Canadian Studies in Population, Vol. 11 (1), 1984, pp. 47-60

POPULATION AGING: ITS FISCAL IMPACT IN SELECTED OECD COUNTRIES

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Résumé — Un nombre croissant de personnes âgées sous-entend une augmentation des pensions de retraite et des dépenses de santé. Là où les pensions de retraites et les soins médicaux proviennent des fonds publics, une "pression fiscale" risque de se produire, car la population en âge de travailler subit un impôt plus élevé. Cet article examine les implications fiscales d'une population vieillissante dans cinq pays de l'OCDE, tout en soutenant qu'une réduction des dépenses publiques sur la jeunesse devrait équilibrer le poids fiscal imputable à la population vieillissante au moins jusqu'à dans le siècle prochain. Il propose des mesures qui élimineraient entièrement cette pression fiscale potentielle.

Abstract — The growing number of elderly implies increased pension payments and health expenditures. Where pensions and health care are provided from public revenues, a "fiscal squeeze" can occur as the working-age population incurs a heavier tax burden. This paper examines the fiscal implications of population aging within five member countries of the Organisation for Economic Co-operation and Development (OECD). The paper argues that, at least into the next century, reduced public expenditures on youth should offset the tax burden which is due to population aging. It proposes certain measures that would eliminate altogether the potential fiscal squeeze.

Key Words — **fiscal implications of population aging**

Introduction

In Canada, as in most other countries of the Organisation of Economic Co-operation and Development (OECD), the aging population structure could have significant fiscal repercussions. This population aging is reflected in the growing proportion of the population aged 65 and over and in rising median ages. In Canada, for example, the proportion of elderly is projected to increase from a 1976 figure of 8.7 per cent to more than 11 per cent by the turn of the century, and the median age is projected to increase from 31 to 40. With the aging population structure, public expenditures on health and pensions will grow, placing a heavy tax burden on those in the working age group. Some authors have predicted a "fiscal crisis" as taxpayers renounce all obligations to the elderly, and according to this scenario this "crisis" could occur before the turn of the century (Calvert, 1977).

This paper attempts to estimate the fiscal burden of population aging for Canada and some other member countries of the OECD – the United States, West Germany, France and the United Kingdom. Although only five countries have been selected – largely because of data deficiencies for other countries – it is thought that the conclusions are applicable to more than these five. The initial section compares dependency ratios among countries, while the second section uses a simple model to estimate the fiscal burden. In none of the selected countries is the fiscal "crisis" immediate, for the aging population occurs concomitantly with a decreasing youth dependency ratio and also – except in the case of West Germany – with a growing number in the working age group. However, by the second and third decades of the next century, the increasing number of elderly may mean somewhat more onerous tax burdens. The final section suggests policies either to ease the tax burden, given the age structure, or to change the age structure itself, thus deferring or even averting the more alarmist scenarios.

Dependency Ratios

For those concerned with the age structure of populations, the concept of dependency ratios is critical. The concept attempts to measure how many dependents those in the productive years must support. Dependency ratios for the five OECD countries being studied are given in Table 1. As can be seen, the elderly dependency ratio (as defined in note 2 of

TABLE 1.
DEPENDENCY RATIOS 1976-2050 FOR FIVE OECD COUNTRIES

Decades	Canada			USA			West Germany			France			UK		
	Dy	De	Dt	Dy	De	Dt	Dy	De	Dt	Dy	De	Dt	Dy	De	Dt
1976	53	14	67	51	18	69	37	25	62	58	25	83	50	25	75
2000	31	18	49	43	20	63	25	23	48	50	24	74	46	24	70
2010	28	20	48	39	20	59	21	28	49	47	23	70	42	23	67
2020	27	27	54	40	23	63	22	28	50	47	27	74	42	25	67
2030	28	36	64	42	30	72	22	37	59						
2050-2070	27	37	64	42	30	72	21	38	59						

Source: Statistics Canada, Population Projections, Projection I Cat. No. 91-520 (occasional); US Bureau of Census Current Population Report, Series P-25; Karl Schwarz "La baisse de la natalite en Allemagne Federale. Population July 1978 pp. 999-1016; INSEE Projection de la Population Totale pour la France (Paris 1978); Office of Population Censuses and Surveys (mimeo).

