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A SIMPLE EVALUATION OF PROJECTIONS IN OASDI TRUSTEES REPORTS

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I. INTRODUCTION

Because of the ever-changing nature of the OASDI program, it is usually difficult to provide a simple and easy-to-understand evaluation of the accuracy of the cost projections presented in the annual reports of the Board of Trustees. Attempts to compare the projections with the emerging experience can easily end up in either: (1) comparisons of apples and oranges, because of the significant changes made in the OASDI program since the projections were prepared, or (2) explanations of the elaborate adjustments that need to be made to the projections before valid comparisons can be undertaken.

It is unusual for the OASDI program to remain unchanged by major legislation for a period sufficiently long for simple and meaningful comparisons of the accuracy of the projections to be conducted. I believe, however, that we may be now approaching an appropriately long period, and that it would be useful to attempt an appraisal of recent projections. Since the amendments enacted in 1983, the provisions of the OASDI program have not been the subject of significant modifications. Simple comparisons of key parameters could be presented without the need to offer cumbersome explanations of the differences.

II. PRINCIPAL PARAMETERS OF COMPARISON

In order to be useful, the process of evaluation must be reduced to a comparison of no more than a handful of parameters. If too many comparisons of large numbers of parameters are attempted, the reviewer may end up paying substantial attention to parameters that, in actual practice, do not carry significant weight. It is also important to appraise those parameters that most directly relate to the purposes for which the projections were prepared.

The principal purpose of the projections presented in the OASDI Trustees Reports is to determine and to communicate the financial status of the OASDI program--that is, whether the income to the program is expected to be sufficient to cover its expenditures. An appraisal of any one of the many assumptions that were adopted in the preparation of the projections is of much lesser importance than an evaluation of the resulting projected OASDI cost, in terms of percentage of taxable earnings (generally referred to as the "cost rate"). The cost rate should be the principal parameter of comparison, because the adequacy of the program's financing is ascertained, generally, by

comparing it with the income rate; and because any lack of accuracy in that comparison can be assigned almost directly to variations in the cost rate. The income rate is almost totally determined by the FICA tax rate, which is specified in the law and is not subject to variations.

Another parameter of importance (although of lesser importance) that could be used in appraising the accuracy of the OASDI projections, is the "contingency fund ratio" (cfr). This parameter refers to the ratio of the funds at the start of the year to the expenditures in that year, and it provides a measure of the solidity with which the program can withstand adverse but temporary conditions.

Historically, the projected cost rates and the cfr's have been used in making financing decisions about the OASDI program. The cost rates have been mostly used to establish the long-range financial stability, while the cfr's have been used to make sure that over the short-range the income will be enough to cover the expenditures.

Should current-cost financing be specifically established for the program, the the cfr would become a more important parameter for appraising the accuracy of the projections, because future decisions about the program's taxes and benefits would be highly dependent on the projected cfr's.

III. EVALUATION OF COST RATES

Table 1 summarizes the cost rates for calendar years 1983-2000 presented in the 1983-90 annual reports of the OASDI Board of Trustees, under the alternative II-B intermediate set of assumptions. Each line in the table pertains to the calendar year for which the cost rate was estimated, while each column pertains to the calendar year of the Trustees Report in which the cost rate was presented. For calendar year 1990, the 1983 Trustees Report presented a cost rate of 11.27 percent of taxable earnings; this estimate was revised in later reports, and in the 1990 report it was estimated at 10.60 percent of taxable earnings. This means that, if a specific line is followed from left to right, it tells us how the estimated cost rate for a particular year has been modified from one report to the next.

The values underlined and shown in bold numbers pertain to years for which "final" estimates of the cost rates were available, at the time that the report was prepared. For example, at the time that the 1988 report was prepared, final estimates of the cost rate for years prior to 1987 were available. It will be noted, nevertheless, that some "final" estimates are revised to incorporate additional delayed information.

