
The Earnings Replacement Rate of Old-Age Benefits in 12 Countries, 1969-80

by Jonathan Aldrich*

This article reports the findings of the first cross-national study since 1975 of earnings replacement rates—the proportion of immediate preretirement earnings replaced by social security retirement benefits. In the countries studied—Austria, Canada, Denmark, France, the Federal Republic of Germany, Italy, Japan, the Netherlands, Sweden, Switzerland, the United Kingdom, and the United States—the replacement rates in recent years seem to have continued their upward trend, although they appear to be rising more slowly than before, and under some interpretations seem to be leveling off. In 1980, the United States was fifth among the countries studied in replacement rates for retired couples (one working spouse, one nonworking spouse) and fell within the middle range for single aged beneficiaries: Six countries provided higher benefit levels, four provided lower benefits, and one provided benefits at the same level.

The purpose of this article is to analyze the development of old-age benefit levels in a cross-national context since 1975. One of the most useful bases for such an international evaluation is the earnings replacement rate, a comparison of the old-age social security benefit at the time of retirement to immediate preretirement earnings. The concept of earnings replacement as a standard for international comparison was introduced in a 1970 **Social Security Bulletin** article, and subsequently the material was updated and expanded to present replacement rates for a number of countries over the period 1965-75.¹ Replacement rates during the 1960's and early 1970's generally showed an increasing trend, rising substantially in some cases as efforts were made to increase "real" retirement benefits. Although some data are included for earlier years, this article focuses on replacement rates during the period 1975-80 in 12 countries—Austria, Canada, Denmark, France, the Federal Republic of Germany, Italy, Japan, the Netherlands, Sweden,

Switzerland, the United Kingdom, and the United States. In recent years, replacement rates seem to have continued their upward trend, if more slowly than before. When the delayed effects of previous legislation and policy implementation are isolated, however, an underlying trend toward the leveling-off of replacement rates in the countries studied becomes discernible.

In the period immediately following World War II, many Western European countries continued to operate existing social security systems. The need for income maintenance for the elderly was especially great during this period, but because of the economic upheaval caused by the war, few governments had the means to provide it extensively. Most old-age pension programs could provide only limited income maintenance for a limited number of the aged. With economic reconstruction, both the level and extent of benefits soon came to be considered inadequate. Rising expectations, spurred in part by the economic boom of the 1950's, formed the basis for social security program expansion. In response, a number of systems were restructured during the late 1950's and the 1960's. Coverage was extended to reach many of those previously excluded and benefit levels were greatly increased. In some cases, whole programs were added to provide an additional layer of earnings-related benefits.

The role of social security financing was a decisive factor in program expansion during the 1950's and

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¹ Max Horlick, "The Earnings Replacement Rate of Old-Age Benefits: An International Comparison," **Social Security Bulletin**, March 1970, pages 3-16, and Leif Haanes-Olsen, "Earnings-Replacement Rate of Old-Age Benefits, 1965-75, Selected Countries," **Social Security Bulletin**, January 1978, pages 3-14. The nations studied in 1978 were the same as in 1982 except that Japan has been substituted for Norway in this article. In 1970, the same countries were studied as in 1978 except that Belgium was also included.

1960's. Pay-as-you-go financing allowed increases in benefit levels and extension of coverage to be paid out of increasing current revenues. Wage-linked social security revenues grew in real terms during the 1950's as wage gains far exceeded price increases. In addition, revenues grew as contribution rates were raised. With real incomes rising, it was possible to direct a larger and larger proportion of personal income to the social insurance function while at the same time sustaining substantial growth in real disposable income.

Increased financing capacity put pressure on legislators to expand and upgrade programs. One of the results was an increase in retirement benefit levels throughout the 1960's and 1970's. Yet the program expansion of the 1960's and 1970's was based on projections that assumed the continuation of the economic growth of the 1950's and 1960's.

The recessionary climate appeared unexpectedly after 1973. In a number of the countries studied (for example, Austria, West Germany, the Netherlands, and Switzerland) wages began to decelerate. In others, wages accelerated slightly, but, in all of the countries studied, the gap between wage gains and price inflation narrowed. The net result was a decrease in average annual real wage gains. With real wage growth decelerating, the real increases in social security revenues that were experienced during the 1950's and 1960's began to slow. This, in turn, was compounded by the effect of increased unemployment.

