirement at age 62 and of 13.04% for retirement at
age 65.

ELEMENTS AFFECTING CONSTITUTION OF POPULATION COVERED

In a social insurance system providing old-age retirement benefits as its major feature for substantially the entire population of a country, the changing age distribution of the nation over time is very important to consider in determining the cost of the program. In turn, the cost of the program will have an effect on its benefit provisions. Among the factors affecting the constitution of the population covered are fertility, imigration, mortality, health and work ability, state of the economy, and the philosophy prevailing as to retirement.

If we are considering national social insurance systems, it is necessary to take into account essentially only the characteristics of the population as a whole. Beginning with a certain population structure, its characteristics will change in the future as a result of the input factors of fertility and immigration and the output factors of mortality and emigration. One might well say that immigration is a form of fertility, because it adds numbers to the population, even though not at age zero. Similarly, it may be said that emigration is a form of premature mortality.

Effect Of Fertility

Fertility has probably the greatest effect on the size of the population over the long run because — at least up until now, and quite likely in the future — mortality rates have not varied so greatly as to have as large an effect on population sizes. Of course, if there should be some astounding breakthrough in medical science, and people would be able to live for several

hundred years instead of a likely maximum span of life of about
110-115 years, the situation would be different.

On the other hand, fertility rates have fluctuated relatively
widely over the past, and it is not inconceivable that this will
happen in the future. Currently, fertility is somewhat below the
replacement level, and many forecasters make the assumption that
this will continue in the future, or that even lower fertility
rates will occur. On the other hand, some believe that fertility
rates will rise at least to the replacement level because of an
inherent nature of people to reproduce themselves -- or perhaps
through strong governmental measures to encourage increased fertility.

Net immigration can be an important factor in increasing or
maintaining the size of the population. In the United States,
a very important element is illegal immigration, which in recent
years has considerably exceeded legal immigration. As long as
this continues, there will be the important effect of the size
of the population increasing significantly, generally beginning
with the younger adult ages.

If all other demographic elements are constant, higher fer-
tility rates will have a favorable effect on social insurance
systems providing old-age retirement benefits. As long as fertility
is above the replacement rate (or the actual fertility plus the
effect of net immigration achieves this result), there will be
a steadily growing covered work force to provide the contributions
necessary to support the retired population. This type of chain-
letter effect will show relatively low costs for the social

insurance program, although eventually the chain must break (because population size cannot increase forever), and the cost of the program will become significantly higher.

On the other hand, if fertility (and its proxy, net immigration) decreases significantly, the cost of the social insurance system will rise sharply after a few decades because of the much higher ratio of retirement beneficiaries to covered workers. This will be a temporary phenomenon, however, with the cost peaking for several decades, until the retired population consists of survivors of the lower number of births that result from the reduced fertility. Nonetheless, serious financial problems will be posed to the social insurance system in the interim.

Two vivid examples of this peaking effect occur in the U.S. social insurance system. The OASDI program will have a much-publicized increase in the ratio of beneficiaries (including auxiliary and survivor beneficiaries) to covered workers beginning in about 2010, rising from the current level of 1 to 3 to a level of 1 to 2 in 50 years, according to the intermediate-cost estimate. Then, the survivors of the post-World War II baby boom will be reaching the retirement ages. At the same time, the number of persons in the working ages will be decreasing as a result of the baby boomers retiring and of the smaller number of new entrants into the work force from the relatively low number of births each year from 1970 on. Not so well known is the fact that there will be somewhat of a peak in the beneficiary-worker ratio in about 2035, because those reaching retirement age thereafter come from the smaller annual birth cohorts from 1970 on.

Another example is the Railroad Retirement system, which is currently in a peak period — although not because of fertility trends, but rather because of employment conditions in the past. Specifically, railroad employment was at a relatively high level during World War II, but decreased significantly thereafter. The persons who entered service in the early 1940s at relatively young ages are thus now at the retirement ages. As a result, the Railroad Retirement system currently has a very high ratio of beneficiaries to workers — about $2\frac{1}{2}$ to 1. In fact, the number of beneficiaries peaked several years ago (in 1979) and is now slowly declining. Real relief from the financial pressures of a high beneficiary-worker ratio will, however, not come until after the turn of the century. Even then, the system will have a relatively high ratio — and thus high costs — because of the slow, continual decline in the railroad work force beginning in the late 1940s (from 1.7 million average monthly employment in 1945 to 0.4 million currently). Even eventually, this ratio will be relatively high, because it will be that of a mature program.

Effect of Mortality

Decreasing mortality rates have some favorable implications for social insurance systems providing retirement benefits. Initially, there will be more workers paying contributions and fewer young-survivor benefits. However, far more than offsetting this are the increased probabilities of attaining retirement age and the longer durations on the rolls.

Under some circumstances — and those which are generally occurring throughout the world — the effect of fertility and mortality on social insurance systems providing retirement benefits tend to be additive. In many nations, fertility is at a low level and has decreased greatly from that which prevailed some decades ago, while mortality rates have been steadily decreasing. Both of these trends result in higher costs for the social insurance system and thus in pressures to change the benefit provisions so as to ameliorate to some extent the otherwise very high costs which will occur in the future.

