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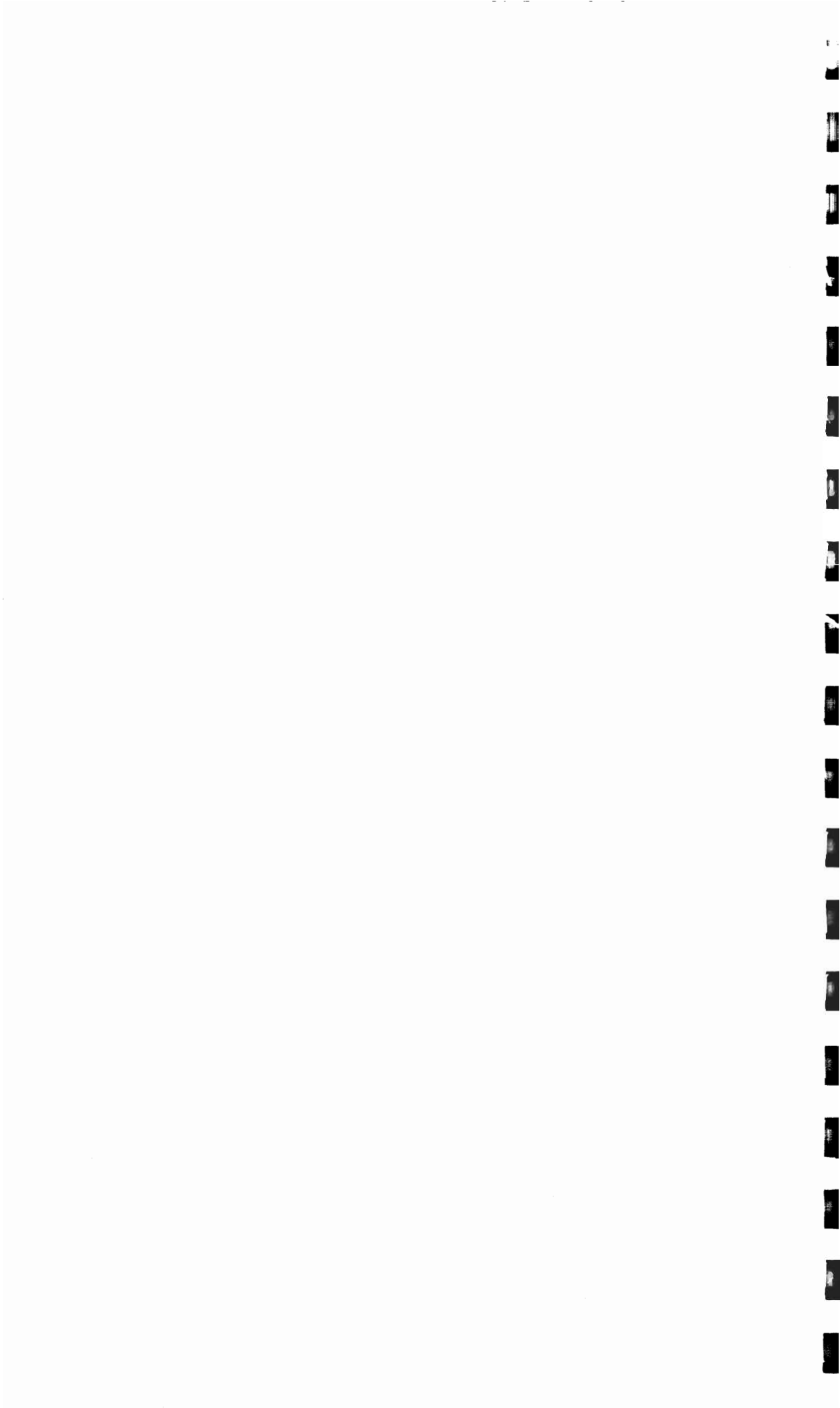
Old Age Security Program

First
Statutory Actuarial Report

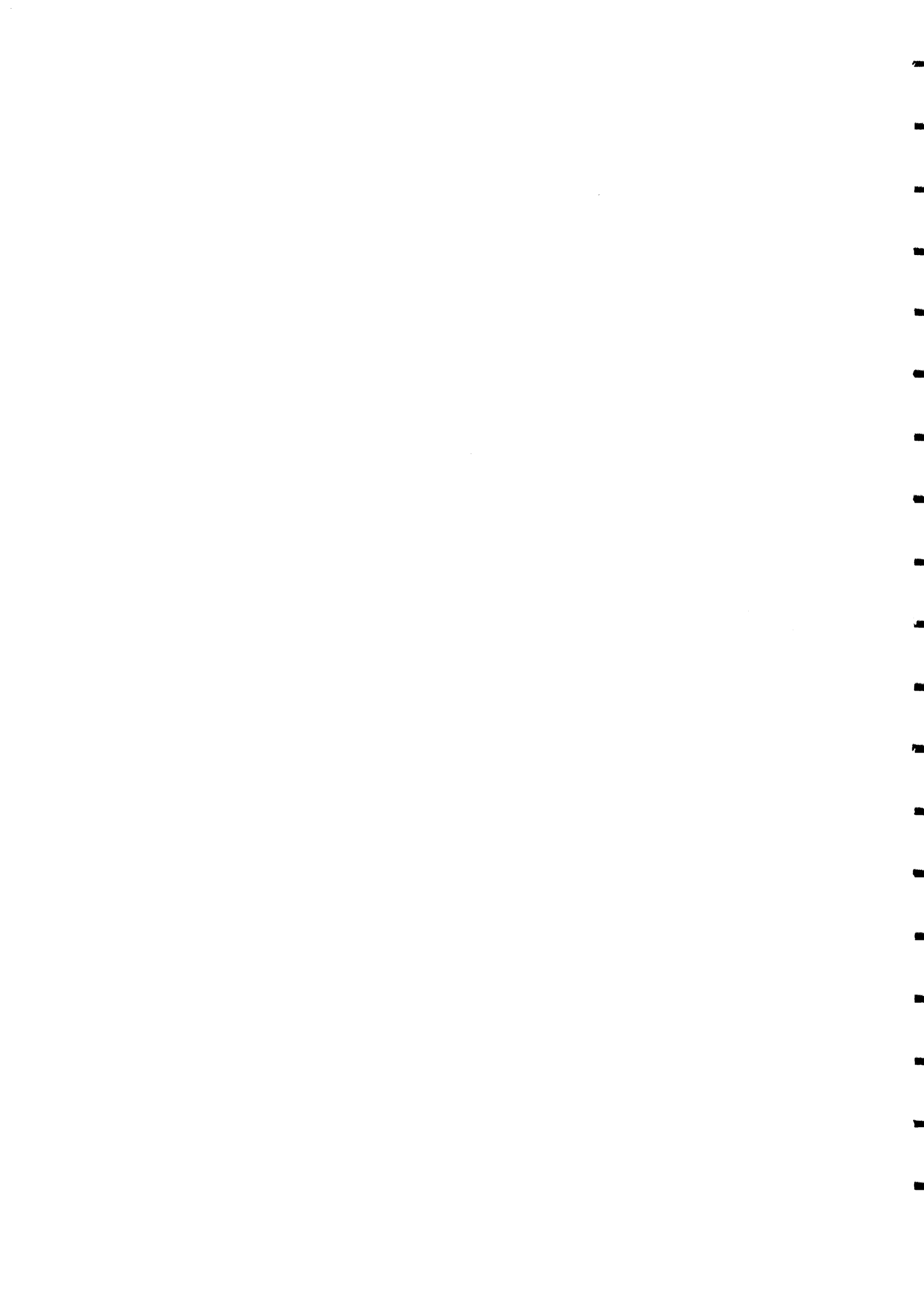## as at December 31, 1988

Canada

OLD AGE SECURITY PROGRAM

FIRST STATUTORY ACTUARIAL REPORT
AS AT 31 DECEMBER 1988

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Appendices

OLD AGE SECURITY PROGRAM

**FIRST STATUTORY ACTUARIAL REPORT
AS AT 31 DECEMBER 1988**

I. INTRODUCTION

This is the First Statutory Actuarial Report since the inception of the
Old Age Security (OAS) in 1951. It has been prepared in compliance with
the Public Pensions Reporting Act which requires the Chief Actuary in
the Office of the Superintendent of Financial Institutions to conduct
actuarial reviews in respect of the pension plan established under
Part I of the Old Age Security Act not later than as at 31 December 1988
and, thereafter, every three years. For Parts II (the Guaranteed Income
Supplement) and II.1 (the Spouse's Allowance) of the Old Age Security
Act, the date of the first report is to be fixed by the Governor in
Council.

