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A REVIEW OF THE NET REVENUE ESTIMATES IN ROBBINS AND ROBBINS, "PAYING PEOPLE NOT TO WORK"

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A REVIEW OF THE NET REVENUE ESTIMATES IN ROBBINS AND ROBBINS, "PAYING PEOPLE NOT TO WORK."

This note discusses the net revenue estimates in the report "Paying People Not to Work: the Economic Cost of the Social Security Retirement Earnings Limit," by Aldona Robbins and Gary Robbins.[1]

Elimination of the retirement earnings test (RET), or partial elimination through the raising of the annual exempt amount (AEA), would increase the benefits paid to some working beneficiaries and would therefore raise the total benefits that the Social Security trust funds must pay. At the same time, however, the partial or total elimination of the RET might encourage some beneficiaries to work more or to retire later than they would have without the elimination, and tax revenues to the Treasury would go up because of individual income taxes and Social Security payroll taxes on the increased earnings. The net revenue to the government of the RET reform is this increase in tax revenues minus the increase in total benefit payments. Most studies of the cost of RET reform have found the net revenue to

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1. "Paying People Not to Work: the Economic Cost of the Social Security Retirement Earnings Limit," by Aldona Robbins and Gary Robbins, with an introduction by Congressman Dick Armey, September 1989. Cosponsored by The Institute for Policy Innovation, Lewisville, Texas, and The National Center for Policy Analysis, Dallas, Texas.

Robbins and Robbins reissued their report in September 1990. Except for the preface and introduction, the 1989 and 1990 reports are identical.

be negative: although there might be some increase in Treasury revenues from the reform, the revenues will not be nearly enough to offset the cost in increased benefit payments.[2]

In their report, Robbins and Robbins (RR) make their own estimates of the net revenues from RET elimination.[3] They reach two striking conclusions. The first is that if the RET were to be eliminated completely for workers aged 65 to 69, the cost in increased Social Security benefits would be approximately offset by the taxes on the increased earnings (in 1990, $4.8 billion in larger benefits, $4.9 billion in larger revenues, for a net revenue increase of $0.1 billion). The second conclusion, featured prominently in a graph at the beginning of the report, is that partial elimination of the RET, in the form of an increase in the AEA, could capture much of the new revenues while avoiding most of the cost in benefits. Robbins and Robbins estimate that the maximum net revenue is achieved with an increase in the AEA to $39,360 from its scheduled 1990 amount of $9,360; such a modification would increase revenues by almost $5 billion while increasing benefits by less than $2 billion, for a

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2. For a recent review of such studies, see Michael Leonesio, "The Effect of Social Security's Retirement Earnings Test on the Labor Market Activity of Older Americans: a Review of the Evidence," unpublished manuscript, Office of Research and Statistics, Social Security Administration, December 1989.

3. The Robbins and Robbins report also discusses marginal tax rates for older workers. This note does not discuss that aspect of the report.

1990 net revenue increase of $3.2 billion. Modifying the AEA is thus billed as a deficit reduction measure.

Evaluating the estimates is difficult because Robbins and Robbins provide few details on how they arrive at their results. I have been able, however, to replicate their earnings and revenue estimates very closely. The replication indicates that these estimates incorporate a serious flaw and are of no value. I have not been able to replicate the benefit estimates, but there are strong indications that these estimates, too, are seriously flawed.

The details of the RR estimates and my replication of the estimates are discussed more fully in the appendix to this note. The discussion here draws on that appendix.

The RR estimates of the revenue increases from taxes on increased earnings are derived from an estimate of potential new elderly workers that embodies an error in the analysis of the earnings distribution. The RR analysis is based on a table of data on the number of 1983 elderly workers by earnings interval. The earnings intervals used to tabulate the data were of very uneven widths, with the narrowest intervals ($1,680 or less) used for earnings just below and above the 1983 AEA of $6,600, wider intervals ($2,000 to $2,500) used for other earnings below $10,000, and much wider intervals ($5,000 and higher) used for earnings above $10,000. (See Table A.1.2 in the appendix.) The tabulated counts of workers in the narrow intervals are, as can be expected, much lower than the counts in the nearby wide intervals. Robbins and Robbins conclude from these low counts that the earnings distribution is depleted near the AEA, and that the reason that workers are missing from that part of the distribution is that they would rather retire than continue in jobs that would cause their benefits to be partially offset by the RET. Their technique for estimating the number of workers who would work if there were no RET is to raise the number of workers in these low-count intervals to an interpolated average of the counts in the higher-count intervals.

In fact, the low counts in those intervals are due to the different widths used to tabulate the intervals. If the differing widths are taken into account, the sharp pattern that Robbins and Robbins believe they have found disappears entirely, leaving no basis for an estimate of new potential workers. The RR estimate of new workers actually introduces a sharp hump in the earnings distribution at earnings just above the AEA.

The RR procedure is illustrated in two different ways in Figures 1 and 2 of this note.[4] In Figure 1 the number of workers in each interval is plotted as a point at the midpoint of the interval, with the height of the point indicating the number of workers in the interval. If the intervals were all of equal width, this would be an adequate representation of the distribution of workers. The intervals in this data, however, are of substantially different widths. It can be seen that the solid line in the graph has three very low points at and just above the 1990 AEA of $9,360. These three points represent counts of, respectively, 90 thousand, 30 thousand, and 80 thousand workers found in three earnings intervals with midpoints $9,360, $10,352, and $12,763. These three points together represent the earnings interval from $9,360 to $14,182 (the earnings intervals represented by the midpoints can be found in Table A.1.3 in the appendix). The three intervals when combined have a total of 200,000 workers. The midpoint of the combined

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4. In both figures, the horizontal axis displays the earnings intervals in both 1983 dollars and the equivalent 1990 dollars. (The 1990 dollars are calculated from the 1983 dollars by multiplying the latter by the projected growth in the AEA from 1983 to 1990). The original 1983 data used the 1983 earnings intervals shown here. The RR report used the corresponding 1990 figures. Unless otherwise noted, the discussion of the report will also use the 1990 figures.

Figure 1 corresponds to Graph 2 in the RR report, except that the solid and dotted lines are reversed; the solid line in Figure 1 represents the present-law distribution and the dotted line represents the RR estimate of the distribution in the absence of the RET. The horizontal axis in Figures 1 and 2 has also been scaled in proportion to earnings, so that the uneven earnings intervals are represented by an uneven spacing of the points, unlike RR Graphs 1 and 2, which space the points evenly.

intervals is $11,771. If the three low points were replaced by a single point of 200,000 workers at $11,771, the dip in the graph would disappear. The sharp drop in the counts of workers near the AEA is therefore due to the use of smaller intervals near the AEA.

It should be obvious that these data cannot be used to analyze the distribution of earnings until some sort of correction is made for the different widths of the intervals. Yet Robbins and Robbins deal with the data as if they need no such correction. They assume that in the absence of the RET the distribution of workers by earnings would decline smoothly between $5,261 and $43,041 and therefore estimate a curve, the dotted line in Figure 1, between these two points. This line lies well above all the intermediate points on the solid line, particularly the three low points near the AEA. Their estimate for the number of new workers is simply the difference between this fitted line and the observed counts of workers.