It may be observed from Table 1 that there has been a tendency for the estimated cost rates to decrease from one report to the next. This means that, in general, the OASDI cost projections presented by the Trustees during 1983-90 have been somewhat pessimistic. However, this observation should not be interpreted as evidence that the Trustees have a tendency to overestimate the future costs of the OASDI program. The fact is that during the period covered by the evaluation, the national economy was on an almost continuous recovery (although, perhaps, not as vigorous as many would have liked), which

could not have been easily foreseen. It is well to recall that in the 1970s, when the national economy performed much worse than could have been easily foreseen, the projections were generally too optimistic.

The author believes that, because of the difficulties in precisely predicting the future cyclical behavior of the national economy, most projections tend to be based on the expected average growth. Thus unbiased projections would tend to overestimate costs in times of recovery, and to underestimate costs in times of recessions. It can, therefore, be stated that the Trustees were not any more pessimistic in the decade of the 1980's than they were overly optimistic in the 1970s.

Table 1

OASDI COST RATES PRESENTED IN TRUSTEES REPORTS DURING 1983-90
 BASED ON THE ALTERNATIVE II-B INTERMEDIATE SET OF ASSUMPTIONS
 (in percent of taxable earnings)

Calendar Year of Projected Cost Rate	Calendar Year in Which Trustees Report Was Issued							
	1983	1984	1985	1986	1987	1988	1989	1990
1983	11.49	11.51	11.59	<u>11.50</u>	<u>11.50</u>	<u>11.50</u>	<u>11.50</u>	<u>11.49</u>
1984	11.44	11.32	11.29	<u>11.26</u>	<u>11.24</u>	<u>11.24</u>	<u>11.24</u>	<u>11.24</u>
1985	11.33	11.15	11.29	11.20	<u>11.13</u>	<u>11.13</u>	<u>11.13</u>	<u>11.09</u>
1986	11.40	11.08	11.09	11.11	11.03	<u>10.98</u>	<u>10.98</u>	<u>10.96</u>
1987	11.39	11.06	11.05	11.02	10.89	<u>10.69</u>	<u>10.72</u>	<u>10.68</u>
1988	11.37	11.06	11.04	11.07	10.90	10.73	10.53	<u>10.61</u>
1989	11.30	11.01	11.00	10.94	10.95	10.72	10.36	10.47
1990	11.27	11.02	11.07	11.00	10.98	10.81	10.52	10.60
1991	11.19	10.99	11.04	10.96	10.97	10.80	10.55	10.64
1992	11.10	10.98	11.03	10.92	10.92	10.75	10.57	10.67
1993	10.93	10.95	11.01	10.89	10.90	10.68	10.56	10.69
1994	10.79	10.85	11.00	10.90	10.89	10.61	10.50	10.69
1995	10.65	10.73	10.86	10.92	10.87	10.55	10.44	10.67
1996	10.51	10.56	10.72	10.78	10.85	10.48	10.39	10.63
1997	10.36	10.37	10.55	10.63	10.76	10.43	10.35	10.59
1998	10.27	10.24	10.35	10.49	10.60	10.39	10.31	10.56
1999	10.17	10.16	10.21	10.36	10.45	10.34	10.31	10.54
2000	10.08	10.08	10.17	10.25	10.31	10.30	10.27	10.56

A brief analysis of the reliability for years for which "final" estimates are available is presented in Table 2. It should be expected that, as a projection moves into future calendar years (i.e., lead time increases), the

reliability of the projected cost rate would diminish. For example, the estimate presented in the 1983 report for 1988 should be less reliable than that presented in the 1987 report. Full reliability cannot be guaranteed, however, until most of the actual data is available, and a "final" estimate is issued. This occurs, in general, in the second year following the year of the estimate; because specific information about OASDI taxable earnings becomes available after the end of the year (when employers and self-employed persons file their annual reports).

Table 2 shows that the reliability does indeed diminish as the lead time increases. In addition, it can be concluded from the table that the reliability diminishes about 0.10 percent of taxable earnings for every additional year of lead. This rule of thumb may tend to overestimate the loss in reliability, because its empirical basis is a period of general overestimation of cost rates. Had the period covered included years of weak economic performance as well as strong years (which would have provided a more appropriate basis), the average loss in reliability would have been smaller, because of the effect of offsetting differences.