The remainder of this report is divided into four sections:

- Section II summarizes the rationale for the choice of the Key Economic
  and Demographic Assumptions used for financial projections.

- Section III presents the Main Table of Financial Projections based
  on a single set of assumptions.

- Section IV provides five Auxiliary Tables designed to test the
  sensitivity of the main projections to some variations in key
  assumptions.

- Section V contains Observations and Conclusions, as well as the
  Actuarial Opinion recommended by the Canadian Institute of
  Actuaries.

There are two appendices. Appendix A summarizes the main provisions of
the OAS Program and Appendix B describes the assumptions and procedures
underlying the table in Section III.

II. RATIONALE FOR THE CHOICE OF KEY ECONOMIC AND DEMOGRAPHIC ASSUMPTIONS

Certain economic and demographic assumptions that must be used in projecting the financial costs of pensions pursuant to the Old Age Security Act into the future (to the year 2100) are of critical importance. These key assumptions are the rate of inflation, the rate of earnings increase, the fertility rate and the level of net immigration. It is not easy to predict what these rates are likely to be from now to 2100.

Because of the importance of these assumptions on the future financing of the OAS pensions, we reviewed a number of studies and learned papers produced by various organizations and individuals in the public and private sectors. We also held discussions with experts in economics and demography.

As a result of this concentrated review of what the future is likely to hold, we determined the assumptions for the ultimate period in the projection span. The ultimate period in the projection span is from approximately the year 2000 to 2100. (For certain of these key assumptions, the beginning of the ultimate period may be earlier than 2000; for others it may be later.)

In respect of the period between 1 January 1990 and the beginning of the ultimate period, the key economic assumptions for inflation and earnings increases are based on projections contained in the February 1990 budget. They reflect the likely effect of the expected replacement on 1 January 1991 of the current federal sales tax by the 7 per cent Goods and Services Tax. These assumptions are blended into assumptions for the ultimate period.

Key Economic Assumptions for the Ultimate Period

On the basis of the best evidence currently available, it would appear that the key long-term economic assumptions for the ultimate period should be such as to produce a differential between the rate of increase in earnings and the rate of inflation of 1 per cent per year. In recent valuations, however, for purposes of cost projections of social security programs and various pension plans, we used ultimate economic assumptions that produced a differential of 1.5 per cent.

Because the future cannot be predicted with a high degree of probability, we decided that, for the cost projections as at 31 December 1988 in respect of the OAS pensions, it would be appropriate to adopt ultimate economic assumptions that would fall part way between those that were thought appropriate in the recent past and those that would reflect what appears to be currently developing trends. We have, therefore, decided to use for this valuation, ultimate economic assumptions that would produce a differential between the rate of increase in earnings and the rate of inflation of 1.3 per cent. The nominal ultimate rates that we are using are increases in earnings at 4.8 per cent per year and inflation at 3.5 per cent per year. These ultimate economic assumptions are the same as we have used in the valuation of the Canada Pension Plan as at 31 December 1988. These assumptions will be reviewed at the next valuation in light of the then developing trends.

Key Demographic Assumptions for the Ultimate Period

A review of the varied opinions held by population experts suggests that the ultimate total fertility rate might well be about 1.75. This fertility rate corresponds approximately to the rate observed in 1980. The rate of 1.75 is somewhat higher than the rate of 1.656 observed in 1987. The 1987 rate reflects the continuing decrease in fertility rates that has occurred since the early 1960s.

There is a considerable divergence of views on whether the decrease will continue, the rate will stabilize at the current level, or whether the rate will rebound. (Ignoring immigration, a fertility rate of approximately 2.1 is required to maintain a stable population).

In recent valuations of the Canada Pension Plan, preceding that as at 31 December 1988, we used an ultimate total fertility rate of 2.0 for purposes of projections. Because it is very difficult to predict what the future total rate of fertility will be, we decided that, for the cost projections as at 31 December 1988 in respect of the OAS pensions, it would be appropriate to adopt an ultimate total fertility rate that would fall part way between that which was thought appropriate in the recent past and that which the current evidence suggests may be developing. We have, therefore, decided to assume, for this valuation, an ultimate total fertility rate of 1.85. We have assumed that the current total fertility rate will increase gradually to reach the ultimate rate of 1.85 in 2010.

Although the number of immigrants admitted to Canada in any one year varies with prevailing conditions and government policy, we decided that, on the basis of current government plans for intake of immigrants (and taking into account emigration from Canada), it would be appropriate to assume that, for the projection period, the net annual immigration to Canada in any year will be 0.4 per cent of the Canadian population in that year. At present, this assumption would produce net immigration of approximately 105,000 per year.

The demographic assumptions for fertility and immigration are the same as we have used in the valuation of the Canada Pension Plan as at 31 December 1988. They will be reviewed at the next valuation in light of the then developing trends.

All the economic and demographic assumptions, including these key assumptions, are detailed in Appendix B.

Auxiliary Tables

To enable the reader to gauge the sensitivity of the various economic and demographic assumptions on the cost projections, Section IV of this report contains Auxiliary Tables of Financial Projections.

III. MAIN TABLE OF FINANCIAL PROJECTIONS

The Main Table of projections is based on the set of assumptions discussed in part in Section II. We regard the assumptions on which the Main Table of financial projections is based as appropriate at this time to estimate the long-range costs (to 2100) of the OAS pensions. The assumptions underlying these main projections are described in more detail in Appendix B. Some of the key ultimate assumptions are:

Rate of increase in earnings:	4.8%
Rate of increase in prices:	3.5%
Mortality:	1985-87 Canada Life Tables adjusted for future mortality reductions
Net annual immigration to Canada (percentage of population):	0.4%
Total fertility rate:	1.85

MAIN TABLE OF FINANCIAL PROJECTIONS

YEAR	POPULATION 65 AND OVER	NUMBER OF BENEFI- CIARIES	AVERAGE BENEFIT $	TOTAL BENEFITS $ M	ADMIN. EXPENSES $ M	TOTAL EXPEN- DITURES $ M	TOTAL COST AS A % OF TOTAL EARNINGS(*) %
1989	3006655	2948420	3927	11579	58	11637	3.44
1990	3091018	3029197	4117	12471	62	12533	3.51
1991	3175361	3111852	4327	13464	67	13532	3.60
1992	3255123	3190020	4474	14272	71	14343	3.65
1993	3335194	3268489	4617	15091	75	15166	3.67
1994	3409748	3341552	4746	15860	79	15939	3.68
1995	3489476	3419686	4889	16718	84	16801	3.69
1996	3567090	3495747	5060	17688	88	17776	3.68
1997	3639628	3566835	5237	18679	93	18773	3.67
1998	3708838	3634660	5420	19701	99	19799	3.65
1999	3766085	3690762	5610	20705	104	20808	3.62
2000	3823828	3747351	5806	21758	109	21867	3.59
2005	4121367	4038939	6896	27853	139	27992	3.49
2010	4582742	4491086	8190	36783	184	36967	3.54
2015	5329745	5223149	9727	50808	254	51062	3.81
2020	6184877	6061178	11553	70025	350	70376	4.15
2025	7118101	6975738	13721	95717	479	96196	4.50
2030	8030811	7870194	16297	128258	641	128900	4.75
2035	8420672	8252258	19355	159725	799	160524	4.61
2040	8548725	8377750	22988	192588	963	193551	4.31
2045	8574080	8402597	27303	229413	1147	230560	3.99
2050	8607071	8434929	32427	273518	1368	274886	3.72
2055	8728319	8553752	38513	329430	1647	331077	3.50
2060	8891579	8713746	45741	398577	1993	400570	3.30
2065	9037007	8856267	54326	481126	2406	483532	3.11
2070	9183034	8999372	64522	580660	2903	583563	2.92
2075	9376112	9188589	76632	704141	3521	707662	2.76
2080	9615374	9423065	91015	857639	4288	861928	2.63
2085	9871147	9673723	108097	1045701	5229	1050929	2.50
2090	10118034	9915673	128385	1273024	6365	1279389	2.37
2095	10347409	10140460	152481	1546225	7731	1553956	2.25
2100	10576444	10364914	181099	1877073	9385	1886458	2.12