The obvious solution to this problem from a purely logical standpoint is to raise the age at which retirement benefits are payable. Certainly, it can be argued that social insurance systems should be kept up to date with economic changes, such as by adjusting benefits to maintain their purchasing power, more or less, and to revise any monetary figures in their provisions (such as the maximum amount on which contributions are payable) so as to keep them up to date in relative terms. In the same manner, it can be argued that such programs should be kept up to date with demographic changes.

Effect of Labor-Force Participation Rates

When the social insurance system covers employed persons (rather than the entire population), an important element affecting its characteristics is the labor-force participation rate, which varies significantly by age and sex. Considering men first, this rate is usually close to 100% after the school-leaving age. It

remains close to 100% for many ages beyond then, until it gradually decreases as persons become disabled. Eventually, rapid declines in the rate occur as the retirement period begins, until it is close to zero at the oldest ages.

In the past, the situation was quite different for women, whose labor-force participation rates were never near the 100% level. A peak in the rates was reached at the early adult ages, with steady decreases thereafter as women left the paid labor market to become homemakers. In more recent years, the curve of the rates by age was bi-modal, because more frequently as the years went by did women who had left the paid labor market to become homemakers return thereto after their children had grown up. If present trends continue, and if women more and more continue in the paid labor market, while at the same time caring for children and conducting other homemaker activities, the curve of the rates by age may show the same shape as that for men -- and, in fact, may even closely approach it.

Growing labor-force participation for women can have significant effects on a social insurance system providing retirement benefits if it also provides auxiliary benefits for spouses and survivor benefits for widows. It is customary -- and quite proper, in my opinion -- for social insurance systems to have anti-duplication provisions such that individuals cannot receive, in their full amounts, more than one benefit for which they are eligible (e.g., benefits as a worker and benefits as a spouse or widow).

Although there are many persons who feel that such a provision is unfair — because the working woman is "penalized" as compared with the homemaker — I do not believe that this is at all the case. Those who hold such a view do not have the broad realization that a social insurance program is unlike private individual insurance, which must be based fully on individual-equity principles. Social insurance, on the other hand, involves a broad pooling of risks besides the mortality one — as, for example, benefitting low-income persons relatively more than high-income persons and those with children as against those without children. Moreover, the working woman usually has certain benefit protection that is not available to the homemaker spouse of a worker (such as disability and child-survivor benefit protection). Further, the anti-duplication provision is not discriminatory against women; it applies equally to male workers, who also cannot receive full benefits both from their own earnings record and their spouse's earning record.

In any event, if an anti-duplication provision is present, and if labor-force participation rates for women increase, the result is a lower cost for the program, because contribution income will be increased more than will benefit outgo. This means that either lower contribution rates will be possible for all, or else enhanced benefit protection will be possible for all.

Effect of Health and Work Ability

An element that directly affects labor-force participation rates is the health and work ability of the population. Quite

obviously, if people become disabled at a greater rate than previously, such rates will drop.

It is sometimes argued that improved health services are keeping people alive longer, but that as a result there are more disabled persons and therefore lower labor-force participation rates. This is used to "explain" the fact that these rates in the late 50s and early 60s in the United States have been decreasing in recent years. Further backup for this view rests upon interview surveys which show that age-specific morbidity rates are higher now than they were several decades ago.

It is my belief that the trend of labor-force participation rates at the ages immediately preceding what might be called normal retirement ages does not result from increased separations due to disability. I believe that the interview technique of measuring disability is grossly faulty. People will report themselves as disabled, rather than giving the real reason which may be adequate income, or at least enough to support early retirement without much decrease in available income. For example, if both spouses are normally employed, the loss in after-tax income when one ceases working is relatively small, especially if some non-tax income results from such cessation. In my opinion, there has been a growing trend -- with the increase in both entitlement programs and 2-worker families and with changing life styles and work-ethic philosophies -- for greater relative mis-reporting of disability.

It certainly seems logical and reasonable to assume that, with lower mortality rates, there should also be lower age-specific

morbidity rates. It is true that improved health care in lowering
mortality rates will leave many people with impairments. However,
with improved health care and personal motivation, persons with
impairments can well be able to work productively — and this may,
in the long run, be better for them, both physically and mentally.

Perhaps the real key to the trends in labor-force participation
rates — and their converse, retirement rates — is the extent
of programs, both in the governmental and private sectors, which
result in the accumulation of alternative forms of income to the
basic one of earnings for work. If the retirement-planning philo-
sophy of the nation is such that people will have reasonably
adequate sources of income whenever employment ceases — and perhaps
because of this — and if the general philosophy is that work is
undesirable and that leisure is to be sought above all else, then
retirement rates (and alleged disability rates too) will rise,
and labor force participation rates will fall.

Whether or not this will be good for a country is a question.
This is, however, not to say that retirement-income programs should
be aimed at only very advanced ages, but rather that they should
not be aimed at relatively young ages, when people are still
vigorous and productive.