The three low points, for example, representing 90 thousand, 30 thousand, and 80 thousand workers, are increased to, respectively, 280 thousand, 270 thousand, and 240 thousand workers. The total count of workers in the three low intervals is thus increased from 200 thousand to 790 thousand workers, an increase of 590 thousand workers. If the three intervals had been represented by one interval with the same 200 thousand workers, this technique would have increased the count at the midpoint of that interval to about 250 thousand, an increase of only 50 thousand workers. The estimate produced by the RR technique is thus entirely dependent on the number and size of the earnings intervals used to define the data, and the estimate can be drastically altered simply by varying the number of earnings intervals.

To get an accurate picture of what is going on, a representation of the earnings distribution must be used that does not incorporate the effects of different-sized earnings intervals. In lieu of a new tabulation of the data using equal intervals, the data we have can be corrected through interpolation or other methods to give an approximation of what the tabulation from equal intervals would have shown. Figure 2 shows one such method of adjusting the data.[5] In this figure, an estimate is made of what the distribution would look like if the 1983 data were tabulated by $1000 earnings intervals or, since the estimates are being made for 1990, by corresponding 1990 intervals of $1,418, determined by adjusting the $1,000 1983 intervals up by the growth in the AEA from 1983 to 1990 ($1,000 x $9,360/$6,600 = $1,418). The estimates are made simply by dividing the count of workers in an interval by the number of $1,418 intervals in the

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5. The horizontal axis in Figure 2 has the same scale as the horizontal axis in Figure 1, but Figure 2 shows the endpoints of the intervals rather than the midpoints. The $9,360 to $11,345 interval in Figure 2 represents two of the intervals in Figure 1: the $9,360-$9,361 interval with midpoint $9,360, and the $9,361 to $11,345 interval with midpoint $10,352.

tabulating interval. For example, the 80,000 workers at midpoint $12,763 in Figure 1 represent the earnings interval from $11,345 to $14,182. The width of the interval is $2,837, or 2.0 times $1,418. There are therefore about 40,000 workers per $1,418 earnings interval in this interval (80,000 divided by 2.0). The next interval to the right has 150 thousand workers in an interval of width $7,091, or about 30,000 workers per $1,418 interval. Thus, while there are more workers in the interval to the right (150,000 compared with 80,000), there are fewer workers per $1,418 of interval (30,000 compared with 40,000). The higher number of workers in the interval to the right is therefore due entirely to the greater width of the interval.

In Figure 2, the earnings distribution is graphed (solid line) as a histogram, or bar chart. The width of each bar equals the width of the earnings interval. The height gives the number of workers per $1,418 1990 interval. The area of the bar, which equals the height times the width, or the number of workers per $1,418 interval times the width of the interval, represents the number of workers in the earnings interval. The bar-graph representation in Figure 2 therefore gives a meaningful representation of the frequency distribution of earnings. The height of the distribution falls to very low levels on the right-hand, high-earnings side, indicating the relative scarcity of high-earnings workers.

In contrast to Figure 1, there is no evidence at all in Figure 2 of a sharp drop in the number of workers near the AEA. In fact, there is a slight rise in the Figure 2 solid-line distribution just below the AEA, which might be evidence of the clustering of earnings at the AEA that has been observed in other studies.[6] Because there is no depleted region in the observed distribution, there is no basis for imputing any number of missing workers. The dotted line in each figure represents the number of workers that Robbins and Robbins estimated would exist in the absence of the earnings test. This dotted line, which was a smooth curve in Figure 1, shows a large hump in Figure 2. The RR technique, instead of filling in a depleted region of the distribution, actually adds a enormous number of workers to an area that was not depleted to begin with.

It is clear that the RR estimates of the number of workers are entirely the result of a misreading of the data. A different tabulation of the data, using a different number of earnings intervals or a different set of interval sizes, could give quite different results. It would be easy to construct a tabulation of these data that would show, if the RR technique were carried out on it, a large <u>decrease</u> in the number of elderly workers if the RET would be eliminated. But neither that result, nor the result that Robbins and Robbins arrived at, would have any bearing on what would actually happen if the RET were eliminated.

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6. See Leonesio, *op. cit.*

The RR estimates of the revenues accruing from the removal of the RET are based on this mistaken estimate of the number of new workers. The revenue estimates, therefore, are no more valid than the employment estimates. (The appendix contains a discussion of some of the procedures used in calculating the revenue estimates.)

Robbins and Robbins also claim that estimates of revenues from new workers in the labor-force should be augmented by an estimate for increased revenues from the resulting increased productivity of capital. Their estimate of the augmented revenues is apparently based on a production-theory argument that the earnings shares of labor and capital maintain roughly constant proportions as national output changes. It can be shown, however, that according to this theory wage rates will fall at the same time that payments to capital rise, and that the RR estimate of increased labor earnings is actually an estimate of the increase in combined payments to labor and capital. If a production-theory correction is to be made, the estimate of labor earnings will have to be reduced by as much as the estimate of capital earnings is increased. If we assume, as Robbins and Robbins do in their estimates, that income from capital is taxed at a lower rate than income from labor, then the effect of apportioning some of the labor earnings increases to capital income would be to <u>reduce</u> the estimate of total revenues.

The RR contention that raising the AEA without eliminating the RET can achieve most of the revenue gains without incurring much of the benefit costs relies on some estimates of the rise in benefit costs as the AEA is raised. The procedure for making these estimates of benefit costs is undocumented and cannot be directly evaluated, but it appears to be inconsistent with the RR estimates for the earnings distribution and the expected level of 1990 benefits. Robbins and Robbins estimate (RR pp. B-4, B-5) that 100 percent of the potential revenue gains will be achievable by raising the AEA to $43,041, while only 36 percent of the increased benefit costs will be incurred at that level. The data that Robbins and Robbins used for their earnings and revenue estimates, however, indicate that there are only about 183,000 workers with earnings above $43,041, yet their estimate of potential benefit costs allocates $3.1 billion in increased benefits to these workers. This is an average of $16,800 per worker, which is extremely implausible. The projected maximum benefit for 1990 is $11,700. A beneficiary couple could receive just over $16,800 if the worker receives the maximum benefit. The average beneficiary couple, however, will receive considerably less than this amount. Furthermore, to fully offset a benefit of $16,800, each of the 183,000 workers with earnings above $43,041 would have to have earnings in excess of $90,000. The average earnings figure used by Robbins and Robbins for workers in this group is less than $63,818.

In summary, the Robbins and Robbins estimates of tax revenues from the total or partial elimination of the RET are wholly without foundation, based as they are on an erroneous technique for estimating the number of new workers. Their argument that their estimate of revenues from increased labor earnings should be supplemented with an estimate of increased revenues from capital earnings is faulty. Their claim that raising the AEA would capture much of the potential revenues without incurring much of the potential costs in higher benefits is undocumented and suspect.