Note 1: Projections are based on a total fertility rate of 2.1 in France and the USA, of an initial rate of 1.85 in Canada (falling to 1.50), and a net reproduction rate of 0.65 in West Germany. The West German projections apply only to the German population. For Canada the assumed net gain through immigration is 100,000 a year.

Note 2: Dy is the youth dependency ratio and is the number of young divided by the number of persons in the working age population (L); De is the elderly dependency ratio and is the number of elderly (those 65 and over) divided by Lt; and the total dependency ratio (Dt) is the sum of both youth and elderly dependency ratios. Dy refers to those below 20 years for France, to those below 19 years for Canada and the U.K., to below 18 years for the USA and to below 16 years for West Germany.

Table 1) is low in Canada, although unlike Germany, France and the U.K., it is projected to increase. In those latter three countries the ratio will decline until the turn of the century, as the increase in the elderly population is more than offset by the increase in the working age group. However, as Table 1 shows, Canada's ratio is projected to remain below those of the European countries until well into the next century.

As for the total dependency ratio (which is the sum of both elderly and youth dependency ratios), projections indicate a decline, at least until the first decade of the next century. Canada's projected decline will be particularly sharp due to the age structure becoming rectangular and less pyramidal. In 1901, the young accounted for 41 per cent of the Canadian population, while at the apex of the pyramid the elderly accounted for five per cent. By the year 2031, the projections show a reversed pyramid with a smaller proportion of young (17 per cent) than of elderly (22 per cent). In Canada and the U.S.A., the increase in elderly dependency ratios occurs concomitantly with a larger decrease in youth dependency ratios, so that total dependency ratios fall.

However, after the year 2010, total dependency ratios start to climb in Canada, France, Germany and the U.S.A. Given the assumed fertility and immigration rates underlying the projections (see note 1 of Table 1), the increase in total dependency ratios will be particularly sharp in Canada and West Germany due to rising elderly dependency ratios. Both in Canada and West Germany, the elderly are projected to approach one-quarter of the population by 2040, but the absolute number of elderly in Canada will increase, whereas in West Germany there should be a decrease (which will be more than offset by the decline in the working age group between 1988 and 2040). In the U.K., on the other hand, projections show stable youth and elderly populations, with a small increase in the working age population. The result is a constant total dependency ratio.

Fiscal Implications

Will the projected increase in elderly dependency ratios impose a fiscal burden on taxpayers, or will reduced expenditures on youth more than offset increased public expenditures on the elderly? This section attempts to estimate public support costs of the elderly, particularly for health care and pensions, and compare them with support costs of the youth.

Health expenditures already account for a high proportion of Gross National Product (GNP) in the OECD countries. With an elderly dependency ratio of 14 per cent in 1976, the share of health in Canada's GNP was 6.8 per cent – approximately the average of the other OECD countries (Boulet and Grenier, 1978). Population aging can be expected to increase this share (Denton and Spencer, 1975a), for the relationship between health expenditures and age can be represented by a U-shaped

curve. Per capita costs decrease rapidly up to about age 10 and then increase; average expenditures per elderly person are approximately eight times that of an average 10-year-old (Denton and Spencer, 1975b). For the very elderly of 75 and over, average per capita costs may be 20 times more than for the age group 10-14 (Boulet and Grenier, 1978). In Canada, the elderly in 1976 were less than nine per cent of the total population and yet consumed 15 per cent of physicians' services and 37 per cent of hospital services. If this usage persists and the elderly account for 22 per cent of the population as forecast for the year 2031, they alone will need 31 per cent of physicians' services and 60 per cent of hospital services. In absolute numbers this means 57 million patient-days per year or 104 per cent of present maximum capacity (Statistics Canada, 1978). The Canadian data conform to other OECD countries. In the U.K., the elderly in 1976, while approximately 14 per cent of the population, accounted for almost 38 per cent of capital and current health expenditures (United Kingdom, 1979) The per capita health cost of those over 65 approaches three times that of the population as a whole, a ratio similar to that of Canada. For those 75 and over, costs increase sharply, with the number of hospital patient-days per head almost triple that of the age group 65-69. This is a cost ratio significant for Canada where those 75 and over could account for 42 per cent of the elderly by 2031.