It might be expected, therefore, that replacement rates would have shown an overall tendency to increase before the 1974 recession and a tendency to level off or fall as social security financing was squeezed by the recession during the period 1975-80. In fact, replacement rates did rise before 1975 in almost all of the 12 countries studied. But the 1975-80 recessionary period also saw a rising trend for replacement rates in a number of countries.

Why did replacement rates rise when social security financing was becoming increasingly strained? The answer appears to lie both in the structure of certain benefit formulas and in the process of social security benefit structure changes.

As will be discussed subsequently, technical details of certain benefit formulas can lead to significant changes in replacement rates as the growth rates of workers' earnings change. Formulas that define the retirement benefit as a percentage of average earnings over a given number of years tend to produce falling replacement rates when the rate of increase in money earnings levels is accelerating, and rising replacement rates when earnings increases are decelerating, other things being equal. In a number of the countries studied, the rate of increase in wages began to slow during the period 1975-80, with the result that in countries having this type of formula, replacement rates increased after 1975.

There appear to be two ways in which the process of social security benefit structure change delayed adjustment to the new economic realities. In some cases, rising replacement rates after 1975 can be attributed to the transitional period associated with social security benefit level change. In two countries (Canada and Sweden²), supplementary earnings-related programs were added to basic old-age, survivors, and disability insurance programs, and in one (Denmark) a benefit scaled to years of employment under social security was added, causing increasing benefit levels to be phased in over a number of years.

Thus, in these countries, programs introduced in the 1960's were still helping to gradually increase benefit levels until the late 1970's. This meant that the financing experience of the 1950's and 1960's, on which many of the programs introduced in the 1960's were based, continued to be translated into policy into the 1970's. The time lag that developed between financing experience and policy implementation was substantial.

In other cases, the recessionary financing squeeze after 1974 had only a marginal impact on current benefit levels because the depth and duration of the recessionary trend had first to be recognized before serious debate could start on policy changes. As these debates proceed and the responses are implemented, the impact on benefit levels may, likewise, begin to show only after a substantial time lag.

The underlying trend toward a leveling off of replacement rates becomes clearer when the lagged effects of benefit formula structure and program phase-in are discounted. Little new legislation aimed at increasing benefit levels was introduced after 1975 except in countries where replacement rates were relatively low (Japan and the United Kingdom). In other countries, specifically West Germany and Switzerland, some decreases in replacement rates were effected through modifications of the wage-revaluation processes used in benefit computation. However, the policies producing these decreases were undertaken primarily with an eye to the long-run financing problems associated with an aging population and the maturing of expanded old-age benefit rights. If the response to current economic conditions is a contraction of social security expenditures to better reflect revenues, the upward trend of replacement rates before 1975 and the leveling off thereafter may be precursors of an eventual downward drift in replacement rates over the coming years.

Replacement Rates in 1980

Table 1 presents the 1980 earnings replacement rate for an average wage-earner over a full career in the

² For more information about benefits in Sweden, see "Retirement Options Under the Swedish National Pension System," pages 12-22 of this issue.

Table 1.—Replacement rates of social security old-age pensions for workers with average wages in manufacturing, and for couples, selected countries, 1969–80

Country	Pension as percent of earnings in year before retirement											
	Single worker						Aged couple					
	1969	1975	1977	1978	1979	1980	1969	1975	1977	1978	1979	1980
Austria	67	63	64	65	67	68	67	63	64	65	67	68
Canada	24	33	33	32	33	34	41	47	47	47	48	49
Denmark	31	29	27	28	30	29	45	44	44	48	54	52
France	41	60	64	67	67	66	56	74	78	79	77	75
Federal Republic of Germany	55	51	54	54	50	49	55	51	54	54	50	49
Italy	62	61	64	66	66	69	62	61	64	66	66	69
Japan	26	37	53	54	54	54	27	39	57	57	57	61
Netherlands	43	43	45	44	44	44	61	61	65	65	65	63
Sweden	42	57	59	63	68	68	56	73	73	79	79	83
Switzerland	28	40	39	38	37	37	45	60	59	58	56	55
United Kingdom	27	31	28	29	29	31	43	47	43	45	45	47
United States	30	38	40	41	41	44	44	58	60	61	62	66