Robbins and Robbins make virtually no reference to the work of other researchers who have studied the possible effects of the RET on the earnings of elderly workers. There is good reason to believe that the existence of the RET might cause some elderly workers to cut back on their work or drop out of the work force entirely, but it has proven very difficult in practice to make a confident estimate of the magnitude of such a response. A reasonable conclusion from the existing body of studies is that the labor-supply effect of the RET is far smaller than that estimated by Robbins and Robbins.[7]

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7. See Leonesio, op. cit.

Figure 1: NUMBER OF AGED WORKERS, BY UNEVEN EARNINGS INTERVALS

Number of workers in interval plotted as height above midpoint of interval

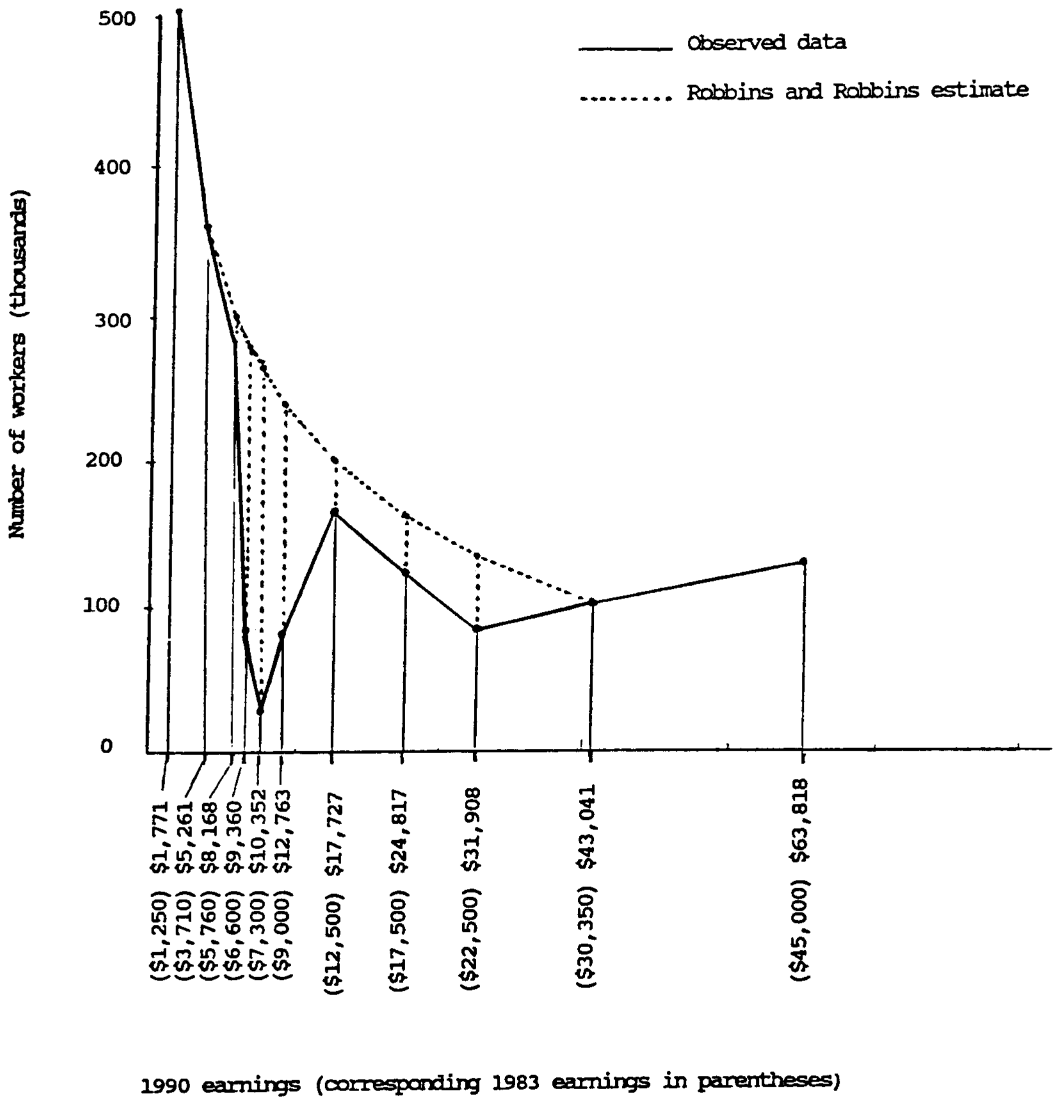
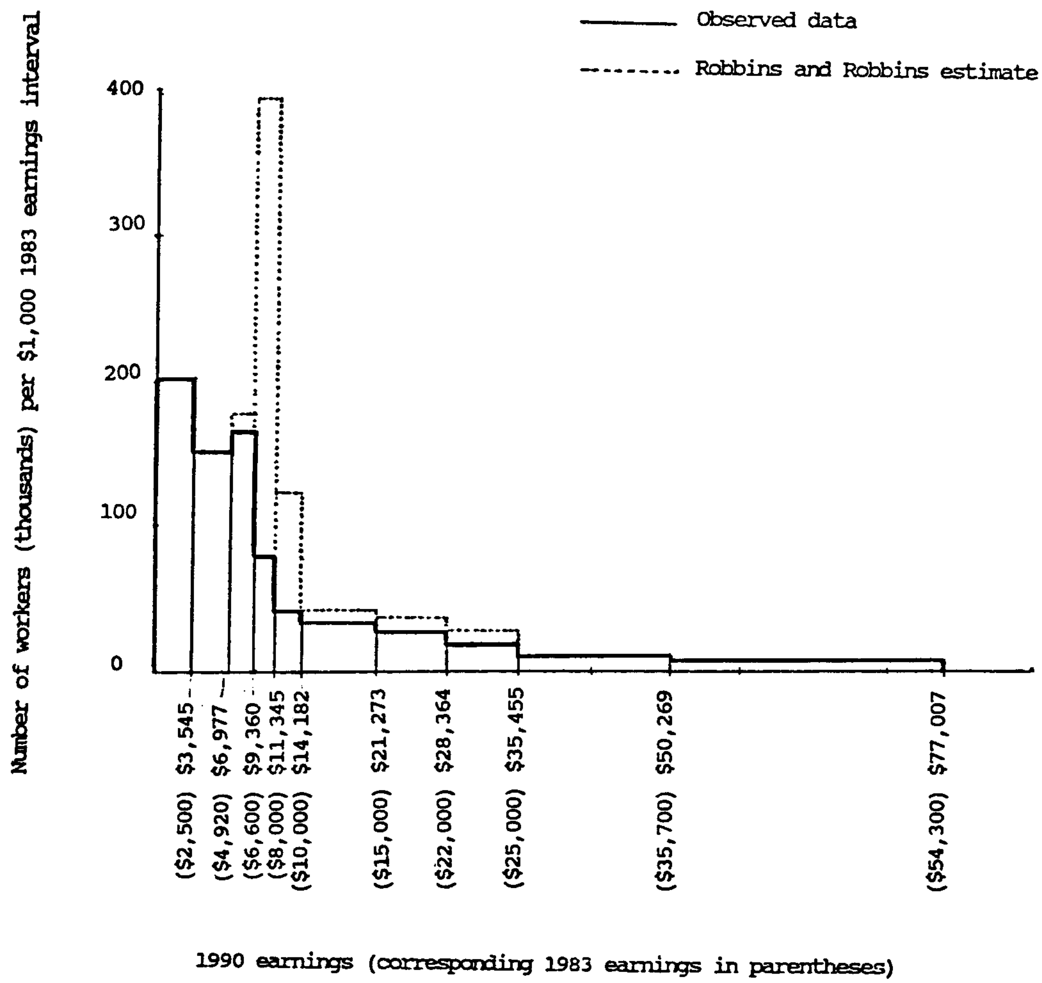