Pensions are another expenditure which reflects population aging. By the mid-1970s, government security payments to the elderly accounted for approximately 6.8 per cent GNP in France, 3.1 per cent in the U.S.A. and 9.1 per cent in West Germany (Organisation for Economic Cooperation and Development, 1976). Payments from the Canada Pension Plan (not including the Province of Québec) are projected to increase (in current dollars assuming three per cent annual inflation) from $814 million in 1976 to $13 billion by the year 2000 and to $87 billion by 2025 (Pesando and Rea, 1977). Given population projections, continued phasing-in of public pensions and slow economic growth, Canada and Québec Pension Plans combined could account for seven per cent of GNP by 2031, compared with three per cent in 1976 (Patterson, 1980). The aging population, therefore, will mean rising health and pension expenditures.

On the other hand, the proportion — and in some countries, the absolute number — of youth will decrease, yielding possible savings on education, crime prevention and family allowance payments. To estimate the fiscal impact of the changing age structure, the Clark model is assumed in which the youth (as defined for each country in Table 1) and the elderly require publicly financed expenditures (Clark and

Spengler, 1980). These expenditures are financed through taxes on the employed. Thus in each period t,

$$(T_{1t}\, Y_t)\,(N_t L_t) = B_{1t} H_{1t} \tag{1}$$

and

$$(T_{2t}\, Y_t)\,(N_t L_t) = B_{2t} H_{2t} \tag{2}$$

where

T_1 = tax rate to support payments to the youth
T_2 = tax rate to support payments to elderly
Y = average income of employed workers
L = working age population
N = fraction of L employed
B_1 = average benefits to youths
H_1 = number of youth dependents
H_2 = number of elderly dependents
B_2 = average benefits to elderly

Equations 1 and 2 can be written

$$T_{1t} = b_{1t}(H_{1t}/N_t L_t) \text{ where } b_{1t} = B_{1t}/Y_t \tag{3}$$

and

$$T_{2t} = b_{2t}(H_{2t}/N_t L_t) \text{ where } b_{2t} = B_{2t}/Y_t \tag{4}$$

Taking the logarithm of both equations and differentiating with respect to time, we obtain

$$\frac{\dot{T}_{it}}{T_{it}} = \frac{\dot{b}_{it}}{b_{it}} + \frac{\dot{d}_{it}}{d_{it}} - \frac{\dot{N}_t}{N_t} \text{ where } i = 1 \text{ or } 2;\ d_{it} = \frac{H_{it}}{L_t} \tag{5}$$

Equation (5) relates, in terms of their rates of growth, the tax rate required to support dependent group i (T_i) to that group's benefit level expressed as a fraction of average employment income (b_i), to its fraction in the population (d_i), and to the fraction of the working age population

employed (N). For any given growth path of the three right-hand variables, it is possible to determine the implied changes in the tax rates. For example, if b_i and N are assumed constant, it is possible to determine tax rates necessary for future support costs as a percentage of their 1976 equivalent. To determine respective benefits paid for by taxpayers, the health costs disaggregated by age cohorts, pension payments, primary and secondary education expenditures and family allowances must be estimated. Since expenditures are rarely disaggregated by age groups, such estimates must be crude. However, one study for Canada estimated the public cost of an old person compared to a youth at 1.7:1 (Table A1) (Ridler, 1979). For the U.S.A., the relative cost of an elderly person may be three times that of a youth (Clark, Dreps and Spengler, 1978). Using both estimates, the fiscal impact of the aging population structure can be derived from Table 1. If we assume different relative costs of an elderly person to a youth are 1.7 times greater (T^L) or three times greater (T^h), the total tax costs can be calculated as a percentage of 1976 costs. This is shown in Table 2.

The table indicated that none of the five countries faces an immediate fiscal crisis. Indeed, in both Canada and the U.S.A. the tax burden of supporting dependents will remain below the 1976 level well into the next century. Even assuming the "high" relative cost of 3:1 for supporting elderly as compared with youth, the 1976 tax rate is not equalled until 2020; with a lower relative cost of 1.7:1, not until 2030. In West Germany, the tax rate will not equal the 1976 rate until 2030 whichever projection is used. For France and the U.K. — which have shorter projections — their tax rates to support dependents will be below those of 1976

TABLE 2.
TAX RATES FOR SUPPORT OF TOTAL DEPENDENTS

	Canada		USA		West Germany		France		UK	
	T^L	T^h	T^L	T^h	T^L	T^h	T^L	T^h	T^L	T^h
1976	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
2000	.79	.89	.94	.99	.80	.84	.89	.92	.94	.94
2010	.79	.98	.90	.94	.86	.94	.85	.87	.87	.89
2020	.95	1.1	.97	1.0	.87	.95	.92	.96	.91	.94
2030	1.2	1.4	1.1	1.3	1.1	1.2				
2050–2070	1.2	1.4	1.1	1.3	1.1	1.2				

at least until 2020. Both countries, however, show rising tax rates after 2010, suggesting that eventually tax rates to support dependents will equal those of 1976.