Table 2

DIFFERENCE BETWEEN "FINAL" AND PROJECTED COST RATES BY LEAD TIME
(in percent of taxable earnings)

Calendar Year of Projected Cost Rate	Lead Time Between Year Projected and Year of Report						
	None	1 Year	2 years	3 Years	4 Years	5 Years	Average
1983	0.00	--	--	--	--	--	0.00
1984	-0.08	-0.20	--	--	--	--	-0.14
1985	-0.20	-0.06	-0.24	--	--	--	-0.17
1986	-0.15	-0.13	-0.12	-0.44	--	--	-0.21
1987	-0.21	-0.34	-0.37	-0.38	-0.71	--	-0.40
1988	-0.12	-0.29	-0.46	-0.43	-0.45	-0.76	-0.42
Average	-0.13	-0.20	-0.30	-0.42	-0.58	-0.76	-0.29

It is also of interest to compare the estimates of the earliest projection in the period with those in the latest projection. This type of analysis does not yield a true evaluation, but does offer an indication of the relative stability of the projections. Table 3 provides a comparison of the projections in the 1983 and 1990 Trustees Reports for 1990-2010. This table shows that in the 7-year period, 1983-90, the Trustees have been recognizing the better-than-expected performance of the national economy, and have lowered the estimates of the projected cost rate for the short-range period (the next 5 to 10 years). However, the additional information and analysis obtained during the 7 years, have caused the Trustees to become slightly more

pessimistic (or less optimistic) about the long-range future. The change in perspective about the long-range future has not been large, and in fact, has amounted to somewhat less than 0.8 percent of taxable earnings in any of the next 15 to 20 years.

It is well in order, at this point, to caution the reader against too much enthusiasm about a high degree of reliability in the methods and assumptions used by the Trustees for the projections. The truth is that many factors and procedures are used to prepare the projections, none of which is perfect or easy to predict; as a consequence, it would be improper to claim that the resulting estimated cost rates for any one year in the next 20-year period, will certainly be within 0.8 percent of taxable earnings.

Table 3

COMPARISON OF COST RATES PROJECTED IN 1983 AND 1990 TRUSTEES REPORTS
(in percent of taxable earnings)

Calendar Year of Projected Cost Rate	Projected Cost Rate in		Diffe- rence
	1983 Report	1990 Report	
1990	11.27	10.60	-0.67
1991	11.19	10.64	-0.55
1992	11.10	10.67	-0.43
1993	10.93	10.69	-0.24
1994	10.79	10.69	-0.10
1995	10.65	10.67	0.02
1996	10.51	10.63	0.12
1997	10.36	10.59	0.23
1998	10.27	10.56	0.29
1999	10.17	10.54	0.37
2000	10.08	10.56	0.48
2001	10.01	10.55	0.54
2002	9.96	10.55	0.59
2003	9.92	10.55	0.63
2004	9.90	10.57	0.67
2005	9.90	10.59	0.69
2006	9.93	10.63	0.70
2007	9.98	10.69	0.71
2008	10.07	10.79	0.72
2009	10.18	10.93	0.75
2010	10.31	11.08	0.77

IV. EVALUATION OF CONTINGENCY FUND RATIO

As was indicated earlier, it would be of interest to evaluate the Trustees projections of the contingency fund ratio (cfr). This parameter, which is defined as the ratio of the funds on hand at the start of the year to the expenditures in that year, does not have the same degree of importance as that assigned to the cost rate. Nevertheless, it is considered by many OASDI students as an important element in assessing the financial stability of the program, even if the program's financing schedule produces a substantial accumulation of funds.

Table 4 summarizes the cfr for calendar years 1983-2000 presented in the 1983-90 annual OASDI Trustees Reports under the alternative II-B intermediate set of assumptions. Each line in the table pertains to the calendar year for which the cfr was estimated, while each column pertains to the calendar year of the Trustees Report in which the cfr was presented. For calendar year 1990, the 1983 Trustees Report presented a cfr of 38 percent--that is, the OASDI funds projected for the start of 1990 were equivalent to about 38 percent of the expenditures projected for that calendar year. This projection was revised in later reports, and in the 1990 report it was estimated at 74 percent. This means that, if a specific line is followed from left to right, it would tell us how the projected cfr for a particular calendar year has been modified from one report to the next.