(*) Although it is useful to express the total cost as a percentage of total employment earnings in Canada, it should be noted that the OAS program is financed from general federal tax revenues.

IV. AUXILIARY PROJECTIONS

The five Auxiliary Tables of Financial Projections are presented for purposes of measuring the effect of certain variations in key assumptions. The Auxiliary Projections are based on ultimate assumptions that differ in the following respects from those used for purposes of the Main Table:

(a) Auxiliary Table 1 is based on the same assumptions as the Main Table except that the ultimate rate of inflation is 1 per cent higher than assumed in the Main Table.

(b) Auxiliary Table 2 is also based on the same assumptions as the Main Table except that the ultimate rate of inflation is 1 per cent less than assumed in the Main Table.

(c) Auxiliary Table 3 uses the same assumptions as the Main Table except that the rate of decrease in future mortality is half of that assumed for the purposes of the Main Table.

(d) Auxiliary Table 4 uses the same assumptions as the Main Table except that the rate of fertility is assumed to remain at the 1987 level of 1.656 until the end of the projection period.

(e) Auxiliary Table 5 uses the same assumptions as the Main Table except that the ultimate differential between the rate of increase in earnings and the rate of inflation is 1 per cent instead of 1.3 per cent, and that the ultimate total fertility rate is 1.75 instead of 1.85.

AUXILIARY TABLE 1

YEAR	POPULATION 65 AND OVER	NUMBER OF BENEFI- CIARIES	AVERAGE BENEFIT $	TOTAL BENEFITS $ M	ADMIN. EXPENSES $ M	TOTAL COST	
						TOTAL EXPEN- DITURES $ M	AS A % OF TOTAL EARNINGS(*) %
1989	3006655	2948420	3927	11579	58	11637	3.44
1990	3091018	3029197	4117	12471	62	12533	3.51
1991	3175361	3111852	4327	13464	67	13532	3.60
1992	3255123	3190020	4474	14272	71	14343	3.65
1993	3335194	3268489	4617	15091	75	15166	3.67
1994	3409748	3341552	4746	15860	79	15939	3.68
1995	3489476	3419686	4889	16718	84	16801	3.69
1996	3567090	3495747	5109	17859	89	17948	3.72
1997	3639628	3566835	5339	19042	95	19137	3.74
1998	3708838	3634660	5579	20277	101	20379	3.76
1999	3766085	3690762	5830	21517	108	21624	3.76
2000	3823828	3747351	6092	22830	114	22944	3.77
2005	4121367	4038939	7592	30663	153	30817	3.84
2010	4582742	4491086	9461	42490	212	42702	4.09
2015	5329745	5223149	11790	61581	308	61888	4.62
2020	6184877	6061178	14692	89053	445	89498	5.28
2025	7118101	6975738	18309	127720	639	128359	6.00
2030	8030811	7870194	22816	179570	898	180468	6.64
2035	8420672	8252258	28433	234639	1173	235812	6.77
2040	8548725	8377750	35433	296848	1484	298332	6.65
2045	8574080	8402597	44156	371022	1855	372877	6.46
2050	8607071	8434929	55026	464138	2321	466459	6.31
2055	8728319	8553752	68572	586546	2933	589479	6.23
2060	8891579	8713746	85453	744612	3723	748335	6.17
2065	9037007	8856267	106489	943094	4715	947810	6.09
2070	9183034	8999372	132704	1194251	5971	1200222	6.00
2075	9376112	9188589	165372	1519536	7598	1527133	5.96
2080	9615374	9423065	206083	1941931	9710	1951640	5.95
2085	9871147	9673723	256815	2484358	12422	2496779	5.94
2090	10118034	9915673	320037	3173380	15867	3189246	5.92
2095	10347409	10140460	398822	4044240	20221	4064461	5.88
2100	10576444	10364914	497002	5151387	25757	5177143	5.83

(*) Although it is useful to express the total cost as a percentage of total employment earnings in Canada, it should be noted that the OAS program is financed from general federal tax revenues.

AUXILIARY TABLE 2

YEAR	POPULATION 65 AND OVER	NUMBER OF BENEFI- CIARIES	AVERAGE BENEFIT $	TOTAL BENEFITS $ M	ADMIN. EXPENSES $ M	TOTAL COST	
						TOTAL EXPEN- DITURES $ M	AS A % OF TOTAL EARNINGS(*) %
1989	3006655	2948420	3927	11579	58	11637	3.44
1990	3091018	3029197	4117	12471	62	12533	3.51
1991	3175361	3111852	4327	13464	67	13532	3.60
1992	3255123	3190020	4474	14272	71	14343	3.65
1993	3335194	3268489	4617	15091	75	15166	3.67
1994	3409748	3341552	4746	15860	79	15939	3.68
1995	3489476	3419686	4889	16718	84	16801	3.69
1996	3567090	3495747	5011	17517	88	17605	3.65
1997	3639628	3566835	5136	18320	92	18412	3.60
1998	3708838	3634660	5265	19135	96	19231	3.55
1999	3766085	3690762	5396	19916	100	20016	3.48
2000	3823828	3747351	5531	20727	104	20831	3.42
2005	4121367	4038939	6258	25275	126	25402	3.17
2010	4582742	4491086	7080	31798	159	31957	3.06
2015	5329745	5223149	8011	41841	209	42050	3.14
2020	6184877	6061178	9063	54934	275	55209	3.25
2025	7118101	6975738	10254	71531	358	71888	3.36
2030	8030811	7870194	11602	91307	457	91764	3.38
2035	8420672	8252258	13126	108321	542	108862	3.12
2040	8548725	8377750	14851	124418	622	125040	2.79
2045	8574080	8402597	16803	141185	706	141891	2.46
2050	8607071	8434929	19010	160352	802	161153	2.18
2055	8728319	8553752	21508	183978	920	184898	1.95
2060	8891579	8713746	24335	212048	1060	213108	1.76
2065	9037007	8856267	27533	243836	1219	245055	1.57
2070	9183034	8999372	31150	280335	1402	281736	1.41
2075	9376112	9188589	35244	323841	1619	325460	1.27
2080	9615374	9423065	39875	375746	1879	377624	1.15
2085	9871147	9673723	45115	436429	2182	438611	1.04
2090	10118034	9915673	51043	506128	2531	508659	0.94
2095	10347409	10140460	57751	585618	2928	588546	0.85
2100	10576444	10364914	65339	677238	3386	680624	0.77

(*) Although it is useful to express the total cost as a percentage of total
    employment earnings in Canada, it should be noted that the OAS program
    is financed from general federal tax revenues.

