The Second Actuarial Valuation of the Railroad Retirement Act*

"At intervals not longer than 3 years the Board shall make an estimate of the liabilities created by this Act and the Railroad Retirement Act of 1935 and shall include such estimate in its annual report." In accordance with this statutory mandate, the Railroad Retirement Board has issued the second actuarial valuation, along with its recommendations and a statement of the Actuarial Advisory Committee, as an appendix to the annual report for 1942-43.

The first valuation covered the period ended December 31, 1938. The experience and data accumulated in the 3 succeeding years provided a more complete basis for the compilation of mortality, disability, withdrawal, and retirement rates and salary scales. They also permitted a far more accurate determination of the liabilities for years of service before 1937 which, although prior to the date of enactment, are credited toward benefits under the retirement system. The actuary's report, summarized below, was approved as to method and presentation by a three-member Actuarial Advisory Committee consisting of actuaries recommended by employees, carriers, and the Secretary of the Treasury.

The First Valuation and Actual Experience

Annual costs of benefits based on estimates of the first valuation compared with the experience during the past few years showed that the estimated disbursements exceeded the actual expenditures by a steadily in-

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Section 15 (d) of the Railroad Retirement Act, as amended (Public No. 195, 76th Cong.), approved June 24, 1937.
creasing percentage—4.6 percent in 1940, 5.4 percent in 1941, and 6.4 percent in 1942. This deviation from the expected cost is due mainly to the fact that, with improving business conditions, there was a sharp decrease in the number of actual as compared with anticipated retirements.

Furthermore, a level annual pay roll of $2 billion into perpetuity was assumed in the previous valuation; the present actual annual pay roll is close to $4 billion (without taking the recent pay raise into account), and the pay roll in the valuation year was $2.7 billion. The lower benefit outgo and higher pay-roll base do not necessarily mean that the level cost figure of 11.11 percent indicated in the first range figures used for comparison, it must be remembered, have been strongly influenced by prevailing economic conditions.

Investigations and Studies

Mortality investigations.—A series of mortality investigations emphasized the high mortality rates among age annuitants retiring in the years 1937-38 and the considerably lower rates thereafter. Following passage of the act, there was some question as to its constitutionality. A significantly large number of the individuals who retired were in poor health; others who were eligible to retire remained at work pending the settlement of litigation. The mortality in more recent years has been 5 percent lower than that predicated by the "Railway Employees Mortality Table" developed for the first valuation.

The investigation of mortality among disabled annuitants indicated that the standard previously used for valuing the costs of their benefits was not applicable. Consequently, a new table, the "1941 Disabled Railway Employees Select Mortality Table," based on actual experience, was constructed for this second study. This table was used to measure costs not only for disabled annuitants on the rolls on December 31, 1941, but also for all future annuitants in this class.

Another investigation dealt with deaths in active service. It indicated that claims for lump-sum death benefits have been or will be filed with respect to only 55 percent of all deaths which occurred before 1942. Actual disbursements for such deaths, however, will constitute about 90 percent of the total amount which would be payable for all deaths. The average lump-sum death payment increased from $39 in 1937 to $271 in 1941.

Retirement rates.—The rates of disability retirements in 1939-41 were much below the 1937-38 rates. The trend toward lower rates in the years 1942-43 was expected because of the higher wages, better employment opportunities due to wartime activities, and consequent encouragement to remain at work. In view of these conditions, the second valuation introduced a new set of disability rates reflecting the aggregate experience of the 5 years 1937-41. These rates are considerably below those of the first valuation for ages under 55 but for the older ages, where the disability rate has its greatest effect on costs, the differential ranges from 10 to 20 percent.