manufacturing industry in each of the 12 countries studied. Replacement rates are also shown for selected years over the period 1969–79. Since a benefit supplement is payable to a dependent spouse in some countries but not in others, the replacement rates for single beneficiaries and retired couples are shown separately. Because three of the 12 countries (Austria, West Germany, and Italy) provide for no such supplement, the replacement rates shown are the same for both categories. The old-age benefits provided in the countries with no supplement were originally planned to support a retired couple. Of the nine countries providing spouses' supplements, two (Switzerland and the United States) provide a supplement equal to 50 percent of the insured worker's earned benefit, three (Canada, Denmark, and Sweden) have as a part of their social security benefit a universal flat-rate pension and provide the spouse of pensionable age with the flat-rate amount of the universal pension, two (the Netherlands and the United Kingdom) provide the spouse of pensionable age with a supplement equal to a percentage of the basic flat-rate benefit paid to an insured worker, and two (France and Japan) provide a flat-rate supplement that is adjusted on an ad hoc basis (for further details, see the program characteristics section).

The replacement rates shown here have not been adjusted to reflect the effect of differences in the treatment of social security benefits under the respective countries' income tax laws. In nine of the 12 countries, social security retirement benefits are included fully in taxable income. In one (West Germany), all or a portion of the benefit may be excluded, and, in two (Italy and the United States), benefits are fully excluded. In those countries where benefits are not subject to the income tax, the net replacement rate is somewhat higher than these figures would indicate.

Couple's Benefit

The earnings replacement rate for aged couples in 1980 varied from 83 percent in Sweden to 47 percent in

the United Kingdom. Seven of the 12 countries had replacement rates for aged couples of more than 60 percent, compared with only six of 12 in 1975 and only three of 12 in 1969. Among the 12 countries studied, the U.S. program places toward the bottom of the highest group, ranking fifth out of all the old-age programs surveyed. The replacement rate in 1980 was 65 percent or greater in five countries, between 55 percent and 65 percent in three countries, and less than 55 percent in four countries.

Single Beneficiaries

Replacement rates for single beneficiaries in 1980 ranged from 69 percent in Italy to 29 percent in Denmark. Sweden and those countries that provide little or no spouses' supplement tend to offer higher replacement rates for single beneficiaries. In four countries, about two-thirds of preretirement earnings were provided by the retirement pension. Another four countries fell into a middle group where between 44 percent and 49 percent of earnings were replaced; in the remaining four countries, between 29 percent and 37 percent of earnings was replaced. Benefit levels for single beneficiaries in the United States fell in the middle range: Six countries provided higher benefit levels, four provided lower levels, and one had benefits at the same level.

Trends in Replacement Rates, 1969–80

As noted earlier, two factors influenced the changes in earnings replacement rates over the period 1969–80. The first was the changing environment of wage and price levels. Since the replacement rate is a comparison of generally wage-determined benefits with preretirement wage levels, any shift in the rate of change of wages, or prices, where these are integrated into the benefit formula, will have a significant impact on replacement rates. The second factor was new legislation,

which had both "immediate" effects (those having a one-time impact on benefit levels when social security legislation was promulgated) and "extended" effects (those having a continuing impact on benefit levels for years after promulgation).

Effects of the Wage-Price Relationship

With regard to the wage-price relationship, the period 1969-80 can be divided into two segments with the recession of 1974 as the pivotal point. Before 1974, productivity gains had allowed substantial "real" wage increases, that is, wage increases that were considerably greater than consumer price increases. Since social security contributions amounted to a percentage of earnings or payroll, real wage increases over the postwar period led to increasing social security revenues. In addition, with real personal incomes increasing, a larger percentage of income could be spared for maintaining the income of the elderly. Thus, program expansion was further financed through increasing contribution rates. Austria, France, West Germany, Italy, Japan, the Netherlands, Switzerland, and the United States all increased their contribution rates for old-age, survivors, and disability insurance programs during the 1960's.

Real increases in social security revenues, however, slowed dramatically in the wake of the 1974 recession. One solution to this problem—increasing contribution rates—might have brought in the needed additional revenues for programs still in the process of expanding, but it became both politically and economically unfeasible as the recession deepened.