AUXILIARY TABLE 3

YEAR	POPULATION 65 AND OVER	NUMBER OF BENEFI- CIARIES	AVERAGE BENEFIT $	TOTAL BENEFITS $ M	ADMIN. EXPENSES $ M	TOTAL EXPEN- DITURES $ M	TOTAL COST AS A % OF TOTAL EARNINGS(*) %
1989	3001485	2948420	3927	11579	58	11637	3.44
1990	3082491	3020840	4124	12458	62	12520	3.50
1991	3162741	3099485	4334	13434	67	13501	3.60
1992	3237669	3172914	4482	14220	71	14291	3.63
1993	3312198	3245953	4625	15013	75	15088	3.65
1994	3380568	3312955	4755	15751	79	15830	3.65
1995	3453449	3384379	4897	16574	83	16657	3.66
1996	3523618	3453145	5069	17502	88	17590	3.65
1997	3588179	3516415	5246	18447	92	18539	3.63
1998	3648941	3575962	5430	19416	97	19513	3.60
1999	3697345	3623397	5620	20362	102	20464	3.57
2000	3745868	3670950	5816	21351	107	21458	3.53
2005	3992893	3913034	6908	27031	135	27166	3.40
2010	4397648	4309694	8204	35358	177	35535	3.42
2015	5080513	4978902	9744	48515	243	48758	3.66
2020	5863682	5746408	11573	66503	333	66836	3.97
2025	6713156	6578892	13745	90427	452	90879	4.28
2030	7528146	7377583	16325	120438	602	121040	4.50
2035	7820134	7663731	19389	148590	743	149333	4.33
2040	7854796	7697699	23028	177260	886	178146	4.01
2045	7798514	7642543	27350	209020	1045	210066	3.69
2050	7765283	7609977	32483	247193	1236	248429	3.41
2055	7832669	7676014	38579	296134	1481	297615	3.19
2060	7947594	7788642	45820	356875	1784	358659	3.01
2065	8041828	7880990	54420	428881	2144	431025	2.82
2070	8126273	7963747	64633	514724	2574	517298	2.64
2075	8245428	8080519	76764	620294	3101	623396	2.49
2080	8405603	8237490	91172	751026	3755	754781	2.35
2085	8581702	8410067	108283	910669	4553	915223	2.23
2090	8748614	8573641	128606	1102623	5513	1108136	2.11
2095	8895594	8717681	152743	1331568	6658	1338225	1.99
2100	9036973	8856233	181411	1606615	8033	1614648	1.87

(*) Although it is useful to express the total cost as a percentage of total employment earnings in Canada, it should be noted that the OAS program is financed from general federal tax revenues.

AUXILIARY TABLE 4

YEAR	POPULATION 65 AND OVER	NUMBER OF BENEFI- CIARIES	AVERAGE BENEFIT $	TOTAL BENEFITS $ M	ADMIN. EXPENSES $ M	TOTAL COST TOTAL EXPEN- DITURES $ M	AS A % OF TOTAL EARNINGS(*) %
1989	3006655	2948420	3927	11579	58	11637	3.44
1990	3091018	3029197	4117	12471	62	12533	3.51
1991	3175359	3111851	4327	13464	67	13532	3.60
1992	3255123	3190020	4474	14272	71	14343	3.65
1993	3335191	3268486	4617	15091	75	15166	3.67
1994	3409743	3341547	4746	15860	79	15939	3.68
1995	3489467	3419677	4889	16718	84	16801	3.69
1996	3567077	3495734	5060	17688	88	17776	3.68
1997	3639606	3566813	5237	18679	93	18772	3.67
1998	3708810	3634633	5420	19700	99	19799	3.65
1999	3766038	3690716	5610	20705	104	20808	3.62
2000	3823763	3747287	5806	21758	109	21866	3.59
2005	4121128	4038705	6896	27851	139	27990	3.49
2010	4582130	4490487	8190	36778	184	36962	3.55
2015	5328455	5221885	9727	50796	254	51049	3.84
2020	6182505	6058854	11553	69999	350	70348	4.20
2025	7114131	6971848	13721	95664	478	96142	4.59
2030	8024565	7864073	16297	128159	641	128799	4.90
2035	8411210	8242985	19355	159546	798	160344	4.81
2040	8534743	8364048	22988	192273	961	193235	4.57
2045	8553946	8382866	27303	228874	1144	230018	4.29
2050	8578790	8407213	32427	272620	1363	273983	4.06
2055	8681942	8508302	38513	327679	1638	329318	3.88
2060	8787782	8612025	45741	393924	1970	395894	3.70
2065	8840698	8663883	54326	470675	2353	473028	3.50
2070	8864604	8687311	64522	560525	2803	563328	3.30
2075	8905985	8727865	76632	668835	3344	672179	3.12
2080	8979830	8800233	91015	800952	4005	804957	2.97
2085	9071384	8889955	108097	960978	4805	965783	2.82
2090	9152505	8969455	128385	1151544	5758	1157301	2.68
2095	9212457	9028207	152481	1376627	6883	1383510	2.54
2100	9265432	9080123	181099	1644399	8222	1652620	2.40

(*) Although it is useful to express the total cost as a percentage of total employment earnings in Canada, it should be noted that the OAS program is financed from general federal tax revenues.

AUXILIARY TABLE 5

YEAR	POPULATION 65 AND OVER	NUMBER OF BENEFI- CIARIES	AVERAGE BENEFIT $	TOTAL BENEFITS $ M	ADMIN. EXPENSES $ M	TOTAL EXPEN- DITURES $ M	TOTAL COST AS A % OF TOTAL EARNINGS (*) %
1989	3006655	2948420	3927	11579	58	11637	3.44
1990	3091018	3029197	4117	12471	62	12533	3.51
1991	3175361	3111852	4327	13464	67	13532	3.60
1992	3255123	3190020	4474	14272	71	14343	3.65
1993	3335192	3268487	4617	15091	75	15166	3.67
1994	3409745	3341549	4746	15860	79	15939	3.68
1995	3489470	3419680	4889	16718	84	16801	3.69
1996	3567083	3495740	5060	17688	88	17776	3.69
1997	3639618	3566825	5237	18679	93	18773	3.69
1998	3708825	3634647	5420	19701	99	19799	3.68
1999	3766061	3690739	5610	20705	104	20808	3.66
2000	3823792	3747315	5806	21758	109	21867	3.64
2005	4121244	4038818	6896	27852	139	27991	3.59
2010	4582425	4490775	8190	36781	184	36964	3.70
2015	5329081	5222498	9727	50801	254	51055	4.05
2020	6183655	6059981	11553	70012	350	70362	4.48
2025	7116047	6973725	13721	95689	478	96168	4.95
2030	8027587	7867034	16297	128207	641	128848	5.33
2035	8415775	8247458	19355	159633	798	160431	5.28
2040	8541488	8370658	22988	192425	962	193387	5.05
2045	8563649	8392375	27303	229133	1146	230279	4.78
2050	8592417	8420568	32427	273052	1365	274418	4.55
2055	8704270	8530184	38513	328522	1643	330165	4.38
2060	8837852	8661094	45741	396168	1981	398149	4.22
2065	8935477	8756767	54326	475721	2379	478100	4.03
2070	9018403	8838034	64522	570250	2851	573101	3.85
2075	9132991	8950331	76632	685883	3429	689313	3.69
2080	9286417	9100688	91015	828298	4141	832440	3.56
2085	9456424	9267295	108097	1001767	5009	1006776	3.44
2090	9615937	9423617	128385	1209851	6049	1215900	3.32
2095	9755183	9560079	152481	1457728	7289	1465016	3.18
2100	9889859	9692061	181099	1755220	8776	1763996	3.06

(*) Although it is useful to express the total cost as a percentage of total employment earnings in Canada, it should be noted that the OAS program is financed from general federal tax revenues.