Figure 2: HISTOGRAM OF AGED WORKERS, BY UNEVEN EARNINGS INTERVALS

Number of workers in interval represented by area of rectangle above the interval



Appendix

How the RR estimates were made

Sections A.1 through A.5 in this appendix present the Robbins and Robbins (RR) estimates of existing workers, new workers under RET removal, new earnings, new revenues, and new benefits, along with my conjectured replication of the methods used to arrive at some of these estimates. For the earnings and revenue estimates, the correspondence between the replicated estimates and the RR estimates is close enough that we can confidently assume that we understand their procedures and can criticize their estimates. I have not been able to replicate the RR benefit estimates, because Robbins and Robbins give little explanation of how they made these estimates. Nevertheless, the benefit estimates that are presented can be analyzed for consistency with the worker and earnings estimates and with the expected level of benefits. Sections B.1 through B.5 criticize the estimates in the corresponding A sections.

A.1: Distribution of workers under the current-law RET

Robbins and Robbins use as a basis for their calculations an estimate of the 1990 earnings distribution of workers aged 65-69 who are eligible for Social Security benefits. This distribution is presented in Graphs 1 and 2 of their report. The numbers are not given in the report, but a rough estimate can be made from visual inspection of the graphs (Table A.1.1).

These figures, according to Robbins and Robbins, are derived from 1983 Continuous Work History Sample (CWHS) data by "adjusting the class intervals for the growth in average wages." SSA has provided 1983 CWHS data on the number of workers in response to several requests in the last few years, and the RR figures closely match the numbers provided by SSA. The SSA figures, giving the number of workers (in thousands) aged 65 through 69 in 1983, are given in Table A.1.2.

Although one row in the CWHS data seems to have been split into two rows in the RR data (114,000 into 87,000 and 30,000), the numbers in most of the rows of Table A.1.1 are very close to the corresponding ones in Table A.1.2, and we can be reasonably confident that the RR figures were derived from either these or very similar CWHS data.

The RR 1990 earnings intervals and midpoints can be derived by making the following series of adjustments to the 1983 values:

- o Assign the highest interval of the CWHS table a midpoint of $45,000, so that it represents a range from $35,700 to $54,300.
- o Split the $6,600 to $7,999 group of 114,000 workers into a group of 85,000 workers at $6,600 and a group of 29,000

workers in the \$6,601 to \$7,999 interval. (This split is made in order to replicate as closely as possible the RR fourth and fifth row values of 87 and 30.)

o Convert these 1983 intervals and midpoints into 1990 values by multiplying by the ratio of the 1990 earnings limit to the 1983 earnings limit (\$9,360/\$6,600). (This gives a much closer replication of the RR midpoints than would the ratio of projected 1990 average wage to 1983 average wage (\$21,585/\$15,239)).

Table A.1.3 shows the resulting 1983 and 1990 earnings ranges and midpoints, along with the original CWHS number of workers (with the \$6,600 group split into two groups) and the estimated RR figures.

This series of calculations replicates the RR earnings midpoints exactly. The \$43,041 value used by Robbins and Robbins is apparently the result of a calculation like that given here (i.e., the multiplication of \$30,350 by 9,360/6,600), despite RR footnote 17 on p. 10, which states that \$43,041 was calculated as the point where the maximum 1990 benefit of \$11,712 would be fully phased out. At a \$1 for \$3 phaseout rate above an earnings limit of \$9,360, the maximum benefit would be fully offset at an earnings of \$44,496.

The CWHS-derived numbers in column 3 are close to the RR numbers in column 4. Some lack of agreement can be expected even if the RR procedure has been replicated exactly, because the fourth column has been estimated from visual inspection of RR Graph 2. Some of the differences might also be due to the fact that Robbins and Robbins have in some unspecified way incorporated projections of the number of retired workers in 1990.

The replicated numbers in column 3 are graphed as a solid line in Figure 1. This corresponds to the solid line in RR Graph 1 and the dotted line in RR Graph 2. Figure 1 differs from the RR graphs in that the horizontal axis is correctly scaled in Figure 1, making the different earnings interval sizes more apparent.

<u>A.2: Number of new workers if the RET is removed</u>

In their next step, Robbins and Robbins attempt to determine what the earnings distribution would have looked like in the absence of the RET by fitting a "smooth decline" to the graph. This is done by "estimating a logarithmic function based upon a change in earnings between \$1,771 and every other earnings class." Apparently, what was done was to fit the equation

$$N = a + b*\log(E-1771),$$

where N is the number of workers in an earnings interval and E is the earnings at the midpoint of that interval, to the two points given by E=5261, N=361 and E=43041, N=104. This gives values for a and b resulting in the function

$$N = 1210 - 104.05 * \log(E-1771).$$

The fitting and calculations were done without regard for the size of the earnings intervals that determine N and E. The resulting estimates are reported in the column 3 of Table A.2.1. This table also reports, in column 4, the resulting estimate of the change in the number of workers and, for comparison, in column 5, the actual RR estimate of the change in the number of workers. The numbers in column 5 are close enough to the numbers in column 4 to indicate that the replication is close to the actual RR procedure, although there are some puzzling discrepancies.

The fitted data of column 3 are shown in Figure 1 as the dotted line. This corresponds to the solid line in RR Graph 2.

A.3: Total new earnings

The total new earnings figure estimated by Robbins and Robbins is calculated by taking the number of new workers in each group and multiplying by the midpoint earnings for that group. For total removal of the RET, all the affected earnings groups are added together. For an increase in the earnings limit, only those affected workers in groups with earnings under the new limit are included. Because their distribution fitting technique predominantly increases workers in the low earnings groups, most of the potential earnings increases will be attributed to small increases in the earnings limit.

A.4: Increases in Federal government revenues

The RR estimates of increased earnings are converted into estimates of increased Federal taxes by multiplying the earnings estimates by factors representing the marginal tax rates of the new earners. For one set of estimates this marginal rate is .303, representing a .15 individual income tax bracket rate plus a .153 combined employer-employee FICA tax rate. For another set the marginal rate goes as high as .433, representing the RR estimates of the proportion of workers at higher earnings levels who will be in the .28 or .33 income tax brackets. No attempt is made to adjust for the taxation of benefits, which would increase the estimates of new revenues. It is not clear from the discussion whether an adequate attempt is made to allow for the proportion of new-earner beneficiaries whose taxable non-earnings income is low enough that a .15 marginal tax rate over-estimates the average tax on their new earnings. For a beneficiary couple with only benefit income, $10,000 dollars or so of any new earnings will be exempt from taxation because of the standard deduction and personal exemptions. This will lower the tax on the new earnings well below the marginal rate of 15 percent.