While wage-linked revenues were being squeezed by the recession, the expenditure side of many social security programs was reacting quite differently. Social security expenditures in many countries were linked to increases in consumer prices. In fact, in eight of the countries in this study, benefit amounts were adjusted to reflect changes in the consumer price index. During the 1960's and early 1970's, inflation followed a generally increasing trend in most industrialized countries. But, with the oil price increases of 1973 and 1974, inflation spurted forward, as did social security expenditures.

Legislative Effects

Most of the legislation introduced from 1969 to 1974 had immediate effects on benefit levels. By 1975, these effects had resulted in increased earnings replacement rates in a number of the countries studied. France, Italy, Japan, Switzerland, and the United States all modified their benefit formulas during this period to provide increased benefit levels. But earlier legislation, especially provisions aimed at introducing supplementary, earnings-related social security programs, continued to have

an impact on replacement rates in a number of countries well into the latter part of the decade. Canada, Denmark, and Sweden introduced such supplementary programs during the 1960's. Full supplementary pensions were not payable in these countries at the beginning of the 1970's, however, since the programs were still in the process of being phased in over several decades. For example, the Swedish supplementary pension program did not begin to award a full pension until 1980, when 20 years of coverage was accruable. Each year of coverage before 1980 entitled the eligible pensioner to one-twentieth, or 5 percent, of the full pension. The effects of such legislation were thus extended over several decades, gradually raising replacement rates automatically each year.

Opposite Effects

The wage-price relationship and social security legislation in the countries studied appear to have generally had opposite effects on replacement rate levels according to the type of benefit formula in use in the particular country. In the pre-1974 period, high real-wage increases depressed the replacement rate in Austria, West Germany, and Italy, where benefit formulas use earnings bases that consistently lag behind the current earnings of individuals going into retirement. During the same period, social security legislation had the opposite effect in several other countries. Real benefit level increases were legislated in France, Japan, Switzerland, and the United States. In the remaining three countries (Canada, Sweden, and the United Kingdom) previous legislation led to increases in real benefit levels through a maturing process.

From 1975 to 1980, the effects shifted. Countries such as Austria and Italy with time-lagged earnings bases began to show increases in their replacement rates as wages began to decelerate. West German benefit levels showed the same effect until the computation of the earnings base was altered in 1978. On the other hand, little social security legislation was introduced to increase benefit levels during this period. In fact, in several countries (for example, West Germany and Switzerland), legislation was introduced to decrease benefit levels.

Methodology

The 12 countries selected for this study are those with the most well-developed social security systems for which relevant data were available. They are the same countries included in the 1978 study except that Norway has been replaced by Japan. This change was made because it was felt that the Norwegian and Swedish pension programs were relatively similar, and that the Japanese old-age benefit program needed to be better

understood because of Japan's growing importance in the current global framework.

The cross-section of benefit formula "types" presented in the 1978 article has been preserved. Four different approaches to income maintenance for the retired are represented—the two-tier benefit formula (Canada, Denmark, Sweden, and the United Kingdom), the two-part formula (Japan and Switzerland), the earnings-related benefit formula (Austria, France, West Germany, Italy, Switzerland, and the United States), and the flat-rate benefit formula (the Netherlands). Despite the variety of approaches and a wide divergence in replacement rates, it is interesting to note that no particular approach is necessarily associated with having a "high" or "low" replacement rate.

The difficulty of finding comparable wage figures for a number of years led to the use of wage figures published by the International Labour Organization (ILO). The statistical problems involved in establishing the definition of an "average worker" were dealt with in detail in the 1970 *Bulletin* article cited earlier. There, "average wages" were defined as those published by the ILO for men working in manufacturing. However, the lack of current data by sex of worker for all the countries studied in this article has made it necessary to use the average wages of all workers (both male and female) in manufacturing as published by the ILO. Therefore, although a high degree of consistency has been maintained between this study and the two previous studies, wage figures and the replacement rates computed from them may not be identical.