V. OBSERVATIONS, CONCLUSIONS AND ACTUARIAL OPINION

1. Highlights of the Main and Auxiliary Tables

The following table shows sample costs, expressed as percentages
of total employment earnings, as taken from the Main Table and each of
the five Auxiliary Tables.

| YEAR | MAIN TABLE % | AUXILIARY | | | | |
		TABLE 1 %	TABLE 2 %	TABLE 3 %	TABLE 4 %	TABLE 5 %
1990	3.51	3.51	3.51	3.50	3.51	3.51
1991	3.60	3.60	3.60	3.60	3.60	3.60
1992	3.65	3.65	3.65	3.63	3.65	3.65
1993	3.67	3.67	3.67	3.65	3.67	3.67
1994	3.68	3.68	3.68	3.65	3.68	3.68
1995	3.69	3.69	3.69	3.66	3.69	3.69
1996	3.68	3.72	3.65	3.65	3.68	3.69
1997	3.67	3.74	3.60	3.63	3.67	3.69
1998	3.65	3.76	3.55	3.60	3.65	3.68
1999	3.62	3.76	3.48	3.57	3.62	3.66
2000	3.59	3.77	3.42	3.53	3.59	3.64
2025	4.50	6.00	3.36	4.28	4.59	4.95
2050	3.72	6.31	2.18	3.41	4.06	4.55
2100	2.12	5.83	0.77	1.87	2.40	3.06

The costs expressed as a percentage of total employment earnings are
affected by the key economic and demographic assumptions used in the
estimates.

(a) Economic

Being of a flat-rate nature, OAS benefits are not related
to earnings. They vary in accordance with the rate of inflation.
Consequently, the costs, expressed as a percentage of total
employment earnings, are affected by the differential between the
assumed rates of increase in earnings and prices. (The Main Table
assumes a differential of 1.3 per cent in the ultimate period.)
A decrease in the differential between the assumed rates of
increase in earnings and prices produces an increase in costs
expressed as a percentage of total employment earnings. Conversely,
an increase in the differential produces a decrease.

(b) Demographic

The demographic assumptions with respect to continual reductions in
future mortality and an ultimate level of fertility lower than the
one that has prevailed, on average, for the current population,
contribute to a population-aging process that causes cost increases
as long as the process continues. Immigration has effects on costs
which vary from one year to the next, depending on the age
distribution of all immigrants in the population (especially
proportions under and over age 65). But on the basis of the assumed
levels of net immigration, these effects are generally very small.

The net effect of economic and demographic assumptions is a gradual increase in costs shown in the Main Table from 3.51 per cent of total employment earnings in 1990 to 4.75 per cent in 2030 followed by a gradual decrease reaching the current levels around 2055. The gradual decrease continues to the end of the projection period (2100) when the total costs becomes 2.12 per cent of total employment earnings. This decrease takes place even though the effect of the low assumed fertility rates would have almost stabilized by 2055. The reason for the continual decrease in total costs as a percentage of employment earnings is that the effect of the assumed 1.3 per cent differential between earnings and prices is greater than the effect of the assumed decreases in the rates of mortality.

2. Sensitivity Tests

Divergence of future experience from the assumptions underlying the Main Table would produce different results. Examples of such results are shown in Auxiliary Tables 1, 2, 3, 4 and 5.

It can be seen from the previous section that, all other things being equal, an increase of 1 per cent in the inflation rate would increase OAS costs, as a percentage of total employment earnings, by 0.18, 1.50, 2.59 and 3.71 per cent in 2000, 2025, 2050 and 2100, respectively. Conversely, a decrease of 1 per cent in the inflation rate would decrease OAS costs by 0.17, 1.14, 1.54 and 1.35 per cent, respectively, in the same years.

If mortality improvement was only 50 per cent of the level assumed in the Main Table, OAS costs would decrease by 0.06, 0.22, 0.31 and 0.25 per cent in 2000, 2025, 2050 and 2100, respectively.

On the other hand, as shown in Auxiliary Table 4, OAS costs would increase by 0.09, 0.34 and 0.28 per cent, respectively, in 2025, 2050 and 2100, if fertility rates remained at their current level of 1.656 in the future instead of the ultimate level of 1.85 assumed for 2010 and after in the Main Table. In the same vein, Auxiliary Table 5 shows that costs would increase much more than under Auxiliary Table 4 if the ultimate earnings-prices differential was decreased from 1.3 to 1.0 per cent even if the ultimate fertility rate is increased from 1.656 to 1.75; indeed, costs would increase by 0.45, 0.83 and 0.94 per cent, respectively, in 2025, 2050 and 2100.

The Auxiliary Tables indicate that OAS costs are more sensitive to the probable variations in economic assumptions than to the probable variations in demographic assumptions.
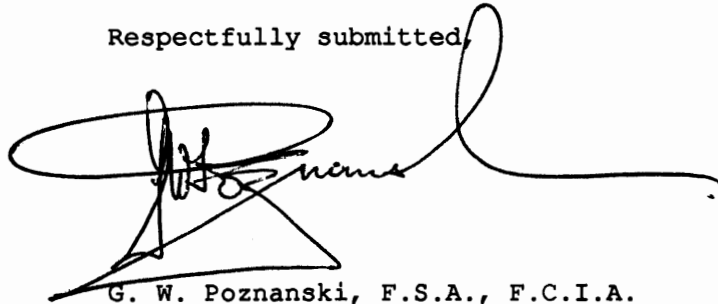
3. Actuarial Opinion

In my opinion, for the purposes of this actuarial report,

(a) the assumptions that have been used are adequate and appropriate; and

(b) the methods employed are consistent with sound actuarial principles.

This report has been prepared and this opinion given in accordance with generally accepted actuarial principles and the Recommendations of the Canadian Institute of Actuaries.

Respectfully submitted,

G. W. Poznanski, F.S.A., F.C.I.A.
Chief Actuary

Ottawa, Canada
19 June 1990

APPENDIX A

MAIN PROVISIONS OF THE OLD AGE SECURITY PROGRAM

1. INTRODUCTION

The Old Age Security Act came into force in December 1951; it is an important element of Canada's retirement income system. The other important element is the Canada Pension Plan.

Benefits provided pursuant to the Old Age Security Act include the Old Age Security Pension (OAS), the Guaranteed Income Supplement (GIS) and the Spouse's Allowance (SPA).

This report covers only the OAS program.

2. FINANCING

The OAS program is financed from federal general tax revenues.

3. BENEFITS

The Old Age Security Pension is a monthly benefit payable to persons who are eligible. To be eligible, previous employment history is not a factor, nor is it necessary to be retired.

(a) Eligibility

To qualify for an OAS pension, an individual must be aged 65 or over, and

(i) must be a Canadian citizen or a legal resident of Canada on the day preceding approval of his/her application, or,

(ii) if not residing in Canada, must have been a Canadian citizen or a legal resident on the day preceding the day he/she ceased to reside in Canada.

A minimum of 10 years of residence in Canada after reaching age 18 is required to receive a pension in Canada. To receive an OAS pension outside the country, a minimum of 20 years of residence in Canada is required. Persons who cannot meet the residence requirements to qualify for an Old Age Security pension and/or do not meet the requirements for the payment of the pension abroad, may use periods in a country with which Canada has concluded a social security agreement to satisfy these requirements. The amount of the OAS pension, however, is based only on years of residence in Canada.

(b) Amount of Benefits

The amount of an individual's pension is determined by the length of his/her residence in Canada.

A person who has resided in Canada, after reaching age 18, for periods that total at least 40 years may qualify for a full OAS pension.

A person who has not resided in Canada for 40 years after age 18 may still qualify for a full pension provided that on July 1, 1977 he/she was 25 years of age or over, and

   (i) was resident in Canada on that date, or

  (ii) had resided in Canada prior to that date and after reaching age 18, or

(iii) possessed a valid immigration visa on that date.

In such cases, the individual must have resided in Canada for at least 10 years immediately prior to approval of the application. Any absences in the 10-year period may be offset if the applicant had been present in Canada prior to those 10 years, after reaching age 18, for a total period equal to at least three times the length of the absences. In that case, however, the applicant must also have resided in Canada for at least one year immediately prior to the date on which the application for a pension is approved.