Robbins and Robbins augment their estimate of additional earnings with an estimate of additional capital income stimulated by the increased labor earnings. Their justification is given in footnote 24 on p. 12:

> In general, we cannot experience an increase in income from labor without also experiencing an increase in income from capital. For example, if new elderly workers begin working in a previously empty office building, the building owners will receive a new rental income. If the workers use computers, there will be new income to the owners of computers.

Robbins and Robbins note that for the economy as a whole, each $1 of labor income tends to be associated with about 50 cents in capital income. Accordingly, an adjustment for revenues from new capital income is made by assuming that each $1 of new labor income will generate $.50 of new capital income, and that this new capital income will be taxed at a marginal rate of .15. The capital revenue factor on new earnings is therefore .075. When this is added to the personal tax factor of .303 (in the lower set of estimates), the result is that new revenues total 38 percent of the estimated new earnings.

<u>A.5: Total new benefits</u>

The RR report assumes, without stating the source (p. 11, 12), that raising the earnings limit $1,000 will cause $37 million in new benefits to be paid, and that raising the limit $3,000 will cause $110 million in new benefits to be paid. (Slightly different figures are given in RR Table B-II.) For complete elimination of the RET, they accept an SSA Office of the Actuary estimate that the cost in new benefits would be $4.8 billion.[8] For intermediate earnings limits, some sort of interpolation is made (RR Table B-II, p. B-4). At a relatively high earnings limit of $63,818 this interpolation gives a benefit cost of $2.7 billion, or only 56 percent of the cost of total elimination.

(I have not been able to replicate the interpolations made by Robbins and Robbins in going from their values in RR Table B-II to their values in RR Table V-A. In RR Table B-II the maximum

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8. The Office of the Actuary actually estimates costs on the order of $5.3 billion a year. Their 1990 calendar-year estimate, however, for technical reasons having to do with the timing of Social Security payments from the Trust Funds, includes only 11 out of 12 months of increased benefit payments, yielding the slightly lower figure of $4.8 billion.

net revenue is at an AEA of $43,041, but in RR Table V-A the maximum is at $39,360. The tables contradict each other in other ways. RR Table V-A also contradicts RR Table IV, as Robbins and Robbins mention in a footnote (footnote 2 on pp. 15 and 16), but the footnote is puzzling, since it tries to explain why a number is larger in one table than in the other table when it is in fact smaller.)

Table A.5.1, giving estimated benefit increases by AEA level, is taken from RR Table B-II on p. B-4 of the report.

Criticism of the RR estimates

B.1: Distribution of workers under the current-law RET

Graph 1 in the Robbins and Robbins report (and the corresponding Figure 1 of this note) is simply a graph of the number of workers against the earnings midpoints, with no adjustments to the data for the different widths of the earnings intervals. A graph of this sort, giving the numbers of workers in widely varying earnings intervals, is very deceptive.

Because increasing the size of the income range will increase the number of workers in the range, graphs or histograms cannot be usefully made from data within uneven intervals until an adjustment is made for the uneven intervals. With the above data, the numbers can be adjusted to give the number of workers within each thousand dollars of income interval by dividing by the number of thousands of dollars in the income range. The first row of Table A.1.2, for example, which contains an income interval of 2.5 thousand (1983 $), would be divided by 2.5. Column 4 of Table B.1.1 gives the results.

Column 4 of this table is graphed as a solid line in Figure 2. Figure 2 is plotted as a histogram, with equal areas indicating equal numbers of workers, and with the base of each histogram bar spread over the earnings interval. This is the most informative way of representing distributions when the data come from uneven intervals. Except for the rise in workers in the $4,920 to $6,600 1983 interval, this graph shows a uniform decline in the number of workers as earnings increase.

The rise in the interval just below the 1983 AEA of $6,600 might well be evidence of an RET response. Eyeballing the graph, we can estimate that a smoother distribution would put the height in that interval at about 110,000 workers per $1,000 interval, or about 57,000 less than the observed value of 167,300. The difference, multiplied by the width of the interval in thousands (1.68), gives an estimate of 96,000 workers who have reduced their earnings because of the RET. Even if we assume this to be true, the data are not refined enough to tell us how much these workers would have been earning in the absence of the RET. There are 807,000 workers with earnings of $6,600 or more; the estimate of 96,000 affected workers thus represents about 12 percent of the above-the-limit work force. An estimate of how the earnings of these workers would change if the RET were eliminated would require distributing them to points above the earnings limit, but the data do not tell us how far above the limit they should go. In addition, the corrected graph shows no evidence of a "gap" in the distribution, and therefore gives no foundation for making estimates of how many workers might return to work.

Some other statements made by Robbins and Robbins about the existing earnings distribution are unsupported by the data:

On p. 10 they state that "About 400,000 elderly workers earn annual wages within 10 percent of the earnings limit." No supporting evidence is given for this figure other than a reference to a graph. The range of earnings within 10 percent of the limit would have been $5,940-$7,260 in 1983, and will be $8,424-$10,296 in 1990. If the 1983 range is extended to the range $4,920-$7,999, i.e., from 25 percent below the limit to 21 percent above the limit, then 395 thousand workers are included. But if an estimate of the number of workers within 10 percent of the earnings limit is made by interpolation (by using the factor [6600-5940]/[6600-4920] to reduce the number of workers in the lower range and the factor (7260-6600)/(8000-6600) to reduce the estimate of the number of workers in the upper range) then only about 165,000 workers are estimated to be within 10 percent of the earnings limit, less than half the figure given by Robbins and Robbins. An estimate by the Office of the Actuary a few years ago put the figure for workers within 10 percent of the earnings limit at 174,000.

On the same page, Robbins and Robbins state that "within the range of $31,908 to $43,041 the number of wage earners begins to rise--reflecting the fact that the retirement earnings penalty at this point no longer influences the decision about how much to earn." The range from $30,000 to $44,000 corresponds roughly to the range over which the average to maximum benefits in 1990 will become fully phased out. But the data on the distribution of workers come from 1983, rather than 1990, and in 1983 the phase-out rate was one-half, rather than one-third, so that the earnings at which benefits were fully offset was substantially lower in 1983. The maximum benefit in 1983 was $8,514, yielding a full-offset earnings of $23,628, with a 1990 equivalent of $33,509. If there is to be a rise in the number of workers in the range of earnings for which the average to maximum benefit becomes fully phased out, it would therefore be more appropriate to look for it in the $28,364 to $35,454 range (in 1990 $) represented by the $31,908 point, rather than in the $35,455 to $50,628 range represented by the $43,041 point. Yet in the RR graph, the number of workers is still falling at the $31,908 point. But these rises and falls in the graph are moot anyway, given the mistake Robbins and Robbins have made in dealing with the unequal earnings intervals. When correctly graphed, the number of workers falls steadily through both points.