Conditions in the past few years also gave rise to much lower rates for age retirements. The new rates, introduced to account for these changes, range from 50 to 70 percent of the figures given in the first valuation with the exception of the critical age 65, for which the rate is 82 percent of the original figure. Despite this sharp reduction in rates above age 65, the actual decrease in cost arising therefrom is less than 10 percent, because retirements are not eliminated but merely postponed. Under these assumptions, the average retirement age for individuals whose annuities will begin at ages 65 and over becomes 76.4 instead of 66.6. For the immediate future, retirement rates lower than those used in the second valuation are in prospect. The trend may be reversed as economic activity slows down.

The rates of withdrawal prior to retirement age, developed in the previous valuation, were reasonably well substantiated by the investigations on this issue. They were therefore used again.

Prior-service credit.—The first valuation derived its estimate of service prior to 1937 mainly on the basis of unverified employee reports. For the second valuation, however, a substantial portion of the data used was verified. Service claims were modified in accordance with information obtained from the prior-service project conducted by the Board. Thus, although only a 4-percent sample was employed, the results obtained are more reliable than those of the first valuation. That study showed that 1,349,000 individuals were eligible on December 31, 1938, for prior-service credit. This figure included those still living on that date whether or not retired. An estimated 53,000 of these died before the end of 1941. A further exclusion of 129,000 persons on the retirement rolls on that date, on an accrual basis, left 1,167,000 persons alive and not retired as of December 31, 1941, who were eligible for prior-service credit. This figure agrees closely with the estimated 1,103,000 shown in the second valuation, which had eliminated 50,000-75,000 "casuals" who had negligible service and who will probably never apply for annuities.

Number of employees.—Following the plan of the first valuation, two censuses were obtained as of December 31, 1941—one for active employees and the other for inactive individuals—to determine the coverage of the system. The 4-percent prior-service sample was coordinated with a 4-percent wage sample of all employees with service subsequent to 1936. This valuation considered every employee to be in the active-service census if he worked in 1941 and was alive and not retired on December 31 of that year. The number of such persons was found to be 1,978,000. The total number of individuals who worked at any time in 1941 was 2,005,000. The difference of 27,000 was found to be distributed almost evenly between deaths and retirements in that year.

For the inactive census, a division was made between persons who had some service prior to 1937, and those with subsequent service only. The former group contained 164,000 individuals and the latter 824,500, so that roughly the inactive-census universe comprised a million persons. The computations showed that, for employees in the active-service census, the average service rendered through the end of 1941 was 22.1 years, while for the inactive census the corresponding averages were 9.3 years for individuals with prior-service credit and 0.4 years for those with service after 1936 only.
New entrants.—The first valuation based the age distribution of new entrants on the 1924-29 survey by the Federal Coordinator of Transportation. The second valuation included in the new-entrants distribution individuals with service in the past but not in the year immediately preceding their reentry. Thus, those who worked in 1940 but not in 1939 were classified as new entrants, whether or not they worked prior to 1939. The average age of this group was found to be 29.5 years—about 2 years older than the average indicated by the Federal Coordinator's survey.

Salary scales.—The benefit formulas prescribed by the Railroad Retirement Act determine the annuities as a function of earnings and length of credited service. It was therefore necessary to develop salary scales for all employees who may eventually become eligible for benefits. On the basis of two 4-percent samples of active employees, for the former group the scales presented are: (a) average prior-service compensation, (b) total subsequent wages for 1937-41, and (c) future wages. The last was also used for the new entrants distribution. The scales for service already performed were based on actual data, whereas for the future the 1940 wages, adjusted upward to make allowance for the wage increases which became effective as of September 1941, served as a base.

To translate the value of benefits into terms of pay-roll percentages, an "equivalent level annual pay roll" must be established. The first valuation settled upon a $2 billion annual pay roll into perpetuity. For the second valuation, the pay roll for the past several years was projected into the future on the assumption that it would rise to a maximum of $3.84 billion in 1944 and then level off at $2.29 billion in 1950 and thereafter. This $2.5 billion was considered approximately equal to the present value of future benefits as of December 31, 1941, for all groups of employees. For this purpose the active employees not reentered, plus the active employees alive and not reentered on December 31, 1941, served as a base.