The values underlined and shown in bold numbers pertain to years for which final estimates of the cfr were available at the time that the report was prepared. For example, at the time that the 1988 report was prepared, final estimates of the cfr were available for all years prior to 1988.

In the analysis of the cfr, the reader should be aware that this parameter is not a fundamental statistic and that, to a large extent, it is a residual or by-product. The funds available at the start of any year are, in fact, what is left of all the income that the program has had up to that point in time, after covering all the expenditures that the program has had. These funds represent the accumulated differences between income (including interest receipts) and expenditures since the program started in 1937. The cumulative-of-residuals nature of the funds makes the cfr difficult to project with accuracy.

It will be noted from Table 4 that there has been a tendency for the estimated cfr to increase from one report to the next. This points out the same phenomena as the evaluation of the cost rate: that, in general, the OASDI cost projections presented by the Trustees during 1983-90 have been somewhat pessimistic. Again, this observation should not be interpreted as evidence that the Trustees have a tendency to under-estimate the future size of the OASDI accumulated funds. Rather the apparent pessimism stems from continuous strong growth in the national economy since 1983, which could not have been easily foreseen. As a result, more funds were accumulated than could have been expected.

Table 4

OASDI CONTINGENCY FUND RATIOS PRESENTED IN TRUSTEES REPORTS DURING 1983-90
 BASED ON THE ALTERNATIVE II-B INTERMEDIATE SET OF ASSUMPTIONS
 (in percent of annual expenditures)

Calendar Year of Projected cfr	Calendar Year in Which Trustees Report Was Issued							
	1983	1984	1985	1986	1987	1988	1989	1990
1983	15	<u>14</u>						
1984	22	21	<u>21</u>	<u>21</u>	<u>21</u>	<u>21</u>	<u>21</u>	<u>21</u>
1985	21	21	<u>24</u>	<u>24</u>	<u>24</u>	<u>24</u>	<u>24</u>	<u>24</u>
1986	23	25	25	29	<u>29</u>	<u>29</u>	<u>29</u>	<u>29</u>
1987	23	27	27	29	31	<u>31</u>	<u>31</u>	<u>31</u>
1988	24	29	30	35	40	<u>41</u>	<u>41</u>	<u>41</u>
1989	29	41	41	46	53	56	57	<u>57</u>
1990	38	54	54	59	67	71	77	<u>74</u>
1991	51	69	71	75	83	89	98	<u>94</u>
1992	64	85	87	92	100	107	120	113
1993	80	101	104	109	117	127	141	132
1994	98	119	121	126	134	147	164	153
1995	117	138	139	143	152	169	188	173
1996	137	159	159	162	169	191	212	194
1997	160	183	181	184	189	214	237	216
1998	183	207	205	206	210	237	262	237
1999	208	232	230	230	233	261	287	258
2000	234	258	254	255	258	285	312	280

A brief analysis of the reliability for years for which final estimates are available is presented in Table 5. Just as with the projected cost rates, it should be expected that, as the projection moves into future calendar years and lead time increases, the reliability of the projected cfr would diminish. For example, the estimate presented in the 1983 report for 1989 should be less reliable than that presented in the 1988 report. Full reliability cannot be guaranteed, however, until all actual data are available and a final estimate is issued. This occurs, in general, in the year following the year of the estimate.

Table 5 shows that the reliability does indeed diminish as the lead time increases. In addition, it can be concluded that the growth in the rate of loss in reliability is more than linear, but less than exponential. Perhaps the loss in reliability could be compared to the sum of the digits in the number of years of lead time. For example, the average loss in reliability

for 4 years of lead time could be compared to the sum of the digits from one to four, that is, to 10; and for 5 years of lead time, the comparison would be with 15 (the sum of the digits from one to five).

However, in trying to develop any rule of thumb, the reader should take into consideration that the period analyzed here was one of general underestimation of future OASDI funds. Had the period covered included years of weak economic performance as well as strong years (which would have provided a more appropriate basis for a rule), the average loss in reliability would have been smaller, because of the effect of offsetting differences.