B.2: Number of new workers with the RET removed

The second step of the RR estimate, "fitting" a non-RET distribution, is invalid for several reasons:

- Again, no account is taken of the different earnings interval widths used to define the distribution. Their estimated function, for example, gives a value of 238,000 workers for the interval centered on $10,352 (1990$) without considering how wide that interval is. This would not be a problem if all the earnings intervals were of the same width, but they are not. In particular, the two bracketing intervals used to define the logarithmic curve, the interval centered around $5,261 and the interval centered around $43,041, are both wider than the intervals in the estimated part of the curve adjacent to them. (The $5,261 point represents the $2,500 to $4,920 interval in the 1983 data, for an interval width of $2,420. The immediately following intervals have widths of $1,680 and $1,400. The $43,041 point represents the $25,000 to $35,700 interval in the 1983 data, an interval width of $10,700. The immediately preceding intervals have widths of $5,000, $5,000, $5,000, and $2,000.) As a consequence, the estimated points will be elevated above a true logarithmic fit between the two selected endpoints. This is not a trivial error. Even if the actual earnings distribution were logarithmic, the correct fit of the distribution would give estimated numbers substantially lower than those estimated by Robbins and Robbins. The numbers they estimate, in fact, bear no meaningful relation to a correct logarithmic fit.

  Just as the original data can be corrected for the varying earnings intervals, so can these "fitted" values of numbers of workers be corrected. The RR fitted estimates, transformed into thousands of workers per $1,000 earnings interval, are given in the final column of Table B.1.2.

  The adjusted RR figures are graphed as a dotted line in Figure 2. It can be seen in Figure 2 that the RR technique has inserted a huge lump in the distribution of workers in the $4,920 to $10,000 interval of 1983 earnings, the intervals surrounding the 1983 AEA.

- The RR technique does not take into account the behavioral incentives of the RET. These incentives affect both the choice of working or not working and the choice of how many hours to work. Any given worker near retirement can be thought of as making both choices at the same time: a $20,000 a year worker, for example, can be thought of as choosing between staying at $20,000, dropping to some lower amount, say $19,000, or retiring completely. The RET affects both the choice between $20,000 and $19,000 and the choice between $20,000 and $0, but in different ways.

For the choice between $20,000 and $19,000, the effect of the RET can be dealt with through its effects on <u>marginal</u> tax rates, i.e., the rates showing how much out of each extra dollar in earnings the worker gets to keep after taxes. For earnings between the AEA and the level at which benefits are fully offset, the RET in 1990 will add 33 percentage points to the marginal tax rate that the worker pays on additional earnings. (Workers really face a lower rate than this, because some of the offset benefits are returned after retirement in the form of delayed retirement credits.) At earnings either below the AEA or above the full-offset level, the RET will contribute nothing to the marginal tax rate. In between these two levels, however, the RET adds significantly to the tax rate, and we can expect that it causes some workers to reduce their earnings somewhat. The effect of the RET on counts of workers at a given earnings level, at $20,000, for example, will be the net effect of a loss of workers who decrease their earnings from $20,000 to lower amounts and a gain of workers who decrease their earnings to $20,000 from higher amounts. This net effect on the count of workers might be small. At or just below the AEA, however, there is a net gain of workers from higher levels with no net loss to lower levels, so that we can expect to find a higher count of workers at and just below the AEA. This in fact has been observed in some studies. This marginal-tax effect of the RET does not affect the total count of workers; it only shifts them around in the distribution. Because changing the RET has no effect on the marginal tax rate of workers above the full-offset point, the effect of an RET elimination on such high-earnings workers would be limited to a possible "income-effect" as high-earnings workers reduce their earnings in response to the larger benefits that they would be allowed to receive. (The income effect can also operate on workers in the phase-out range, moderating the effect that operates through marginal tax rates.)

The second type of RET effect, that operating on the decision whether to work for $20,000 or for $0 dollars, affects the total number of workers. For this decision, the RET operates not through its effect on the marginal tax rate but through its effect on the total tax. This effect on the tax is measured, if we leave aside the complications of benefit taxation and delayed retirement credits, by the amount of benefits offset. This amount starts at zero at the AEA, grows larger as earnings increase above the AEA, reaches its maximum at the level of earnings where benefits are fully offset, and stays at that maximum for higher earnings. Unlike the marginal tax effect of the RET, which is approximately constant between the AEA and the full-offset level, and zero outside that interval, the total tax effect of the RET grows gradually over the interval and does not drop to zero above the interval. The effect of RET removal is potentially positive at all earnings levels above the AEA, although, just as for the marginal earnings effects, there is a possible "income effect" that could cause some workers to retire earlier (e.g., at age 68 rather than age 69) in response to the higher benefits they could receive after age 65 while they are still working.

The RR estimates appear to be a hybrid of these two effects. In the RR report there is much discussion of the RET as a marginal tax, and the estimate for new workers is made only for earnings below the full-offset point, which indicates that they are thinking of the effects that operate through the marginal earnings decision. Yet their estimates add workers to the labor force, rather than shift them around in the earnings distribution, which indicates that they are thinking of the decision to work or not work. There is no indication in the paper that they have sorted these effects out. Their estimate of an <u>increase</u> in the number of workers below the AEA in response to an RET removal cannot be justified under either effect.

- o Robbins and Robbins tend to forget that they are dealing with 1983 data. They fit a zero change in the number of workers at the $43,041 point because at those earnings the 1990 maximum benefit will be fully offset. In 1983, however, when the offset rate was still $1 for each $2 of earnings above the earnings limit, the offset region was shorter, so that the estimate of the non-RET distribution should be fitted differently. This would lower parts of the upper (solid) line in Graph 2. In addition, the estimate of the 1990 effect of removing the RET should start with an adjustment of the 1983 data to reflect the fact that the 1990 RET is already substantially smaller than that observed when the data were gathered. This would raise parts of the lower (broken) line in Graph 2. With the upper line being lowered, and the lower line being raised, the estimates for the 1990 effects would be reduced, wholly aside from all the other problems with this technique.

Robbins and Robbins claim that their estimate of the number of new workers is plausible, given what is known about worker elasticities:

> "...we project an overall increase in aftertax earnings of 122 percent and an increase in the number of elderly workers of 38 percent. This implies a labor supply elasticity of 0.31 (0.38/1.22) for elderly workers. Note that this estimate is conservative. Labor supply estimates for the U.S. labor force as a whole range from 0.1 to 0.45, and it is generally believed that the labor supply elasticity is much higher for elderly than for younger workers." (p. B-1)

No definition is given for "taxable earnings", nor can I find any place in the report where some net-of-taxes earnings or wage is calculated to rise 122 percent. For the elasticity calculation being made here--the responsiveness of the number of elderly workers--the appropriate price variable is not the after-tax hourly wage rate, which would be appropriate for the analysis of changes in hours worked by workers who are already working, but the annual earnings net of taxes and benefit offsets. If we take the extreme case of a worker with enough non-earnings, non-benefit income that all of his earnings will be taxed at the 28 percent income-tax bracket rate, then the total income tax and payroll tax on his earnings will be about 35 percent of earnings. The RET tax on the earnings will depend on how far a worker is above the AEA. For a worker with earnings of $10,352 in 1990 (this is the earnings level at which Robbins and Robbins estimate the highest response in new workers), the RET tax will be $331, or 3.2 percent of earnings. The rise in after-tax earnings is therefore from 62 percent of earnings to 65 percent of earnings, a 4.8 percent increase, far below 122 percent. The number of workers in this group increased by 820 percent (29,000 to 268,000). The implied elasticity is therefore 820/4.8, or 170, hardly a conservative elasticity. (Not all economists would agree that even an elasticity of 0.31 is a conservative elasticity.)