A person who cannot meet the requirements for the full OAS pension may qualify for a partial pension. A partial pension is earned at the rate of 1/40 of the full monthly pension for each complete year of residence in Canada after reaching age 18. Once a partial pension is approved, it may not be increased as the result of additional years of residence in Canada.

The full OAS monthly benefit payable during the last quarter of 1988 was $320.08. All OAS benefits payable are increased in January, April, July and October of each year in line with rises in the cost of living as measured by the Consumer Price Index.

APPENDIX B

ASSUMPTIONS AND PROCEDURES

INDEX

APPENDIX B

ASSUMPTIONS AND PROCEDURES

1. Economic Assumptions

The economic assumptions used for the Main Table for the years 1990 to 1994 are based on the assumptions of the February 1990 federal budget, linked to the ultimate assumptions over the following two years.

The most significant feature of the ultimate level of the economic assumptions adopted for the Main Table is the differential of 1.3 per cent between the rate of increase in earnings (4.8 per cent) and the rate of increase in prices (3.5 per cent).

The assumed absolute level of inflation is of relatively slight practical significance in determining the level of costs expressed as percentages of total employment earnings, as long as the real rate of increase in earnings remains unchanged.

Year	Annual increase in CPI (%)	Annual increase in average earnings (%)
1988(*)	4.1	4.8
1989(*)	5.0	5.0
1990	4.7	4.1
1991	5.1	3.8
1992	3.4	3.6
1993	3.2	3.9
1994	2.8	3.7
1995	3.0	4.0
1996 and after	3.5	4.8

(*) Rates for these years are actual experience rates.

2. POPULATION PROJECTION

(a) General

The OAS covers eligible population in all of Canada. Therefore, the population projections for purposes of cost estimates cover the whole country.

We made population projections from the 1986 census data, after first applying adjustment factors to compensate for the 1986 census undercount. The projections carry forward to 2100, providing a period of 112 years from the effective date of this valuation.

This section describes the underlying fertility, mortality and migration assumptions used in the population projections. Schedule 1 summarizes the results (all ages combined) and includes figures for selected past years. Schedules 5, 6A, 6B and 7 provide more detailed statistics for selected years by sex and age group.

SCHEDULE 1

Middle of Year	Census or Projected Population (in thousands)			Population Aged 65 and over as a percentage of Population Aged 20 to 64
	Male	Female	Total	
1951	7,089	7,921	14,009	14.3
1961	9,219	9,019	18,238	15.1
1971	10,795	10,773	21,568	15.4
1981	12,068	12,275	24,343	16.6
1986(*)	12,994	13,204	26,198	17.3
2000	14,868	15,241	30,109	20.7
2025	17,532	18,142	35,674	34.9
2050	18,889	19,773	38,662	40.3
2100	22,096	22,976	45,072	43.2

(*) 1986 population adjusted for undercount of 1986 census.

(b) **Fertility**

The age-fertility rate corresponds to the number of live births per
female at a given age of the female. The total fertility rate
corresponds to the sum of all live births per female over the entire
period of reproductive ages (for convenience, the rates are
multiplied by 1,000 in Schedule 2 below). The ultimate total
fertility rate used for this report is 1.85. However, we have chosen
2010 as the year from which these ultimate rates are assumed to
apply. For purposes of distributing the ultimate total fertility rate
into age-specific rates, the postulated rate of 1.85 was distributed
in the same proportion as the 1987 experience. For the years from
1988 to 2009, we obtained the rates by linear interpolation between
the actual 1987 values and the assumed ultimate values for 2010 and
after.

SCHEDULE 2

FERTILITY RATES

Age Group	Recently Experienced Fertility Rates					Fertility rates assumed for 2010 and after
	1970	1975	1980	1985	1987	
15-19	42.8	35.3	27.6	23.7	23.2	25.9
20-24	143.3	112.7	100.1	85.3	81.5	91.0
25-29	147.2	131.2	129.4	125.3	123.0	137.4
30-34	81.8	64.4	69.3	74.6	76.3	85.2
35-39	39.0	21.6	19.4	21.8	23.7	26.5
40-44	11.3	4.8	3.1	3.0	3.4	3.8
45-49	0.9	0.4	0.2	0.1	0.2	0.2
Total	2,331.5	1,852.0	1,745.5	1,669.0	1,656.5	1,850.0

(c) Mortality

Mortality rates shown in Life Tables, Canada and the Provinces, 1985-1987 (published by Statistics Canada and referred to here as 1985-87 Canada Life Tables) are assumed to apply in 1986. To reflect anticipated sustained improvements in life expectancy, we projected these 1986 mortality rates to the year 2100 using the following annual rates of decrease:

(i) for 1987 to 2010, the annual rates of decrease (varying by age, sex and calendar year) were determined by interpolation between

    A. the average reduction rates experienced in Canada between 1976 and 1986, and

    B. the constant rates of decrease, described in (ii) below, in respect of the period 2011 to 2100;

(ii) for 2011 and later years, the annual rates of decrease (varying by age and sex only, not by calendar year) are those identified as "Alternative II (medium)" in Actuarial Study No. 102 (Social Security Area Population Projection) prepared by the Office of the Actuary of the U.S. Social Security Administration. These rates of decrease were determined by analysing the current trends in mortality decrease separately for each of 10 broad causes of death.

To account for AIDS, ignored in all the phases of these projections, we increased male mortality for the years 1989 to 2018 by the increments estimated by the Canadian Institute of Actuaries' Task Force on AIDS in its November 1988 Report of the Subcommittee on Modeling. A constant level of new infections is assumed to hold from 1984 to 1988 and to decrease gradually from that level to 0 in 1999. On the basis of the cumulative number of deaths attributable to AIDS (as reported by the Federal Centre for AIDS), we also increased female mortality but by only 10 per cent of the above increments for males.

The resulting projected mortality rates assumed to apply to the year 2100 produce a life expectancy at birth of 80.3 for males and 86.9 for females, compared to 73.0 and 79.7 on the basis of the 1985-87 Canada Life Tables. At age 65 the life expectancy according to the mortality rates assumed to apply in 2100 is 19.3 for males and 24.5 for females, compared to 14.9 and 19.1 on the basis of the 1985-87 Canada Life Tables. Schedule 3 sets out sample values of the mortality rates assumed to apply in 2100 as well as the mortality rates on the basis of the 1940-42 and 1985-87 Canada Life Tables.

SCHEDULE 3

COMPARISON OF MORTALITY RATES
(ANNUAL DEATHS PER 1,000 PERSONS)

	Age	Canada Life Tables 1940-42	Canada Life Tables 1985-1987	Rates Assumed for Year 2100
Males	0	62.50	8.58	2.24
	1	7.21	0.67	0.27
	5	1.98	0.30	0.12
	10	1.22	0.18	0.08
	20	2.41	1.30	0.64
	30	2.60	1.30	0.83
	40	4.28	1.97	0.95
	50	8.95	5.32	2.50
	60	20.29	14.68	7.75
	70	47.59	36.73	21.21
	80	117.38	86.65	52.59
	90	250.48	191.97	114.49
Females	0	49.31	6.78	1.61
	1	6.34	0.62	0.24
	5	1.57	0.22	0.07
	10	0.90	0.14	0.05
	20	1.80	0.42	0.20
	30	2.60	0.51	0.26
	40	3.86	1.12	0.53
	50	7.01	3.12	1.68
	60	15.28	7.51	4.23
	70	38.12	18.67	10.23
	80	101.96	51.73	27.19
	90	233.91	144.15	72.61

The rates in Canada Life Tables and the assumed mortality
rates for 2100 consist of one-year probabilities of mortality for
individual ages 0 to 109. The 1986 census population data, available
by individual ages up to 89, were adjusted to spread the age group 90
and over by individual ages to 109. Survivors of the population for
a particular year were then obtained simply by applying the
probabilities of survival for that year to the given population.