Table 5

DIFFERENCE BETWEEN FINAL AND PROJECTED CONTINGENCY FUND RATIOS BY LEAD TIME
(in percent of annual expenditures)

Calendar Year of Projected cfr	Lead Time Between Year Projected and Year of Report							
	None	1 Year	2 years	3 Years	4 Years	5 Years	6 Years	Average
1983	-1	--	--	--	--	--	--	-1
1984	0	-1	--	--	--	--	--	-1
1985	0	3	3	--	--	--	--	2
1986	0	4	4	6	--	--	--	4
1987	0	2	4	4	8	--	--	4
1988	0	1	6	11	12	17	--	8
1989	0	1	4	11	16	16	28	11
Average	0	2	4	8	12	16	28	6

It is also of interest to compare the estimates of the earliest projection in the period with those in the latest projection. This type of analysis does not yield a true appraisal, but does offer an indication of the relative stability of the projections. Table 6 provides a comparison of the projections in the 1983 and 1990 Trustees Reports for 1990-2010. This table shows that in the 7-year period, 1983-90, the Trustees have been recognizing the better-than-expected performance of the national economy, and have increased the estimates of the projected cfr for the short-range period (the next 10 to 15 years). Some of the increases have amounted to almost 60 percent of annual expenditures. However, the additional information and analysis obtained during the 7 years have caused the Trustees to become more pessimistic (or less optimistic) about the long-range future. Because of the sensitivity of the projected accumulation of funds to modifications in the assumptions used in the projections, the change in perspective about the long-range future has significantly affected the cfr projections and by the year 2010 the difference is close to 40 percent of annual expenditures.

This analysis clearly shows that the contingency fund ratio is highly sensitive to changes in the national economy and to the assumptions used to project OASDI costs. The author believes that it would be appropriate to use the cfr to develop tax schedules for 5 to 10 years into the future. However, it should be recognized that that tax schedules going beyond this short-range period, provide only an indication or sense of direction of the needed tax rates, and that those schedules must be reviewed periodically.

Table 6

COMPARISON OF CONTINGENCY FUND RATIOS
 PROJECTED IN 1983 AND 1990 TRUSTEES REPORTS
 (fund balance as percent of annual expenditures)

Calendar Year of Projected cfr	Projected cfr in		Diffe- rence
	1983 Report	1990 Report	
1990	38	74	36
1991	51	94	43
1992	64	113	49
1993	80	132	52
1994	98	153	55
1995	117	173	56
1996	137	194	57
1997	160	216	56
1998	183	237	54
1999	208	258	50
2000	234	280	46
2001	261	301	40
2002	289	321	32
2003	317	341	24
2004	345	361	16
2005	372	379	7
2006	399	397	-2
2007	425	415	-10
2008	449	430	-19
2009	472	443	-29
2010	491	455	-36

V. QUANTIFICATION OF AGGREGATE ELEMENTS

It has been stated in the previous two sections of this Actuarial Note that, although the financial performance of the OASDI program has been much better than projected in the annual reports to the Congress, this should not be interpreted as evidence that the Trustees have a tendency to overestimate the future costs of the program. The principal reason given for the overestimation of costs is that the national economy was on an almost continuous recovery, which could not have been foreseen. A simple quantification of this statement is presented in this section.

The quantification is presented in aggregate terms, and it refers to the principal parameter of the evaluation, that is, the OASDI annual cost rate. Because this parameter is the ratio of the annual expenditures to the annual taxable payroll, a simple quantification would need to refer to these two aggregate elements separately. These two elements could be further subdivided into smaller components, but only at the risk of losses in simplicity and precision. There are many factors that affect the performance of the national economy, most of which cannot be measured with precision, and whose effects are not easy to establish at any given time.