At the other extreme, assume that a worker with $44,000 of earnings has a fully-offset benefit of $11,000. The RET tax is therefore 25 percent of earnings. If the RET is eliminated, his after-tax earnings go from 40 percent of earnings to 65 percent of earnings (ignoring the complications of benefit taxation), a rise of 62.5 percent. Yet Robbins and Robbins simulate no new workers at this earnings level. They seem to ignore this group because they focus entirely on marginal tax rates for small changes in earnings, rather than on the tax rates which apply to the decision of whether to work or not. For workers whose benefits are fully-phased out, the RET has no effect (aside from a possible income effect) on the decision between earning $44,000 or $45,000, but it does affect the decision between earning $44,000 or $0.

B.3: Total new earnings

Because the estimate of the number of new workers in each earnings interval is wrong, the estimate of total new earnings is also wrong.

It is a curious feature of the RR procedure that 19 percent of the potential new earnings are achieved without raising the earnings limit from its scheduled value. (See Table A.3.1, row 4, column 5.) The RR "curve fitting" technique raises the number of workers even below the 1990 exempt amount. If they had tried to avoid this problem by fitting the curve from the $9,360 point (the 1990 AEA) rather than the $5,261 point, the procedure would not have yielded such a increase in workers; in fact, as can be seen from RR Graph 2 or my Figure 1, if the fitted curve had started at the $9,360 point rather than at the $5,261 point, there would have been a negligible effect on the total number of workers, perhaps even a reduction.

B.4: Increases in revenues

The argument that the estimate of new earnings needs to be supplemented with an estimate for increased income to capital seems to be based on an inadequate understanding of the interaction between labor payments and capital payments in neoclassical production theory. In that theory, if new workers enter the labor force, not only must they draw capital away from competing uses, but they themselves must compete with existing workers. As a result, the average payment to capital will rise, but the average wage will fall. Robbins and Robbins argue for including the rise in capital payments, but neglect to include the corresponding fall in the average wage.

More technically, let Y denote total national output, which is equal to the sum of the total payments to labor, W, and the total payments to capital, R:

$$Y = W + R.$$

Historically, W has remained at about two-thirds of Y and R at about one-third of Y even as Y has changed. Some versions of neoclassical production theory support this relationship:

$$W = .67 * Y, \text{ and}$$

$$R = .33 * Y.$$

This gives

$$R = .50 * W.$$

The relation between W and Y can be inverted:

$$Y = 1.5 * W.$$

This relation also holds among changes in W, denoted dW, changes in R, denoted dR, and changes in Y, denoted dY:

$$dY = d(W+R) = 1.5 * dW.$$

If the size of the labor force is denoted L, and the average wage is denoted w, then total payments to labor are given by

$$W = w * L.$$

If a change in the RET causes the size of the labor force to change by dL, then a crude estimate of the change in total labor payments would be given by multiplying this change by the average wage:

$$dW = w * dL.$$

Robbins and Robbins argue that the historical relationship between labor payments and capital payments should be maintained in their estimates by supplementing this crude estimate of increased labor payments with an estimate for increased capital payments of half that amount:

$$dY = d(W+R) = 1.5 * dW = 1.5 * w * dL.$$

These estimates, however, ignore the effect of the new workers on the wage rate w. The new workers will cause the average wage for all workers, including those already in the labor force, to fall slightly, by an amount dw, so that the total change in labor payments is

$$dW = w * dL + L * dw.$$

Because dw, the change in the average wage, is negative, this corrected estimate for total wage payments will be smaller than the crude estimate.

According to the theory that supports the two-thirds/one-third split in labor and capital payments, the fall in the average wage will be just enough that total wage payments will only rise by .67*w*dL instead of by w*dL. The total change in payments to labor will therefore be

$$dW = .67 * w * dL.$$

At the same time, according to this theory, total payments to capital to will rise so that

$$dR = .33 * w * dL$$

$$= .50 * dW.$$

The total effect on combined labor and capital payments will be

$$d(W+R) = .67*w*dL + .33*w*dL = w*dL.$$

Thus, the theoretical estimate for the change in total payments is equal to the crude estimate for the change in labor payments. If Robbins and Robbins want to make this kind of production-theory correction, they should multiply their estimate of earnings increases by .67 to get a corrected estimate of new earnings, and then take half of this estimate of new earnings to estimate the new payments to capital. If, as Robbins and Robbins assume in their estimates, capital income is taxed at a lower rate than labor income, then this correction will <u>decrease</u> their estimate of total revenues, rather than increase it.

B.5: Total new benefits

The allocation of much of the potential new benefit payments to very high AEA increases is unconvincing. New benefit costs come from two sources: the reduction in benefit offsets for current beneficiaries, and benefits paid to new claimants who had not applied under the lower earnings test. By the assumptions that Robbins and Robbins are using, $693 million of the $4.8 billion in potential benefit costs is attributable to new claimants (footnote 2, p. B-4). This leaves $4.1 billion attributable to reduced offsets. The projected maximum benefit in 1990 is $11,700. The maximum combined worker/spouse benefit will therefore be on the order of $17,550. This maximum benefit would be fully offset in 1990 at an earnings of $62,010. Workers with benefits below the maximum will on average reach the full-offset earnings at a far lower level. We can expect, then, that if the AEA were raised to above $62,000, almost all of the beneficiaries who would be receiving offset benefits under the $9,360 AEA would no longer have offsets. Almost all of the cost of full RET elimination that is attributable to the elimination of offsets on already-entitled beneficiaries ($4.1 billion) should therefore be incurred under partial elimination by the time the AEA is raised to $62,000. (A portion of the $0.7 billion in benefits to new claimants should also be incurred by that level.) Yet Robbins and Robbins estimate that raising the AEA to $63,818 will cost only $2.7 billion in larger benefit payments (Table A.5.1, column 2).