(d) Migration

Immigration and emigration are generally recognized to be volatile parameters of future population growth since they are subject to a variety of demographic, economic, social and political factors. Immigration, especially, is subject to government control. During the period 1 June 1973 to 31 May 1989, for example, annual immigration varied from 83,000 to 214,000, and annual emigration is estimated to have fluctuated between 41,000 and 84,000. Net annual immigration during the most recent 10-year period averaged 76,752.

For purposes of this report, we decided to assume 155,000 immigrants and 50,000 emigrants for the 12-month period following 1 July 1986. We increased both these figures with time to maintain a constant ratio of net immigration to total current Canadian population of 0.4 per cent.

Schedule 4 shows the distributions of immigrants and emigrants by age group and sex used for this report. They are based on Statistics Canada data for 1983-88.

SCHEDULE 4

DISTRIBUTION OF IMMIGRANTS AND EMIGRANTS BY AGE GROUP AND BY SEX

	Immigrants		Emigrants	
Age Group	Males	Females	Males	Females
	(%)	(%)	(%)	(%)
0- 4	3.334	3.172	3.780	3.597
5- 9	3.547	3.307	4.387	4.299
10-14	3.695	3.450	4.197	3.947
15-19	4.656	4.733	3.638	3.522
20-24	6.580	7.543	4.327	5.501
25-29	7.668	7.414	7.212	7.553
30-34	5.697	5.391	6.687	6.525
35-39	3.572	3.478	6.194	4.985
40-44	2.073	2.053	4.011	3.208
45-49	1.427	1.729	2.190	1.845
50-54	1.257	1.967	1.412	1.212
55-59	1.453	2.142	0.987	0.873
60-64	1.556	1.906	0.595	0.711
65-69	1.042	1.248	0.560	0.710
70+	1.150	1.760	0.516	0.819
Total:	48.707	51.293	50.693	49.307

(e) Population Tables

Schedules 5, 6A and 6B show the 1986 starting Canadian population (1986 census adjusted for undercount) and the projected midyear populations for 1990, 2000, 2025, 2050, 2075 and 2100. The populations shown are distributed by sex and broad age groups. Schedule 7 shows corresponding dependency ratios.

SCHEDULE 5

POPULATION IN THOUSANDS

BOTH SEXES

	AGE GROUP	1986	1990	2000	2025	2050	2075	2100
	0- 4	1853	1938	1881	2026	2164	2307	2470
	5- 9	1834	1875	1978	2059	2176	2316	2483
	10-14	1826	1850	2002	2061	2176	2327	2502
	15-19	2002	1898	1950	2042	2190	2359	2539
TOTAL	0-19	7515	7561	7811	8188	8706	9309	9994
	20-24	2478	2104	1966	2079	2272	2449	2629
	25-29	2459	2581	2053	2201	2388	2552	2729
	30-34	2295	2475	2244	2334	2465	2612	2790
	35-39	2076	2259	2665	2353	2466	2611	2802
	40-44	1654	2016	2503	2257	2405	2580	2785
	45-49	1339	1580	2254	2184	2344	2559	2764
	50-54	1252	1297	1991	2164	2346	2549	2734
	55-59	1229	1235	1548	2251	2370	2516	2680
	60-64	1150	1182	1250	2544	2295	2425	2589
TOTAL	20-64	15932	16729	18474	20367	21351	22853	24502
	65-69	930	1057	1126	2248	2078	2241	2432
	70-74	753	791	985	1836	1830	2002	2225
	75-79	521	603	783	1385	1560	1749	1957
	80-84	315	367	493	844	1288	1434	1598
	85-89	155	186	288	465	1033	1018	1162
	90+	77	87	149	341	816	932	1202
TOTAL	65+	2751	3091	3824	7119	8605	9376	10576
GRAND TOTAL		26198	27381	30109	35674	38662	41538	45072

SCHEDULE 6A

POPULATION IN THOUSANDS

MALES

	AGE GROUP	1986	1990	2000	2025	2050	2075	2100
	0- 4	949	995	963	1040	1112	1186	1270
	5- 9	939	960	1012	1058	1119	1191	1277
	10-14	936	948	1028	1061	1120	1197	1287
	15-19	1028	973	998	1052	1126	1212	1305
TOTAL	0-19	3852	3876	4001	4211	4477	4786	5139
	20-24	1267	1077	1002	1063	1161	1252	1345
	25-29	1237	1312	1043	1118	1216	1301	1392
	30-34	1151	1243	1142	1185	1256	1332	1423
	35-39	1047	1131	1348	1195	1255	1329	1426
	40-44	839	1015	1249	1140	1222	1309	1413
	45-49	673	798	1120	1099	1184	1293	1398
	50-54	629	647	991	1083	1175	1281	1376
	55-59	605	612	766	1118	1177	1255	1339
	60-64	541	568	605	1245	1128	1196	1279
TOTAL	20-64	7989	8403	9266	10246	10774	11548	12391
	65-69	422	481	534	1064	998	1086	1180
	70-74	330	343	442	835	849	938	1048
	75-79	214	246	318	597	684	776	879
	80-84	117	135	179	332	519	587	668
	85-89	49	60	91	158	366	372	436
	90+	21	22	37	89	222	265	355
TOTAL	65+	1153	1287	1601	3075	3638	4024	4566
GRAND TOTAL		12994	13566	14868	17532	18889	20358	22096

SCHEDULE 6B

POPULATION IN THOUSANDS

FEMALES

	AGE GROUP	1986	1990	2000	2025	2050	2075	2100
	0- 4	904	943	918	986	1052	1121	1200
	5- 9	895	915	966	1001	1057	1125	1206
	10-14	890	902	974	1000	1056	1130	1215
	15-19	974	925	952	990	1064	1147	1234
TOTAL	0-19	3663	3685	3810	3977	4229	4523	4855
	20-24	1211	1027	964	1016	1111	1197	1284
	25-29	1222	1269	1010	1083	1172	1251	1337
	30-34	1144	1232	1102	1149	1209	1280	1367
	35-39	1029	1128	1317	1158	1211	1282	1376
	40-44	815	1001	1254	1117	1183	1271	1372
	45-49	666	782	1134	1085	1160	1266	1366
	50-54	623	650	1000	1081	1171	1268	1358
	55-59	624	623	782	1133	1193	1261	1341
	60-64	609	614	645	1299	1167	1229	1310
TOTAL	20-64	7943	8326	9208	10121	10577	11305	12111
	65-69	508	576	592	1184	1080	1155	1252
	70-74	423	448	543	1001	981	1064	1177
	75-79	307	357	465	788	876	973	1078
	80-84	198	232	314	512	769	847	930
	85-89	106	126	197	307	667	646	726
	90+	56	65	112	252	594	667	847
TOTAL	65+	1598	1804	2223	4044	4967	5352	6010
GRAND TOTAL		13204	13815	15241	18142	19773	21180	22976

SCHEDULE 7

DEPENDENCY RATIOS (%)

YEAR	BOTH SEXES		
	YOUNG[1]	OLD[2]	TOTAL[3]
1986	47.2	17.3	64.4
1990	45.2	18.5	63.7
2000	42.3	20.7	63.0
2025	40.2	34.9	75.2
2050	40.8	40.3	81.1
2075	40.7	41.0	81.8
2100	40.8	43.2	84.0

YEAR	MALES		
	YOUNG[1]	OLD[2]	TOTAL[3]
1986	48.2	14.4	62.7
1990	46.1	15.3	61.5
2000	43.2	17.3	60.5
2025	41.1	30.0	71.1
2050	41.6	33.8	75.3
2075	41.4	34.8	76.3
2100	41.5	36.9	78.3

YEAR	FEMALES		
	YOUNG[1]	OLD[2]	TOTAL[3]
1986	46.1	20.1	66.2
1990	44.3	21.7	65.9
2000	41.4	24.1	65.5
2025	39.3	39.9	79.2
2050	40.0	47.0	87.0
2075	40.0	47.3	87.4
2100	40.1	49.6	89.7

[1] Population aged 19 years and under as a percentage of population aged 20 to 64 years.