An average pension was computed from the wage record of the average worker in each country according to the pension formula in effect at the time. Although the earnings ceiling for pension computation purposes was taken into consideration, only in the case of Canada did annual wage figures for the average worker in manufacturing exceed the ceiling and have an impact on the replacement rates calculated. Benefits were computed on the basis of retirement at the beginning of the year in which the illustrative worker reached the statutory normal retirement age (usually, though not always, age 65) and were compared with average earnings in manufacturing in the year preceding retirement. Since pension levels are adjusted several times a year in certain countries, the annual pension calculated for this article may be less than the actual annual pension that would have been received by a beneficiary who earned average wages in manufacturing. This study focuses on the replacement rate at retirement without taking into consideration differentials that subsequently occur because of differences in tax treatment and different methods of indexation or adjustment after retirement.

The number of years that constitute a full career varies in the countries studied. A normal working life was considered to be 40 years for this study, and those

countries that do not define a full pension in terms of qualifying years were ascribed a 40-year qualifying period when the maximum countable years exceeded 40. Of the five countries where 40 working years are assumed, two (Canada and Denmark) require 40 years of residency, two (Austria and West Germany) have a maximum coverage greater than 40 years, and in one (Italy) 40 years is considered maximum coverage. Three countries (France, Japan, and Sweden) have qualifying periods of less than 40 years. The remaining four countries require qualifying periods that are gradually being lengthened as the programs mature. At maturity, three of these (the Netherlands, Switzerland, and the United Kingdom) will have qualifying periods of between 44 and 49 years, and the United States will require only 35 years for a full pension.

It should be noted that the length of coverage has a substantial impact on the replacement rate. Of the 12 countries studied, five (Austria, Denmark, West Germany, Italy, and Japan) have formulas that directly take into consideration the length of the coverage period. The length of coverage ascribed to each country in this article is not based on an average coverage figure for workers in manufacturing, but represents the expected working life of an employee in manufacturing with a focus on standardization across national boundaries. The calculated replacement rates therefore do not represent average replacement rates for workers in manufacturing, since the probability that an average worker will have accrued the quoted number of years of coverage is not equal in all the countries studied.

Program Characteristics

Austria

Benefit formula. The old-age benefit formula in Austria is based on average earnings in the 5 calendar years preceding retirement or earnings in the first 60 consecutive months of compulsory coverage after age 40, whichever is more advantageous—generally the former. Earnings are revalued for (indexed by) the change in national average earnings.

The amount of the benefit is also coverage-related. The basic pension is equal to 30 percent of the worker's average indexed earnings plus 0.5 percent of average earnings per year of coverage for each of the first 10 years, 0.9 percent for each of the next 10 years, 1.2 percent for each of the following 10 years, and 1.5 percent for each of the next 15 years. Thus, the old-age benefit replaces 57 percent of average earnings after 30 years of coverage, 64.5 percent after 35 years, and 72 percent after 40 years. A maximum of 79.5 percent of average earnings is granted after 45 years of coverage.

Characteristics affecting the replacement rate. The 5-year averaging period used to compute the earnings base

affects the replacement rate in periods of wage acceleration or deceleration. When wages are accelerating, as in the period 1969-74, the replacement rate tends to diminish as current higher earnings are averaged with previous lower earnings before being set against the current higher earnings. When wages are decelerating, as in the post-1974 period, the replacement rate tends to increase as preretirement earnings remain more in line with the 5-year earnings average. Average wage increases in manufacturing grew from an annual rate of about 7 percent in the late 1960's to over 15 percent by the mid-1970's before subsiding to around 6 percent toward the end of the decade.

Canada

Benefit formula. Income maintenance for the aged in Canada is primarily provided through two social security programs: a program providing a universal, flat-rate benefit at age 65, and one providing an earnings-related benefit. The universal benefit is payable after 40 years of residence and is adjusted four times yearly with changes in the consumer price index. The earnings-related benefit program, established in 1966, began to pay a full benefit in 1976 at the rate of 25 percent of average revalued covered earnings. Before 1976, a reduced benefit was awarded based on the number of years of coverage. Average annual earnings used to compute the earnings-related portion of the benefit are revalued in line with the change in average wages.

Characteristics affecting the replacement rate. During the phasing-in of the earnings-related benefit, the replacement rate grew considerably. In 1969, only three-tenths of the full earnings-related benefit was payable, but the proportion reached nine-tenths by 1975. This increase caused a 40-percent rise in the earnings replacement rate over this period. In 1976, after completion of the phase-in, however, the replacement rate began to level off. Eventually, it even fell slightly as average wages in manufacturing rose faster than the earnings-related and flat-rate benefits combined.