The disparity between the benefit cost estimates and the revenue estimates can be illustrated in another way. In the RR estimate of the existing·distribution of earnings, there are 120,000 workers in the $50,629-and-over earnings interval (Table A.1.3, column 4). Assume that half of these, or 60,000, have earnings over $63,818. Raising the AEA to $63,818 is estimated by Robbins and Robbins to cost $2.7 billion in larger benefit payments. The cost of total removal is estimated to be $4.8 billion. At an AEA of $63,818, therefore, there still remains $2.1 billion of offset or unclaimed benefits attributable to workers with earnings above $63,818. For 60,000 workers, this is an average unpaid benefit of $35,000 per worker, much higher than the projected maximum 1990 benefit of $11,700 or the combined worker/spouse benefit of $17,550. To offset $35,000 in worker and spouse benefits at an AEA of $63,818, each of the $63,818-and-over workers would need to have earnings of at least $168,000, which is plainly unrealistic. (In the main body of this note, I have made a similar calculation for the estimates of the cost of raising the AEA to $43,041, the point at which Robbins and Robbins estimate the maximum net revenue.)

A more realistic interpolation procedure would allocate a much higher proportion of the potential benefit costs to much smaller increases in the earnings limit. This, however, would invalidate the graph that was so prominently featured in the RR paper, which shows large revenue gains relative to benefit costs for relatively modest increases in the AEA.

Table A.1.1

Reconstruction of RR estimate of existing workers

(1) 1990 earnings	(2) Workers (000's)
$ 1,771	505
5,261	355
8,168	283
9,360	87
10,352	30
12,763	80
17,727	152
24,817	115
31,908	75
43,041	100
63,818	120
Total	1,902

Notes:

- Column 1: From Graph 2 of the Robbins and Robbins report.
- Column 2: From visual inspection of Graph 2.

Table A.1.2

CWHS workers aged 65-69 in 1983

(1) 1983 earnings range	(2) 1983 earnings midpoint	(3) Workers (000's)
$ 1- 2,499	$ 1,250	508
2,500- 4,919	3,710	361
4,920- 6,599	5,760	281
6,600- 7,999	7,300	114
8,000- 9,999	9,000	81
10,000-14,999	12,500	168
15,000-19,999	17,500	125
20,000-24,999	22,500	84
25,000-35,699	30,350	104
35,700+	-----	131
Total		1957

Notes:

o Source: SSA's Office of the Actuary, from tabulation of the 1983 CWHS.

Table A.1.3

Summary table: 1983 and 1990 earnings intervals and midpoints, with CWHS and RR estimates of number of workers

(1) Earnings midpoint 1983	1990	(2) Earnings range 1983	1990	(3) CWHS workers (000's)	(4) R&R workers (000's)
$1250	1771	$ 1- 2499	$ 1- 3544	508	505
3710	5261	2500- 4919	3545- 6976	361	355
5760	8168	4920- 6599	6977- 9359	281	283
6600	9360	6600	9360	85	87
7300	10352	6601- 7999	9361-11344	29	30
9000	12763	8000- 9999	11345-14181	81	80
12500	17727	10000-14999	14182-21272	168	152
17500	24817	15000-19999	21273-28363	125	115
22500	31908	20000-24999	28364-35454	84	75
30350	43041	25000-35699	35455-50628	104	100
45000	63818	35700-54300	50629-77007	131	120
Total				1957	1902

Notes:
- Column 1, 2: See text.
- Column 3: Same as Table A.1.2, column 3, with 114,000 row split into two rows.
- Column 4: Same as Table A.1.1, column 2.

Table A.2.1

Estimates of differences between raw and fitted distributions of numbers of workers: replicated and RR

(1)	(2)	(3)	(4)	(5)
	Workers in 000's			
1990 midpoint	Raw	Fitted	Change	Robbins' change
$1771	508	508	0	0
5261	361	361	0	0
8168	281	298	18	12
9360	85	280	195	194
10352	29	268	238	238
12763	81	242	161	164
17727	168	203	35	49
24817	125	165	40	49
31908	84	137	53	53
43041	104	104	0	0
63818	131	131	0	0
Total	1957	2696	740	759

Notes:

- Column 2: Same as column 3 in Table A.1.3.
- Column 3: For midpoints $5,261 through $43,041, value given by 1210-104.05*log(E-1771), where E is the column 1 value.
- Column 4: Column 3 minus column 2.
- Column 5: Calculated from Table B-1 (p. B-3 of the Robbins and Robbins report) by dividing the estimate of added revenues by the marginal tax rate, then dividing by the earnings interval midpoint.

Table A.3.1

RR estimate of new earnings

(1) 1990 midpoint	(2) New workers (000's)	(3) New earnings millions	(4) Cumulative new earnings	(5) % of Cum.
1771	0	0	0	0
5261	0	0	0	0
8168	12	94	94	1
9360	194	1812	1907	19
10352	238	2468	4375	43
12763	164	2097	6471	63
17727	49	865	7336	72
24817	49	1216	8553	83
31906	53	1703	10255	100
43041	0	0	10255	100
63818	0	0	10255	100
Total	759	10255		

Notes:

- Column 2: Same as column 5 in Table A.2.1. This gives the actual Robbins and Robbins estimates for the change, rather than our replicated estimates. Using the replicated estimates would give similar results.
- Column 3: Column 1 times column 2. In the actual calculations, the figure in column 2 had more significant digits than are displayed here.

Table A.5.1

RR estimates of new benefits as AEA is raised

(1) 1990 AEA	(2) Additional Benefits ($millions)	(3) Percent of maximum
$ 9,360	$ 0	% 0
10,352	0	0
12,763	37	1
17,727	125	3
24,817	553	12
31,908	1,133	24
43,041	1,719	36
$63,818	2,658	56
Remove	$4,773	%100

Notes:
o Source: Robbins and Robbins, Table B-II, p. B-4.

Table B.1.1

Number of 1983 workers, calculated as workers per thousand-dollar interval

(1) 1983 Earnings	(2) Workers (000's)	(3) 1983 Interval ($000's)	(4) Workers per $1,000 1983 interval
1-2499	508	2.50	203.2
2500-4919	361	2.42	149.2
4920-6599	281	1.68	167.3
6600-7999	114	1.40	81.4
8000-9999	81	2.00	40.5
10000-14999	168	5.00	33.6
15000-19999	125	5.00	25.0
20000-24999	84	5.00	16.8
25000-35699	104	10.7	9.7
35700-54300	131	18.6	7.0

Notes:
- Column 1: From Table A.1.2, column 1.
- Column 2: From Table A.1.1, column 3.
- Column 3: Interval width divided by 1000.
- Column 4: Column 2 divided by column 3.

Table B.1.2

RR fitted number of 1983 workers by interval, calculated as number of workers per thousand dollars of interval

(1) 1983 Earnings	(2) Workers (000's)	(3) 1983 interval ($000's)	(4) Workers per $1,000 1983 interval
1-2499	508	2.50	203.2
2500-4919	361	2.42	149.2
4920-6599	298	1.68	177.4
6600-7999	548	1.40	391.4
8000-9999	242	2.00	121.5
10000-14999	203	5.00	40.6
15000-19999	165	5.00	33.0
20000-24999	137	5.00	27.4
25000-35699	104	10.7	9.7
35700-54300	131	18.6	7.0

Notes:
- Column 1: Same as Table A.1.2, column 1.
- Column 2: Same as Table A.2.1, column 3, but with $9,360 and $10,352 points combined.
- Column 3: Interval width divided by 1000.
- Column 4: Column 2 divided by column 3.