Thus the table suggests that the aging population will not impose an immediate burden on taxpayers. The declining youth dependency ratios mean that public expenditures on education and family allowances should fall in real terms, thus providing relief to taxpayers. Only into the next century will the public cost of supporting the elderly not be offset by these falling expenditures on youth. At least until 2020, tax rates to support dependents should remain below those of 1976.

Policy Implications

While being sanguine about the immediate impact of population aging, this paper does not argue for complacency. For with present projections and policies, a heavier tax burden will be felt in the 2020s. To lessen the burden that an aging population may impose in the second and third decades of the next century, policies to increase the number of taxpayers or to change the age structure itself may be necessary. The latter option has been regarded in Canada as ethically distasteful; however, the federal government may be reconsidering its opposition. Demographic policies have already been implemented in France and West Germany, as well as in some of the Eastern European countries (Pressat, 1979). The aim is to raise fertility rates, thereby producing taxpayers for the years after 2020 when population aging may otherwise prove more burdensome.

Even given the age structure there are policies that could ease the tax burden. In the first place, alarmist predictions often ignore how economic growth (through rising capital-labour ratios) affect the tax burden (Denton and Spencer, 1981). According to one study, with an annual real economic growth rate of 4.6 per cent, the proportion of GNP absorbed by pension payments would be no higher in 2021 than in 1976 (Stone and Maclean, 1979). This proportion of course depends on whether benefits per capita are assumed to increase at the same rate as economic growth per capita; but as the Special Senate Committee noted, rising real incomes would permit benefits to be transferred to dependents without increasing tax rates (Canada, 1979). In addition to economic growth, another policy to ease the tax burden is to privatise some of the social costs of the elderly. In Japan, approximately 70 per cent of the

elderly live with their family (Maruo, 1981). The effect is that, as with children, many costs are borne by the family.

Given the age structure, another policy to ease the tax burden would be higher growth of the "employment participation rate." Higher activity rates would provide more taxpayers for a given age structure. Within the OECD, activity rates vary widely. More than two-thirds of Japanese aged 15-64 work, but scarcely one-half of Italians of the same age group do (OECD, 1974). This is partly due to participation rates among women. Less than 30 per cent of Italian women aged 15-64 are in the labour force, compared with 53 per cent in Japan. In Canada the total participation rate is 64 per cent, with the rate for women at 46 per cent. However, increases in the labour force participation rate have their limits. Between 1966 and 1980, total participation rates in Canada increased at an average rate of 0.5 per cent a year, but while female participation rates grew by an annual average rate of more than one per cent, those of adult males actually fell. Given the age structure, further increases in participation rates might be obtained by eliminating mandatory retirement. Those over 65 might choose to continue working for financial or personal reasons, thereby providing more contributors to, and fewer (after tax) beneficiaries of, the Canada and Québec pension plans than forecast by actuarial models. In Japan, for example, 27 per cent of the elderly continue to work, and surveys show that 77 per cent of the elderly would like to work (Maruo, 1981). In Equation 3 and Table 1, the effect would be to reduce elderly dependency ratios, since "working age group" and "elderly" would be redefined. As Stone and Maclean argue, a modest rise in employment and participation rates of the elderly in Canada would achieve significant reductions in future pension payments. A similar observation has been made for France (Le Bras and Tapinos, 1979). The Canadian Special Senate Committee has advocated specific measures to increase employment rates among the elderly.