Because of the low earnings ceiling for contribution purposes for the earnings-related program, persons earning average wages in manufacturing did not have their full wages taxed after 1967. For these persons, therefore, a more rapid increase in the earnings ceiling vis-à-vis average manufacturing wages has partially offset the slower growth in price-indexed, flat-rate benefits since 1976. The universal benefit as a percentage of the total benefit for an individual earning average manufacturing wages fell from about 50 percent in 1975 to about 43 percent by 1980.

Denmark

Benefit formula. Denmark has a two-tier social security benefit system—a universal, flat-rate old-age

benefit based on residence that constitutes the bulk of the total social security benefit, and a modest employment-related old-age benefit. The universal program requires 40 years of residency for eligibility to the full benefit. Because of a shortened phase-in period, however, a full employment-related benefit will be payable after 27 years of coverage, in 1995. The employment-related program began in 1968; it will eventually require 40 years of coverage for the full benefit.

Characteristics affecting the replacement rate. Unlike the supplementary benefit programs in other Scandinavian countries, the employment-related benefit in Denmark is not related to the level of earnings but rather to the length of employment. As a result, persons covered for the same length of time receive benefits of the same amount, regardless of their earnings level.

The amount of the employment-related benefit is modest compared with the universal benefit and is not automatically adjusted to account for changes in prices or wages. Therefore, despite the shortened phase-in period, the increasing employment-related benefit has only managed to keep the total benefit at a constant level vis-à-vis average wages in manufacturing.

France

Benefit formula. A full old-age pension is payable in France at age 60 with 37.5 years of insurance coverage. In 1980, a full benefit at age 60 was payable at the rate of 25 percent of the beneficiary's average annual revalued earnings in the 10 best years. For each year that retirement is postponed past age 60, an additional 5 percent of the earnings base was payable, up to a maximum of 75 percent of the base for someone retiring at age 70. The normal retirement age was considered to be 65, which implies a benefit equal to 50 percent of the earnings base at that age.

Characteristics affecting the replacement rate. The upward surge in the replacement rate from 1969 to 1975 is attributable to a change in the benefit formula. Before 1973, the last 10 years of revalued earnings were averaged to arrive at an earnings base. In 1973, a provision was introduced allowing the 10 years of highest revalued earnings since 1948 to be selected.

Before 1966, the factors used to revalue earnings were based on changes in average cash sickness payments; since then, they have been based on changes in the average contribution over the reference period. These factors have more than compensated for the yearly increase in average wages in manufacturing. The averaging of earlier wages revalued with an overcompensating factor produced a significant increase in the earnings base and a resultant higher benefit level. Volatility after 1975 has been caused by differences between increases in the earnings level (wages in manufacturing) and the adjustment factors used to revalue earnings.

Federal Republic of Germany

Benefit formula. The West German social security old-age program provides benefits equal to 1.5 percent of the personal earnings base for each year of coverage. The maximum creditable coverage—50 years—would therefore provide a benefit of 75 percent. In table 1, however, 40 years of coverage has been assumed, producing a benefit equal to 60 percent of the personal earnings base. This base is computed by dividing the individual's earnings in each year by average covered earnings of all covered workers in that year, averaging the quotients, and multiplying the result by the general computation base. The figure is adjusted annually to reflect the change in average covered wages over two preceding 3-year averaging periods.

Characteristics affecting the replacement rate. The key to changes in the replacement rate is in the relationship of the general computation base to average wages in manufacturing. As wages accelerated in the period 1969-75, the computation base as a proportion of preretirement earnings decreased from 91 percent to 85 percent because of a time lag in the base formula for introducing current wage changes. Thereafter, wages decelerated, and, between 1975 and 1977, an increase in the general base of some 20 percent occurred while wages in manufacturing increased only about 15 percent. The replacement rate therefore began to rise. In July 1978, however, annual increases in the general base were limited to less than the level of actual wage increases for the ensuing 3 1/2 years. The result was a downward movement in replacement rates thereafter.

Italy

Benefit formula. The social security old-age benefit for most wage earners in Italy is awarded at age 60 and is calculated on earnings and the number of covered years. For each year of coverage, 2 percent of the earnings base is awarded, up to a maximum of 80 percent after 40 years. The earnings base is the average of the best 3 years of earnings in the last 10 years.