Level-Cost Calculations

The investigations just described provided the foundation for building service tables, determining the monetary functions, and obtaining the present values of the various benefits. With respect to the service tables, the second valuation deviates from the first by considering disabilities which occur prior to the ages at which annuities are payable. It was therefore necessary to develop separate salary scales for active employees and a fourth for inactive employees. For the former group the scales presented are: (a) average prior-service compensation, (b) total subsequent wages for 1937-41, and (c) future wages. The last was also used for the new entrants distribution. The scales for service already performed were based on actual data, whereas for the future the 1940 wages, adjusted upward to make allowance for the wage increases which became effective as of September 1941, served as a base.

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arrived at and $5,456 million is $3,619 million (item E). This figure provides a measure, in terms of present values, of the inadequacy of the funds which would be accumulated on this basis. The term “initial deficit” as used in item E is therefore not synonymous with the ordinary use of the term, since it only represents the “initial deficit” if the tax rates were kept level at a rate adequate for new entrants—5.77 percent. Since even the present tax schedule employs a step rate which levels off at 7½ percent in 1940, it is apparent that the “initial deficit” as used in item E is only a means for arriving at the final level-cost figure. Because the present taxing provisions require a uniform tax rate regardless of differences among employees as to age or years of past service, the deficiency of $3,619 million in present value must be met by a flat addition to the inadequate “normal tax rate” of 5.77 percent.

To obtain the flat addition indicated above, the assumption was made that interest charges only will be paid on the “initial deficit” into perpetuity. The amount required annually on this basis is indicated in item P. It then becomes necessary to translate the fluctuating future pay rolls into an equivalent level pay roll which is shown in item G. By taking the ratio of item F to item G, the flat addition emerges as a percent of pay roll (4.34 percent).

The total level cost as of December 31, 1941, which is indicated in item K, is then readily established. Since it is the total of item C (the “normal tax rate”), item H (the necessary addition above the “normal rate”) and item J (the annual administrative expenses as a percentage of level pay roll), the resulting figure of 10.21 percent represents the level tax rate that would have been necessary beginning in 1942 if the railroad retirement system were to be completely self-supporting on the basis of the assumptions used in the valuation. The present tax schedule, however, is considerably below that. Consequently, the level cost as of 2 years after the valuation date necessarily is increased, since an inadequate amount of taxes was collected in 1942 and 1943—6 percent in 1942 and 6½ percent in 1943 as compared with the 10.21-percent level required as of December 31, 1941.

The $5,456 million set forth as item A is not, it should be noted, the excess of liabilities over assets. This figure includes the present value of all future benefits based on service prior to as well as subsequent to the valuation date; an accounting figure would require the inclusion of credits for all future taxes as well. Since the present value of all future taxes to be collected from this group under the existing tax schedule, beginning in 1942, is $2,236 million, such an accounting figure would be $3,220 million.

**Implications**

On the assumption that a new tax schedule might be put into effect in 1944, a number of possibilities were suggested to meet the costs on the bases postulated. From an actuarial point of view, it makes no difference whether immediate increases are made, in which case the ultimate level taxes would be lower, or whether a gradual scale is adopted with a higher ultimate tax rate. One approach would be to add a flat 3.32 percent of pay roll to the existing schedule so that the ultimate level reached in 1949 would be 10.62 percent instead of 7.5 as at present. Another would increase the present tax from 6.5 percent to 7 percent and step up the rate by 1 percent every 3 years, to reach an ultimate rate of 12.02 percent in 1958. The second type of alternative starts with a smaller increase, proceeds gradually, and consequently levels off at a higher rate at a later date.

In considering the valuation figures, it should be borne in mind that cost estimates for a broad governmentally administered social insurance system, even though prepared in a completely accurate fashion, cannot be expected to be precise. Despite the availability of extensive data, assumptions often arbitrary and without adequate factual basis must be made concerning future conditions.