Table 7 shows that the OASDI expenditures in 1983-89, after adjustment for the effect of the automatic benefit increases, were about 0.7 percent lower than projected in the 1983 report. On the other hand, the taxable payroll, after adjustment for increases in the Consumer Price Index, was about 4.4 percent higher than projected in 1983. This means that, of the total average difference of around 5.1 percent, close to 90 percent was in the taxable payroll, which is affected principally by the performance of the national economy. Some may argue that this latter proportion may be even higher, if account is taken that, during periods of economic recovery, older workers tend to stay in the labor force, rather than to retire and, therefore, part of the 10 percent proportion due to lower expenditures could be ascribed to a better-than-expected national economy.

The author believes that the better-than-expected national economy could not have been reasonably foreseen at the time that the 1983 report was prepared. At that time the national economy was showing signs of moving out of a recession, and the magnitude of the recovery that actually occurred was much greater than most past recoveries, and, therefore, could not be predicted. For example, the unemployment rate dropped during 1983-89 from about 10.0 percent to about 5.5 percent. Real wages increased at an average annual rate of 2.0 percent. In that period, the average annual increase in real gross national product (GNP) was 4.0 percent. These accomplishments in the national economy could not be foreseen in early 1983 and cannot be expected to continue in the future.

Table 7

COMPARISON OF OASDI EXPENDITURES AND TAXABLE PAYROLL
1983 REPORT vs 1990 REPORT
BASED ON THE ALTERNATIVE II-B INTERMEDIATE SET OF ASSUMPTIONS
(dollar figures in billions)

Calendar Year	1983 Trustees Report			1990 Trustees Report			Ratio of Adjusted Values, 1990 over 1983
	Value Presented	Adjustment Factor	Adjusted Value	Value Presented	Adjustment Factor	Adjusted Value	
Expenditures							
1983	\$169.5	1.0000	\$169.5	\$71.2	1.0000	\$171.2	1.0100
1984	180.3	1.0350	174.2	180.4	1.0350	174.3	1.0006
1985	193.8	1.0826	179.0	190.6	1.0712	177.9	0.9939
1986	209.9	1.1400	184.1	201.5	1.1044	182.5	0.9913
1987	225.2	1.1936	188.7	209.1	1.1188	186.9	0.9905
1988	240.8	1.2461	193.2	222.5	1.1658	190.9	0.9881
1989	256.5	1.2972	197.7	236.2	1.2124	194.8	0.9853
Average	210.9	1.1474	183.8	201.6	1.1041	182.6	0.9935
Taxable Payroll							
1983	\$1475	1.0310	\$1431	\$1489	1.0300	\$1446	1.0105
1984	1575	1.0764	1463	1605	1.0650	1507	1.0301
1985	1710	1.1334	1509	1719	1.1023	1559	1.0331
1986	1840	1.1878	1549	1838	1.1199	1641	1.0594
1987	1977	1.2401	1594	1958	1.1602	1688	1.0590
1988	2117	1.2909	1640	2097	1.2067	1738	1.0598
1989	2269	1.3426	1690	2256	1.2646	1784	1.0556
Average	1852	1.1918	1554	1852	1.1411	1623	1.0444

Note: Adjustment factors are based on (a) the automatic benefit increases for the expenditures and (b) the Consumer Price Index for the taxable payroll.

VI. CONCLUSIONS

Simple comparisons show that the OASDI projections presented by the Board of Trustees in 1983-90 have generally been pessimistic from the point of view of the annual cost rate as well as of the contingency fund ratio. It is believed that the better-than-projected actual experience can be more readily ascribed to a continuing recovery in the national economy than to a tendency by the Trustees to prefer pessimistic assumptions for their projections.

The Trustee's projections of the OASDI cost rate, as a percentage of taxable earnings, were reliable. The difference between the projected rates and the actual experience (or the latest projection) were, generally, less than 0.8 percent of taxable earnings.

The projections were less reliable, in terms of the contingency fund ratio. The difference between the projections and the actual experience amounted in some instances to almost 60 percent of annual expenditures. This high degree of unreliability is inherent in the contingency fund ratio and is not significantly related to any preference by the Trustees for either pessimistic or optimistic assumptions.

Because of its cumulative nature, the contingency fund ratio should not be used to judge the financial stability of the OASDI programs, with the exception of short-term periods covering no more than 5 to 10 years into the future.