Characteristics affecting the replacement rate. Because of the 3-year averaging period, acceleration or deceleration of wage increases have the same effect on the replacement rate in Italy as they do in Austria and West Germany. Wage acceleration leads to lower replacement rates and wage deceleration leads to higher replacement rates, other things being equal.

From 1969 to 1977, replacement rates remained relatively constant despite an increase in the proportion of the earnings base awarded per year of coverage, which rose from 1.625 percent in 1969 to 1.85 percent in 1975 and to 2 percent after 1975. This stability in the benefit level resulted because the increase in wage gains over this period was counterbalanced by the more generous

benefit formula. The earnings base fell from 95 percent of preretirement earnings in 1969 to 82 percent in 1975 and to 73 percent in 1976.

Japan

Benefit formula. The social security program that covers a majority of Japanese workers uses a two-part formula for determining the old-age benefit for retiring workers. Part one pays a variable amount based on length of coverage, and part two pays an earnings-related amount. To determine the coverage-related portion of the benefit, a base amount, which is adjusted annually for prices, is multiplied by the number of covered years up to 35. The annual earnings-related portion is calculated as 1 percent of average revalued earnings for each year, up to a maximum of 35 percent. In 1980, the coverage-related portion of the benefit accounted for almost 60 percent of the total benefit for a person who earned average wages in manufacturing.

Characteristics affecting the replacement rate. The relative weighting of the benefit formula's two components emphasizes length of coverage. Until 1977, it was not possible to have accrued the maximum number of covered years—35—since the retirement benefit program was introduced in 1941. Therefore, increases in replacement rates before 1977 are partially attributable to the gradual accrual of a full career's coverage. In addition, there have been ad hoc increases in benefit levels in line with increases in real wages. In 1973 and again in 1976, the price-adjusted base amount used in the coverage-related portion of the benefit computation was substantially increased. Revaluation of past earnings for changes in the consumer price index was introduced in 1973, giving a further boost to replacement rates between 1969 and 1975.

The Netherlands

Benefit formula. Fifty years of coverage eventually will be required for eligibility to the flat-rate old-age benefit in the Netherlands. The benefit consists of 12 monthly payments plus a once-yearly vacation allowance equal to approximately 7 percent of the annual benefit. For each unexcused year of noncontribution, the benefit is reduced by 2 percent. However, no reduction is made for years of noncontribution before 1957, the year the program was introduced. The benefit level is revised every 6 months, and the single beneficiary's benefit is kept approximately equal to 70 percent of the net minimum wage.

Characteristics affecting the replacement rate. Replacement rates in the Netherlands have remained stable over the past 15 years. This has been due to the process for adjusting minimum wages, and thus old-age benefits, to keep them in line with increases in general wages.

Sweden

Benefit formula. Old-age income maintenance protection in Sweden is provided by means of two programs—a universal benefit program (available to all citizens and to certain resident aliens) and a supplementary program (based on earnings). The universal benefit is payable at a flat rate to all who qualify. (The amount paid under this program will be increased somewhat if the individual is *not* eligible for an earnings-related pension.) The supplementary benefit is computed at 60 percent of average revalued earnings above a price-indexed threshold (the base amount) and below 7 1/2 times that amount. Annual supplementary benefit “pension points” are acquired by dividing annual earnings by the base amount at the beginning of the year. Points from the best 15 years are then averaged and earnings are revalued by multiplying the average number of points per year by the base amount in force at the time of retirement. The base amount is adjusted every time the consumer price index increases by 3 percent or more.

Begun in 1960, the supplementary program eventually will require 30 years of coverage for eligibility to a full benefit. Transitional measures, however, allowed a full supplementary benefit to be paid in 1980 with coverage from 1960.

Characteristics affecting the replacement rate. During the transitional period, 1960–80, the supplementary benefit was phased in at the rate of one-twentieth of the full benefit year. Thus, in 1970, a retiree with coverage since 1960 was awarded ten-twentieths, or one-half, the full supplementary benefit. By 1980, twenty-twentieths of a full benefit became payable. The more than 50-percent increase in the total old-age benefit replacement rate between 1969 and 1980, shown in table 1, is attributable just to this phasing-in process. If the two components of the total benefit are considered separately, it can be seen that the universal benefit has actually risen more slowly than average wages in manufacturing, while the supplementary benefit has risen substantially faster. After the phasing-in had been completed in 1980, however, the annual increase in the total benefit followed the increase in the price-indexed base amount. Should the historical trend of real wage increases continue, a gradual decrease in the future replacement rates of old-age benefits will ensue.