**Short-Range Projections**

The valuation contains two sets of projections of benefits and taxes based on two widely different assumptions as to the nature of pay rolls and other cost factors in the future. The projections do not follow from the level-cost calculations but were prepared...
along the same lines and were based on the assumption that the present benefit structure and tax schedule will remain unchanged.

Estimate A assumes that the pay roll will reach its peak at $3.6 billion in 1943 and will level off at $2 billion in 1950. Estimate B anticipates a $3.8 billion peak in 1944 and a leveling off to $3 billion in 1952. Both assumptions implicitly indicate a decline in railroad activity at the close of the war. Under both of these hypothetical conditions it is supposed that, if pay rolls decrease, the number of age and disability retirements as well as the rates will increase. The projections indicate that for the lower payroll estimate the disbursement level will be $228 million by 1955 (chart 1) and $190 million for the higher estimate (chart 2). If the projections were carried further, the level of disbursements for the higher payroll estimate would meet and then exceed that of the alternative estimate, since the greater number of individuals included in the larger coverage would be reflected eventually in benefits paid. Although the range between the disbursements under the two assumptions is only about 20 percent by 1945, the balance in the account will be affected far more sharply. Thus, for the lower estimate, the fund will be exhausted by 1955; in the second case, the account increases steadily until 1955 it is almost $1.5 billion (chart 3).

Chart 2.—Estimate B: Benefit payments on accrual basis, by type of payment, actual calendar years 1937-41 and estimated 1942-55

Chart 3.—Funds available in railroad retirement account at end of calendar year, actual 1937-41 and estimated 1942-55

Conclusions

The second valuation, just as the first, indicated that the present tax schedule is insufficient to support the benefits provided under the Railroad Retirement Acts. However, on the basis of the assumptions made, the constant amount of 3.33 percent of pay roll would have to be added in 1944 to the present tax rates to render the system self-supporting, as compared with the figure of 3.81 percent as of 1941, derived from the first valuation. This estimate of the necessary tax increase may, under favorable conditions, be too high or, under unfavorable circumstances, too low. A possible, but not very probable, "favorable" situation arises if:

1. The equivalent level pay roll is $3 billion;
2. Retirement and disability rates continue at low levels;
3. New employees enter at younger ages than recorded for 1940; and
4. Mortality rates remain substantially at present levels.

The level cost under these circumstances might dip to 8.1 percent. In such event, the present tax schedule would be almost sufficient to make the system self-supporting. On the other hand, the following set of unfavorable circumstances may arise in the future:

1. The equivalent level pay roll is as low as $2 billion;
2. Retirement and disability rates increase sharply;
3. New employees enter at older ages than used for the valuation; and
4. Mortality rates improve appreciably, especially at ages above 65.

These conditions might push the cost of benefits to 14.5 percent of pay roll. The irreducible minimum below which it would be almost impossible for costs to go would be a figure not very much lower than 8.1 percent. On the other hand, the maximum figure for costs could be considerably higher than 14.5 percent if there should be a catastrophic drop in the railroad pay roll.

The assumptions postulated by the level-cost calculation which yielded a figure of 10.46 percent as of December 31, 1943, have been made consistent with actual experience, with no attempt to be overly conservative. No precise figure can be set as to the exact costs under the present retirement system. There seems to be no doubt, however, that the present tax rates are insufficient.

The valuation concludes with the following statement: "The short-range projections of income and disbursements indicate that receipts will very likely exceed disbursements for the next 3 or 4 years, but that in the succeeding decade this situation might be reversed. However, if this should occur, and if the excess of disbursements over receipts is drawn from the account, it is probable that no additional revenues would be necessary before 1955."

Recommendations of the Railroad Retirement Board

The Railroad Retirement Board paid particular attention to the significant differences between the estimates of liabilities incurred under the
retirement acts as reported by the first and second valuations. The following major facts were cited in the comparison between the two valuations:

"1. The increase of slightly over $1,000,000,000 in excess of the present value of future benefits over funds on hand due largely to the inclusion of new employees and to the different definition of active employees used in the second valuation.