Certainly, insofar as a social insurance system providing
retirement benefits is concerned, decreased labor-force partici-
pation rates and increased age and disability retirement rates
will have a significant impact in the direction of increasing the
cost. In turn, this will have an impact on the working population,

which will have to meet the higher cost.

Perhaps a better alternative would be to have shorter work weeks and longer working lifetimes. Thus, if leisure is desired, it should be spread out more evenly over the life span. Governmental programs could well move in this direction. The minimum retirement age could be gradually increased as mortality (and hopefully, morbidity too) decreases. At the same time, the eligibility standards for disability benefits should not be relaxed, so that people with impairments who could work and contribute to the economy will continue to work for a reasonably long period. In turn, this might well be more beneficial to such persons than being in enforced idleness.

PROBLEMS IN MAKING ACTUARIAL COST ESTIMATES

IN RECOGNIZING POPULATION CHANGE

The foregoing discussion has indicated how population changes can significantly affect the cost of a social insurance program which provides old-age retirement benefits. In turn, cost impacts — as well as the population changes in and of themselves — can affect the basic provisions and structure of the program. The actuaries who are responsible for the valuation of such programs have the difficult task of making appropriate and responsible demographic assumptions for the future (and economic assumptions as well).

Some population elements can be relatively easily handled. The starting population is usually readily available, although adjustments for under-reporting and mis-reporting may be necessary. Projected assumptions for mortality, birth, net immigration, disability, retirement, and labor-force-participation rates are more difficult to make.

For many years, actuaries have studied mortality rates and have made projections thereof. Accordingly, making projected mortality assumptions can be done with a reasonable sense of well-being. And this is despite the occasional flurry in the public press when some gerontologist proclaims, on the basis of rather shallow research, that mortality rates at the younger and middle ages in the future will be virtually negligible and that almost everybody will live to age 85 (or even 95).

On the other hand, projection of fertility rates is fraught with danger, or at least much uncertainty. During the Great Depression of the 1930s, fertility was at a low level. Then, it soared after World War II, and there were widespread fears of the Population Explosion. In the 1970s and currently, fertility is below the replacement level, but it is no longer falling, and, in fact seems to be rising slightly. Where do we go from here?

The general view seems to be that fertility may rise slightly from the present level, but not to the extent that it will ever reach the replacement level. In part because of the net-immigration element as a proxy for fertility, I would prefer to see the fertility assumption for OASDI cost estimates be such that the ultimate basis would be at the replacement level. Certainly, it would be desirable to have several more years of experience and then to move only very gradually downward for the ultimate level assumed.

Thus, rather than moving down the ultimate fertility rate from 2.1 births per woman to 2.0, as did the 1983 OASDI Trustees Report, I would have preferred staying at 2.1 for some years, and then if the experience remained at a lower level, gradually moving downward as to such rate. For example, the ultimate rate would move down .02 in each successive valuation until it more nearly reached the then-current experience level.

At the same time, I believe that net immigration rates should be assumed to be low and that it should not be assumed that there will be high illegal immigration. On the other hand, if it is decided that the assumed fertility rates should be well below the

replacement level, then it would seem reasonable to assume much higher immigration rates — which would be a counterbalancing factor.

The making of assumptions as to future disability incidence rates is very difficult. As indicated previously, some would argue that, with increased longevity, disability rates will be higher. I would argue, on the other hand, that age-specific disability rates should be assumed to decrease over time — on the grounds that, just as for mortality, a person aged x in the distant future is equivalent, both as to mortality and morbidity, to a person now considerably younger than age x. The procedure followed by the SSA actuaries tends to be in between these two approaches — namely, that the assumed disability rates do not depend on the trend of the assumed mortality rates.

The same general situation prevails as to the assumptions for retirement rates. I believe that, particularly when the normal retirement age is increased (as it will be under the 1983 Amendments), the age-specific retirement rates should be decreased over the long run. In fact, such decreases might occur in the short run too — when people begin to realize that they are not "supposed to retire by age 65". In the 1983 OASDI Trustees Report, the ratio of the number of beneficiaries per 100 workers for 2060 was 50.0 according to the intermediate-cost estimate (Alternative II-B), or virtually the same as the 50.4 in the 1982 report, despite the fact that the normal retirement age was increased by the 1983 Amendments.

It would seem, too, that labor-force participation rates near the normal retirement age should be increased somewhat when such age is raised. As to how much to increase such rates for women at the younger and middle ages is basically a matter of informed guessing, based on an extrapolation of recent past experience.

All in all, we in the actuarial profession should recognize the great problems and difficulties involved in developing the assumptions for the long-range cost estimates for social insurance programs which provide old-age retirement benefits. And we should appreciate the excellent professional work in this area currently being performed by the SSA actuaries. Truly it can be said that they make such assumptions to the best of their ability and judgment, and they neither knowingly bias them upward from a cost standpoint (to be "safe" and "conservative") nor downward (to make the program's financial status "look good").