Switzerland

Benefit formula. The monthly old-age benefit in Switzerland, payable at age 65 for men and at age 62 for women, is calculated in two parts—a fixed amount equal to 80 percent of the minimum monthly benefit, and an earnings-related amount equal to 1.67 percent per year of revalued average annual wages. Since 1978,

the minimum benefit has been adjusted (generally every 2 years) according to a mixed wage-price index. Factors for revaluing individual wage histories are derived from this wage-price index. Coverage since 1948 entitles an insured person to a full benefit at retirement age; the earnings-related portion of the benefit is reduced for shorter periods of contribution. The benefit is increased by 50 percent for a couple when the dependent wife is over age 62.

Characteristics affecting the replacement rate. Both the fixed and earnings-related portions of the benefit were increased substantially over the period 1969–75 through a series of ad hoc measures. Beginning in 1978, the increase in benefit levels slowed. In 1979, a new revaluation procedure was introduced that reduced benefit levels for new beneficiaries. By 1980, the mixed index (an average of the wage and price indexes) was fully implemented. Future increases in benefit levels should be lower than increases in average wages if the trend of real wage increases continues.

United Kingdom

Benefit formula. The social security benefit structure in the United Kingdom has changed several times over the past 2 decades. Before 1960, a flat-rate old-age benefit was awarded at age 65 to men who satisfied the coverage requirements and to women who did so at age 60. Graduated contributions were then introduced and the old-age benefit began to include both a flat-rate amount and an amount based on total graduated contributions paid. The graduated contributions were discontinued in 1975, and in 1978 a new earnings-related benefit program was introduced. Thus, a new retiree after 1979 might have had his or her benefit calculated according to a three-tier structure: a flat-rate benefit, a benefit based on accrued graduated contributions, and an earnings-related benefit.

The earnings-related benefit is being phased in over a 20-year period at the rate of 1.25 percent of the wage base per year of coverage. When payable, the full earnings-related benefit will amount to 25 percent of the wage base, which is computed as the difference between the threshold amount (£ 19.5 a week in 1979) and the ceiling (approximately seven times the threshold). This benefit is revalued according to changes in average annual wage levels.

Characteristics affecting the replacement rate. In 1980, the flat-rate portion of the benefit still provided over 85 percent of the total benefit for a new retiree who had earned average wages in manufacturing. This proportion will gradually decrease as the earnings-related portion of the benefit matures and the replacement rate increases. Between 1969 and 1975, benefit levels increased as graduated contributions were accrued and a correspondingly larger benefit was awarded. When the

graduated contribution program was discontinued in 1975, replacement rates began to fall. In 1978, however, graduated pensions began to be adjusted annually to reflect changes in price levels. Additionally, the earnings-related benefit program was introduced, and thereafter replacement rates increased accordingly.

United States

Benefit formula. Under the U.S. program, 35 years of earnings eventually will be averaged to compute the benefit, payable in full at age 65. The total benefit is related to earnings; earnings used to compute each worker's benefit amount are indexed to reflect changes in average wages in covered employment. The benefit formula used to compute the amount initially payable is also adjusted annually to reflect changes in average wages; increases after entitlement are made annually as

necessary to reflect increases in prices. The benefit is increased by 50 percent for a worker with a dependent spouse.

Characteristics affecting the replacement rate. Benefit amounts were increased by ad hoc adjustments in the benefit formula legislated every other year in the late 1960's. A large, immediate increase was legislated in 1972, when the benefit formula also was indexed to reflect increases in prices in future years. Because both wages and prices rose rapidly after 1972, replacement rates also rose rapidly—to historically high levels. This increase was much greater than the offsetting effect of the gradual lengthening of the averaging period. Legislation was enacted in 1977 to change indexation of the benefit formula from prices to wages; it is just becoming effective for workers turning age 65 in 1982. The 1977 legislation was intended to stabilize future replacement rates at a somewhat lower level than those that had been in effect since the mid-1970's.