[2] Population aged 65 years and over as a percentage of population aged 20 to 64 years.

[3] Population aged 19 years and under plus population aged 65 years and over as a percentage of population aged 20 to 64 years.

3. PROJECTING OAS EXPENDITURES (BENEFITS AND ADMINISTRATIVE EXPENSES)

The eligibility rate to OAS benefits for a given year is defined as the ratio of the average number of OAS beneficiaries for the year to the total Canadian population at ages 65 and over as of July 1 of the year; the OAS eligibility rate was 97.95 per cent for 1988 and 98.06 per cent for 1989; it was also very close to 98 per cent for a good number of years before 1988. For purposes of OAS benefit projections, we therefore assumed that the OAS eligibility rate would remain constant at 98.00 per cent in the future.

The projected average number of OAS beneficiaries for any given year after 1989 is equal to the product of the OAS assumed eligibility rate and the total Canadian population, at ages 65 and over, projected for that year.

For 1989, the actual average annual rate of OAS benefit was $3,927.29, calculated as total benefits paid during the year divided by total average number of beneficiaries for the year. For years after 1989, the average annual rate of OAS benefit, taking into account the indexing of OAS pensions, is assumed to be equal to the product of the previous year's average annual rate of OAS benefit and one plus the assumed rate of increase in prices for that year.

Total OAS benefits projected for a given calendar year are equal to the average number of OAS beneficiaries projected for that year times the average annual rate of OAS benefit projected for that year.

The Old Age Security pension is subject to federal and provincial income tax. Moreover, for purposes of federal income taxes, the OAS is reimbursable at the rate of 15 per cent of the individual income exceeding a threshold which is increased annually in accordance with the increase in the consumer price index minus 3 percentage points; this threshold is $50,000 for 1989. The government has stated that it would review the threshold periodically and adjust it as appropriate. Since the reimbursement, generally referred to as "claw-back", is required under the Income Tax Act and not under the OAS Act, we have not taken it into account for purposes of financial projections in this report. We do not believe that the effect of the "claw-back" on take-up rates of OAS pensions is likely to be significant.

On the basis of past experience of the Program, we assumed OAS administrative expenses to be equal to 0.5 per cent of total OAS benefits projected for each future calendar year.

4. COSTS EXPRESSED AS PERCENTAGES OF TOTAL EMPLOYMENT EARNINGS

We divided absolute current dollar amounts of expenditures projected for
each calendar year by the year's projected total employment earnings to
give a simple relative measure of the pattern of OAS costs over the years.
It was well recognized that the Gross Domestic Product (GDP) would have
been a more suitable basis since OAS benefits are financed through general
revenues and not on the basis of total employment earnings. However, we have
retained total employment earnings as the comparative measure of cost because:

  (i) they can be projected with more accuracy than the GDP;

 (ii) they generally represent a simpler notion than the GDP and would
     therefore be more easily understood, and

(iii) they are generally deemed to change at a rate similar to that at which
     the GDP changes.

Total employment earnings were projected as follows:

(a) Average employment rates

For 1985, the Department of Supply and Services provided for 11 age
groups (18-19, 20-24, 25-29, ... , 65-69), by sex, the number of
persons having employment earnings in that year and their average
earnings. These data pertain to Canada excluding Quebec and were
combined with similar data for Quebec obtained from La Régie des
Rentes du Québec. We divided the resulting total number of Canadian
earners by the 1985 Canadian population for each age-sex cell to
produce average employment rates for 1985. We projected these average
employment rates from 1986 to 2100 taking into account the trends in
the rates during the 1970-1985 period and the continued increase in
female employment. The result was a complete set of average employment
rates by age and by sex for each year running from 1985 to 2100.
Schedule 8 shows sample values of these average employment rates.

SCHEDULE 8
AVERAGE EMPLOYMENT RATES

	AGE	1990	2000	2020	2050	2100
Males	18	0.810	0.857	0.857	0.857	0.857
	20	0.814	0.861	0.861	0.861	0.861
	25	0.936	0.970	0.970	0.970	0.970
	30	0.950	0.988	0.988	0.988	0.988
	35	0.938	0.980	0.980	0.980	0.980
	40	0.956	0.964	0.964	0.964	0.964
	45	0.940	0.951	0.951	0.951	0.951
	50	0.891	0.904	0.904	0.904	0.904
	55	0.847	0.873	0.873	0.873	0.873
	60	0.724	0.714	0.714	0.714	0.714
	65	0.390	0.355	0.355	0.355	0.355

Females	18	0.811	0.822	0.844	0.850	0.850
	20	0.846	0.876	0.935	0.940	0.940
	25	0.807	0.809	0.812	0.825	0.825
	30	0.749	0.758	0.778	0.798	0.798
	35	0.737	0.754	0.790	0.818	0.818
	40	0.765	0.768	0.786	0.820	0.820
	45	0.727	0.732	0.757	0.800	0.799
	50	0.644	0.679	0.703	0.746	0.749
	55	0.539	0.618	0.672	0.722	0.738
	60	0.372	0.387	0.411	0.427	0.433
	65	0.164	0.126	0.111	0.100	0.095

(b) Average employment earnings

For years subsequent to 1985, we assumed that average earnings
would increase at the same annual rate as the Industrial Aggregate of
average weekly earnings for Canada. For 1986, 1987, 1988 and 1989, we
used the known rate of increase in the Industrial Aggregate and, for
subsequent years, the rates of increase in average earnings postulated
in the economic assumptions.

However, we did not apply those aggregate rates of increase uniformly
by age and by sex because we assumed a gradual narrowing of the
differential between earnings for males and females. We developed rates
of increase in average earnings by age and by sex that would produce

   (i) an aggregate rate of increase equal to the rate postulated in the
       economic assumptions,

  (ii) rates of increase for each age, both sexes combined, that would
       be the same for all ages combined, and

 (iii) separate rates of increase for male and female average earnings
       for each age such that the ratio of female to male average
       earnings would move 1 per cent of the way to unity each year.

In this manner, average employment earnings were calculated by age and
by sex for each year from 1986 to 2100. Schedule 9 shows sample values
of the average employment earnings.

SCHEDULE 9

AVERAGE EMPLOYMENT EARNINGS

			YEAR		
AGE	1990	2000	2020	2050	2100
	$	$	$	$	$
Males 18	13131	18949	47683	189036	1907487
20	10090	14703	37484	150517	1540420
25	21954	31807	80317	320016	3245824
30	29837	42889	107807	426686	4290732
35	35576	50926	127566	501942	5013164
40	39405	56629	140603	550907	5477500
45	39786	57376	142332	557352	5528871
50	38889	56147	139362	546763	5421110
55	36644	53340	133535	524353	5200110
60	28808	41928	105541	416947	4189881
65	18608	28338	71144	283095	2889915
Females 18	9330	13989	37474	159096	1724683
20	8487	12591	33080	137433	1459396
25	16169	24228	64663	273876	2962646
30	19356	29263	79792	344666	3791677
35	21124	32216	89233	390368	4338905
40	22011	34023	94694	417847	4677026
45	21501	33528	93945	417192	4687619
50	20832	32570	91498	407854	4587785
55	19716	31055	87905	391810	4404796
60	15699	24405	68183	300539	3371773
65	12619	20390	56057	245703	2767659

(c) Total employment earnings

Total employment earnings were calculated for each year after 1985, as the sum, over all ages and for each sex, of the products of

(i) the population projected for the year at the given age and sex,

(ii) the projected age-sex-year average employment rate and

(iii) the projected age-sex-year amount of average employment earnings.