2. The increase of .18 percent of payroll in the level cost for new entrants.

3. The increase of slightly more than $200,000,000 in the initial deficit, which, however, can be covered by a smaller additional tax rate for all employees—4.34 percent as compared with 5.084 percent.

4. The increase of $500,000,000 in the estimate as to the equivalent level annual pay roll, and

5. The reduction of 1.05 percent of payroll in the second valuation as compared with the first in the total level cost as of December 31, 1941."

It was particularly noted that the increase in liabilities and the initial deficit indicated above were more than counterbalanced by the assumption of a $2.5 billion equivalent annual pay roll, which would result in a reduction in the level tax rate required for all employees. Nevertheless, even the lower cost figure produced by the second valuation indicated that the level cost was almost 3 percent in excess of the maximum tax rate under the present schedule.

The Board stated that, despite the very favorable conditions existing today, the retirement rates have not fallen sufficiently to reduce costs appreciably. In consequence, it would appear unwise to count on any material financial relief because of a decline in the rate at which workers retire from the railroad industry. Attention was also called to the fact that the indicated level costs for new entrants had risen in 1941 as compared with 1938, even though there has been a considerable increase in the volume of railroad employment and a great influx of new and young employees into the industry. The introduction of young lives into the system, therefore, does not assure any appreciable financial gains under the present tax structure.

Since the second valuation, based on considerable more favorable conditions than the first, in a large measure tends to substantiate the latter, the inescapable conclusion was reached that the existing level of taxes is not adequate to finance permanently the present benefit structure.

The Board, however, took the position that other relevant factors should be taken into consideration in determining the advisability of a tax increase at the present time. Such factors include:

1. The possibility of additional legislation which would presumably include a new schedule of tax rates to finance adequately both present and proposed benefits.

2. The trend of future payrolls. (Although relatively high figures for 1943 and 1944 were used in the valuation, it appears that these have been and will be exceeded.)

3. The fact that the fund under present tax rates will be sufficient to meet all disbursements during the next decade even under the pessimistic assumptions inherent in the projection under estimate A.

Three conclusions were reached from the foregoing considerations: "First, that additional taxes will be necessary to finance the benefits provided; second, that income and reserves are adequate for immediate requirements; and third, that the delay in changing the rates until the next valuation will permit of better estimates and will not make a great difference in the rate of increase necessary."

In consequence of these conclusions, together with the possibility of changes in the benefit provisions of the act and an accompanying new tax structure, the Board has recommended that no change in tax rates be made at this time.

The Chairman of the Board has stated, however, that the reasons for rejecting an immediate increase in taxes are not necessarily persuasive. The fact that amendments are under consideration (which do not contemplate a reduction in present liabilities) in no way lessens the force of the conclusion that the present taxes are insufficient to support the benefit program now in force. He observed that future experience may reduce the indicated deficiency in the tax rate. He noted also that congressional policy with respect to the Social Security Act, which would appear to make inevitable a Government contribution for the support of that system, should also be applied to the Railroad Retirement Act. Nevertheless, he pointed out, periods of heavy traffic volume and rising payrolls and profits are ideal for tax increases, and a delay might result in an imposition at a time when income and profits are falling and consequently cause a burden on employers and employees which will weigh more heavily than at present. A delay would also require a greater increase later than an additional levy now. Irrespective of future costs, equity would best be served by increases now because present rather than future taxpayers are the chief beneficiaries. He concluded that, although a rise to the full extent indicated by the actuarial report might not be advisable because of the uncertainties mentioned, an increase, effective as soon as possible, was advisable. He recommended an immediate addition to the present taxes of three-fourths of 1 percent of taxable payroll up to $300 a month on employees and a similar increase on employers.

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