In addition to these policies, modification of the age structure itself may be feasible. Most OECD countries have more applicants for immigration than are accepted. By easing immigration quotas, a change of age structure could be achieved. Immigration – particularly of those in the working age group – has the advantage of reducing dependency ratios and of providing taxpayers, but its potential impact on the age structure appears to be small (Denton and Spencer, 1981). A more efficacious means of changing the age structure is that of increased fertility, although at least in the short-run total dependency ratios are also increased. However, the underlying causality of fertility has not been

established, although socio-economic theory provides a plausible explanation (Leibenstein, 1981). According to this theory, certain variables associated with economic development will reduce the desired number of children. Urbanisation, women's education and their income are among the variables that would reduce the supply of, and the demand for, children. Empirically, the data appear to support the theory. The elasticities of fertility with respect to urbanisation and to women's education are high (Schultz, 1976). Policies to increase fertility would therefore offer incentives, subsidies and amenities or would attempt to change preferences (Girard and Roussel, 1982). In West Germany, for example, concern over declining fertility rates has prompted an increase in family allowances and an extension of postnatal leave to six months (the first two months on full pay). In France, considerable subsidies are offered to large families. In Czechoslovakia, a baby bonus of approximately US $200, maternity leave of up to 35 weeks (at 90 per cent of net earnings) and a generous maternity allowance have apparently increased fertility rates (Czechoslovakia, 1978). Other East European countries have attempted to raise fertility through a combination of incentives and job guarantees for expectant mothers. The efficacy and the morality of such policies are open to question, but concern over population aging (and even decline in some countries) suggests that they may become common throughout much of the OECD.

Conclusion

Population projections suggest that many of the OECD countries face aging population, with rapid aging occurring particularly in the early decades of the next century. The immediate future should see a lower total dependency ratio (except in Japan) yielding tax savings on education, family allowances and other expenditures, but the next century shows a higher tax burden as the early cohorts of the "baby boom" reach retirement. Certain policies, however, might be instrumental in deferring, or even averting altogether, this heavier tax burden.

Acknowledgment

The author would like to express his thanks to two anonymous referees who improved this paper considerably.

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Received September, 1980; revised March, 1983.

TABLE A1. PUBLICLY FINANCED BENEFITS FOR THE ELDERLY

By fiscal year in millions of dollars.

	1976	1977	1978
Old Age Security and Guaranteed Income Supplement[a]	4,436.9	4,861.2	5,491.1
Canadian and Quebec Pensions Plans (retirement only)[b]	568.5	735.6	931.4
Health Expenditures (20%)[c]	2,036.4	2,199.0	2,407.8
Total	7,041.8	7,795.8	8,830.3
Total as a Percent of Total Government Expenditures[d]	9.1	9.0	9.2
Total as a Percent of GNP	3.7	3.7	3.8

Sources: Statistics Canada, Consolidated Government Finance Cat. No. 68-202. Statistics Canada Social Security 1978. Cat. No. 86-201.

a. This excludes other programmes such as the Guaranteed Annual Income Supplement, Ontario Tax Credit and Income Tax Provisions.

b. Payments to pensioners accounts for approximately half the total payments of the CPP and QPP.

c. This refers to total health expenditures. The 20% is an estimate based on the fact that the elderly account for 30% of the available patient days (although 9% of the total population) Statistics Canada, Social Security 1978. (86-201) page 18.

d. Some of the programmes are not out of general revenue but are paid by contributors (CPP/QPP).

TABLE A2. PUBLICLY FINANCED BENEFITS FOR THE YOUTH

By fiscal year in millions of dollars.

	1976	1977	1978
Education[a]	8,785.5	9,989.0	10,807.0
Health (32%)[b]	3,258.2	3,518.4	3,852.5
Family Allowances	2,095.2	2,273.5	2,250.6
Youth Offences[c]	1,547.6	1,839.1	2,015.6
Total	15,686.5	17,620.0	18,925.7
Total as a Percent of Total Government Expenditures	20.4	20.4	19.7
Total as a Percent of GNP	8.2	8.4	8.2

Sources: Statistics Canada, Consolidated Government Finance, Cat. No. 68-202. Statistics Canada, Social Security 1978, Cat. No. 86-201.

a. Only includes primary and secondary education.

b. The 32 per cent reflects the proportional distribution of the youth in the total population. Used as a proxy for lack of more adequate data. Health refers to total expenditures on health.

c. Estimated on the basis of the expenditures on law courts, correctional services and police. (approx. 36% of the total spent on protection of persons) plus on the incidence of crime by age (juvenile delinquency rate is twice the crime rate for those over 16 years old; hence a double weight was given to the distribution of youth in the total population).